Study of ERP Adoption in Indian Firms and Development of Sustainable Business Model

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2023

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Index No.-38/16/E

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3. List of Publication:

Journal Publication:

I. **Saha, Ipsita** & Kundu, Amit & Ghosh, Sadhan.(2020). Development of Sustainable Business Model: A Conceptual Framework for the Financial. International Journal of Sustainable Development And Planning (IJSDP), Volume 15, Number 8, 2020

Link: http://www.iieta.org/journals/ijsdp/paper/10.18280/ijsdp.150818

II. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh "Organizational Perspective of Critical Success factor to establish ERP as a Sustainable Solution" published in UGC approved journal Kindler VolXVII Jan-Jun17 published by Army Management Institute.

Link: https://www.aim.ac.in/sites/default/files/KindlerVolXVIIJanJun17_Final.pdf

Book chapter

I. **I. Saha I.**, Kundu A., Ghosh S.K. (2020) A Business Model for Enterprise Resource Planning (ERP) by Establishing a Sustainable Supply Chain Management. In: Ghosh S. (eds) Waste Management as Economic Industry Towards Circular Economy. Springer, Singapore. https://doi.org/10.1007/978-981-15-1620-7_10.

Link: https://link.springer.com/chapter/10.1007/978-981-15-1620-7_10

II. **Saha I.,** Kundu A., Ghosh S.K. (2020) Exploring the Rationale Between ERP and EPR in Asian Countries Using Cloud-Based Approach. In: Ghosh S. (eds) Sustainable Waste Management: Policies and Case Studies. Springer, Singapore.DOI: https://doi.org/10.1007/978-981-13-7071-7_2

Link: https://link.springer.com/chapter/10.1007/978-981-13-7071-7_2

III. **Saha I.,** Kundu A., Ghosh S.K. (2019) A Study to Establish an Energy-Efficient

Sustainable Business Model in Virtual ERP. In: Ghosh S. (eds) Waste Management and Resource Efficiency. Springer, Singapore. https://doi.org/10.1007/978-981-10-7290-1_96.

Link: https://link.springer.com/chapter/10.1007/978-981-10-7290-1_96

IV. Baidya R., **Saha I.**, Bhattacharya T., Ghosh S.K. (2020) Sustainable Waste Transportation in Kolkata Using DBMS and Image Sensing. In: Ghosh S. (eds) Waste Management as Economic Industry Towards Circular Economy. Springer, Singapore. https://doi.org/10.1007/978-981-15-1620-7_13

Link: https://link.springer.com/chapter/10.1007/978-981-15-1620-7_13

V. **Saha, Ipsita** & Kundu, Amit & Ghosh, Sadhan. (2022). Waste Management Strategy of SME Sector towards Environmental Sustainability. Effective Waste Management and Circular Economy.DOI: 10.1201/9781003231608-9.

Link:https://www.researchgate.net/publication/362063891_Waste_Management_Strategy_of_SME_Sector_towards_Environmental_Sustainability

VI. **Saha, Ipsita** & Kundu, Amit & Ghosh, Sadhan. (2022). A Decision Support System for Environment-Friendly Sustainable Model of IT Service Sector Industries. Effective Waste Management and Circular Economy.

Link:https://www.taylorfrancis.com/chapters/edit/10.1201/9781003231608-21/decision-support-system-environment-friendly-sustainable-model-service-sector-industries-ipsita-saha-amit-kundu-sadhan-kumar-ghosh

4. List of Patents: Nil

5. List of Presentations in National/ International Conferences/Workshops:

I. **Ipsita Saha**,Amit Kundu,Sadhan K Ghosh "Adoption of Enterprise System in the SME Sector of India-A Conceptual Study"- International Conference on E-Business and Supply Chain Competitiveness(EBSCC 2016) at IIT,Kharagpur, 12-14 Feb,2016.

II. **Ipsita Saha**, Amit Kundu Sadhan K Ghosh "A Study to Establish an Energy Efficient Sustainable Business Model in Virtual ERP", 6th International Conference on Solid Waste Management, 6th IconSWM 2016, Jadavpur University, Kolkata, India, November 24 - 26, 2016.

III. **Ipsita Saha** , Amit Kundu, Sadhan Kumar Ghosh "A Study of Cloud Based Solution for Supply Chain Management" - Second International Conference on Internet of Things, Data and Cloud Computing, ICC'17, Cambridge city, Churchill College.

University of Cambridge, United Kingdom. 22-23 March 2017.

IV. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh "Role of Big Data Analysis and Internet of Things in Implementation of Smart City"-International Conference on Modelling, Computing and Technological Innovations on February 9-11, 2017, UIT, Burdwan, West Bengal.

V. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh "Novel Approach for Laptop & Cell Phone Waste Management using Cloud Based Data Storage Systems"- The Thirty-Second International Conference on Solid Waste Technology and Management, Philadelphia, PA, USA , March 19-22, 2017.

VI. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh "Exploring the rationale between ERP and EPR in Asian Countries using cloud based Approach" published in 7th International Conference on Solid Waste Management at PJTSAU, Hyderabad, Telengana on 15th -17th December,2017.

VII. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh "Organizational Perspective of Critical Success factor to establish ERP as a Sustainable Solution" published at 11th ISDSI International Conference at Indian Institute of Management Tiruchirappalli on December 28 - 30, 2017.

VIII. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh "Cloud Computing Based Sustainable Approach towards E-waste Management in India" published at International Conference on Waste Management "RECYCLE-2018" at Indian Institute of Technology Guwahati, Guwahati, India on 22-24 February,2018.

IX. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh "A Business Model for Enterprise Resource Planning (ERP) by Establishing a Sustainable Supply Chain Management" published in 8th International Conference on Solid Waste Management at Achharyya Nagarjuna University, Vijaywada from 22nd -24th November, 2018, pp. 160 – 165.

X. Rahul Baidya, **Ipsita Saha**, Tapobrata Bhattacharya, Sadhan Kumar Ghosh "Sustainable Waste Transportation in Kolkata Using DBMS and Image Sensing" published in 8th International Conference on Solid Waste Management at Achharyya Nagarjuna University, Vijaywada from 22nd -24th November, 2018, pp. 306 – 311.

XI. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh, "Critical Success Factors in ERP Implementation in Financial Service Sector of India: an integrative model", 7th India Biodiversity Meet at International Conference 19 - 21 November, 2019 at Indian Statistical Institute, Kolkata.

XII. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh, "A Decision Support System for Environment Friendly Sustainable Model of IT Service Sector Industries", 9th International Conference on Solid Waste Management towards Circular Economy (9th IconSWM-CE) during November 27 - 30, 2019 at KIIT (Kalinga Institute of Industrial Technology), Bhubaneswar, Odisha, India.

XIII. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh, "Waste Management Strategy of SME Sector towards Environmental Sustainability", 9th International Conference on Solid Waste Management towards Circular Economy (9th IconSWM-CE) during November 27 - 30, 2019 at KIIT (Kalinga Institute of Industrial Technology), Bhubaneswar, Odisha, India.

XIV. Raktim Dasgupta, **Ipsita Saha**, Sadhan Kumar Ghosh, "Circular Economy Implementation in SMEs in India", 10th International Conference on Solid Waste Management towards Circular Economy (10th IconSWM-CE) during December 2-7, 2020 at Jadavpur University, Kolkata, India.

XV. **Ipsita Saha**, Amit Kundu, Sadhan Kumar Ghosh,, "A Case Study Investigation Implementing Circular Economy In Sustainable Business Model Of Indian Industrial Sector", 12th Sustainable Waste Management & Circular Economy and IPLA Global Forum 2022 during November 30 - December 03, 2022, at Sri Venkateswara University, Tirupati, Andhra Pradesh, India.

Statement of Originality

I, **Ipsita Saha,** registered on **28/10/2016** do hereby declare that this thesis entitled "**Study of ERP Adoption in Indian Firms and Development of Sustainable Business Model"** contains literature survey and original research work done by the undersigned candidate as part of Doctoral studies.

All information in this thesis have been obtained and presented in accordance with existing academic rules and ethical conduct. I declare that, as required by these rules and conduct, I have fully cited and referred all materials and results that are not original to this work.

I also declare that I have checked this thesis as per the "Policy on Anti Plagiarism, Jadavpur University, 2019", and the level of similarity as checked by iThenticate software is **6 %.**

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CERTIFICATE FROM THE SUPERVISOR

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ACKNOWLEDGEMENT

The author expresses her deep sense of gratitude and heartiest thanks to Prof. (Dr.) Sadhan Kumar Ghosh, Professor & Ex-Dean, Department of Mechanical Engineering & Chief Coordinator, Center for Sustainable Development and Resource Efficiency Management (Formerly Centre for Quality Management System) and the Ex-Dean, Faculty Council of Engineering and Technology, Jadavpur University, Kolkata, India, and Prof. (Dr.) Amit Kundu, Professor & Dean, School of Management, Techno India Group, Kolkata for their valuable guidance, cooperation and significant research inputs at every stage of the work during the preparation of this thesis.

Prof. (Dr.) Sadhan Kumar Ghosh has always been available with his suggestions whenever required and has helped the author to bring her work to its final conclusion. His minute revisions and valuable comments have enriched the entire thesis deeply. He is a renowned personality in the field on Waste Management, Circular Economy, Green Manufacturing, Supply Chain Management, Sustainable Development and he highly encourages doing collaborative projects which has always uplifted the interest of the author to do new things in research. The author is truly indebted for the insights she has gained through focused discussion and deliberations while being with him throughout the research work.

Prof. (Dr.) Amit Kundu has devoted much of his valuable time to guide this research work. His innovative thoughts and exceptional analytical abilities have elevated this challenging research work to a completely new level, leading to an international recognition. He has given the freedom to form the author's own opinion while consistently offering the insightful advice that has highly been instrumental to the effective completion of this thesis. The author is deeply moved by the way he has supported the research growth. His tolerance, adaptability, and sincere concern has made the tenure of research truly comfortable and enjoyable.

The author expresses her thanks to Head of the Department of Mechanical Engineering and all the faculty members, technical assistants and staff members of Mechanical Engineering Department of Jadavpur University for their timely and untiring co-operation. The author is thankful to all the industries that have provided support during data collection and field study. The author expresses thankfulness to the International Society of Waste Management, air and Water (ISWMAW) and IconSWM-CE Platforms for their extreme support.

The author is thankful to all the members of Waste Management and Resource Efficiency Laboratory and Center for Sustainable Development and Resource Efficiency Management (Formerly Centre for Quality Management System) in Jadavpur University for their support and assistance in this whole work. The author expresses her thanks to the staffs of Waste Management Laboratory, Blue Earth Workshop and co-researchers in Jadavpur University for their cooperation and assistance for doing the works.

The author is grateful to the Principal, the management and all the faculty and staff members of Department of Computer Science & Engineering of Guru Nanak Institute of Technology for their encouragement and support.

The author expresses her gratitude towards her loving parents Shri Pradip Kumar Saha and Smt. Shyamali Saha and her in-laws Shri Tanay Kumar Routh and Smt. Sabita Routh for their endless sacrifice and encouragement; they had always been her support and provided her with a congenial environment throughout this journey. Without their blessings completion of this work would not have been possible.

The author humbly appreciates the patience and maturity shown by her little son Tanuj during the research period. Throughout the study, her husband, Tamasuk, has always stood by her and shared his concern. The voluminous field work would not have been possible without his support. The author is thankful for his support and understanding.

The author expresses her sincere thanks to all those who have helped her directly or indirectly to get closer to this accomplishment.

Above all, the author thanks the almighty whole heartedly for the abundant grace on her throughout this research work and for leading her to complete the thesis properly.

Ipsita Saha
Ph. D Researcher at Jadavpur University

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Abbreviations, Model Codes

Abbreviation	Full Description
BM	Business Model
BMI	Business Model Innovation
BPR	Business Process Reengineering
CFA	Confirmatory Factor Analysis
CFI	Comparative-Fit-Index
CMIN	Chi-square value
CMIN/DF	Chi-square to the degree of freedom
CSF	Critical Success Factor
EFA	Effective Factor Analysis
ERP	Enterprise Resource Planning
ES	Enterprise Systems
GDP	Gross Domestic Product
GFI	Goodness of Fit Indicator
IDC	International Data Corporation
IFI	Incremental Fit Index
IS	Information System
KMO	Kaiser-Meyer-Olkin
MRP	Materials Requirements Planning
RMSEA	Root Mean Square Error of Approximation
SBM	Sustainable Business Model
SBMI	Sustainable Business Model Innovation
SCM	Supply Chain Management
SMB	Small and medium-sized business
SME	Small and medium sized enterprises
SOTE	Strategic, Organizational, Technological & Environmental
TAM	Technology Acceptance Model
TLI	Tucker–Lewis Index
TOE	Technology-Organization-Environment
TRA	Theory of Reasoned Action

Executive Summary

During the previous two decades, organizations have looked at a scholarly research papers that have been published according to the literature that looks at how users adopt ERP systems using a Technology Acceptance Model (TAM). It was proposed by Davis (1989) that helps to explore factors that affect users' intentions to use ERP systems. It explains its perceived usefulness and purpose: to improve the ERP system's efficiency and effectiveness. Later on, Tornatzky and Fleischer (1990) created the TOE (technology, organization, and environment) framework, which models the effects of technological, organizational, and environmental contexts on a firm's adoption and implementation of technological advances.

Here in this study, the authors discussed the details of TAM, the TOE framework, the ERP evolution process, its implementation in developed and developing countries, the success factors, and the conceptualization of sustainable development of the business model in "Literature Review" (Chapter 2). The authors considered sources in scholarly journal articles, conference proceedings, book chapters, standard reports, etc. The authors discussed the research gap, research questions, problem statements in the "Purpose of the Study" (Chapter 3), and also, explores the theoretical framework for the ERP Implementation Strategy. A strategic model incorporating four analytical domains (strategy, organization, technology, and environment) for managing the implementation of ERP was proposed. The validity and justification of the proposed theoretical framework were critically analyzed in the subsequent chapters.

In Chapter 4, "Research Objective," the formulated problem statement was mapped to the research gap and objective/s of the study, and the correlation among different branches was there. An attempt has been made to explore all the parameters associated with SOTE framework (Strategic, Organizational, Technological and Environmental) and then, identify the Critical Success Factors (CSFs) of each domain for the successful adaptation of ERP system in the organizations of the three identified sectors considered for the present study, namely, Financial, IT/ITeS and Manufacturing Sector of Indian origin.

In Chapter 5, "Research Design and Methodology," a structured questionnaire was developed based on the four domains, e.g., strategic, organizational, technological, and environmental, and all possible surrogate measures of the four constructs were explored with the exhaustive study of past research studies and by interactions with industry experts in the relevant fields for the incorporation of the same, which would be significant in the context of Indian business. A pilot survey tested the validity and reliability of the questionnaire, and modifications to the questionnaire were made. Then, survey work was conducted in the selected organizations that have implemented ERP in their organizations. All those organizations are purposively selected from the three sectors, namely, Financial, IT/ITeS and Manufacturing Sector. The responses from the senior executives regarding the experience of handling the ERP projects were registered.

The data collected through the survey of the end users' of ERP system, using observable variables of four domain, is subjected to an exploratory factor analysis (EFA) process to

identify the latent constructs of users' intention towards ERP adaptation. The initial factors identified using EFA are confirmed using confirmatory factor analysis (CFA). The critical factors were estimated using structural equation modeling. Structural equation modeling (SEM) is used to help in identifying the relationships between the various latent constructs of the four mentioned domains that influence the adaptation of the ERP system in the organization/s.

In Chapter 6, the results of the financial sector were discussed, and a Sustainable Business Model (SBM) was proposed for the financial industry. Chapter 7 discussed the IT/ITeS service sector findings and proposed an SBM. Similarly, in Chapter 8, the result of the manufacturing industry was discussed, and an SBM was submitted for the manufacturing sector.

Then, in Chapter 9, "Case Research," the authors conducted interviews with the key personnel with the five participating small and medium enterprises (SMEs) of the manufacturing sector of India. All the participating organizations who had already implemented integrated ERP/ customized ERP were interviewed. These SMEs sought out ERP systems in order to gain a competitive edge by integrating key business processes. The article aimed to study and discuss pertinent factors influencing Indian organizations, especially SMEs, to adopt managerial strategies for creating a sustainable business model. This study begins by illustrating the business model domains, namely, the value network, customer value proposition, and interface dimensions, within which the company can create the supply chain modules. The entire supply chain structure validates our proposed sustainable business model formulated for the manufacturing sector.

This research makes several contributions. We can conclude that SOTE (Strategic, Organizational, Technological, and Environmental) capabilities directly impact the ERP implementation in the industrial sector. The design flow and assessment of the model boost organizational readiness, overall productivity, and the supply chain environment. The proposed SOTE framework will guide the managers in establishing a sustainable business model for the financial, IT/ITeS, and manufacturing sectors. The current researchers attempted to bring attention to the variances in the sets of essential success criteria for ERP deployments in India's SME sector units. Future studies should concentrate on these variants to elucidate the underlying mechanisms. It might look at the strategy in Financial, IT/ITeS and Manufacturing industries and the latest findings could be applied to countries other than India.

Chapter 1

Introduction

1.1 Background of the study:

Sustainable development can meet human needs without considering the requirement of future generations to be achieved, and companies can take part in it (Loorbach et al., 2013). Though most companies follow traditional methodologies, the trend is to follow sustainable practices (Ehrenfeld & John, 2008) ensuring that the companies need to enhance the present technology and production procedures. The industries that overlook incorporating the upgraded version of the technology (Keskinand Duygu, 2015) may face specific problems that may prevent the supply chain of that organization. The supply chain affects industrial metabolism (Prieto-Sandoval et al., 2018); hence, industries try to integrate all their different functional modules within their business model. This integration of information with a shared database ability to handle the business processes (Trieu et al., 2010) is called Enterprise Resource Planning-ERP. ERP is a part of Enterprise Systems (ES) that can integrate different processes starting from ensuring raw materials to product delivery.

The business model involves organizational development, Business Process Reengineering, ERP systems, and Information System Planning (Montilva et al., 2000). Despite the effective application of ERP systems in the manufacturing sector, many organizations face financial issues (Abu Al-Rejal, 2016). They cannot use ERP within the information system (IS) (Wang et al., 2008). The reason behind this failure is the improper identification of critical success factors (CSFs).

Industry reports indicate that significant practitioners worked on this to find out a generic model that can be followed by many industries (Sarkar et al., 2016). Based on the survey instrument, latent constructs were estimated, and a generic model specially designed for Indian firms will guide the managers in establishing a sustainable ERP system optimizing the consumption of resources (Daae et al., 2016, Wang et al., 2019).

1.2 ERP implementation across the globe

Regarding employability in the world economy, the employment rate is shifting towards developing countries like India and China. In contrast, most industrialized countries like North America and Europe flourish in service sector employment (Léo & Philippe, 2006). In the "post-manufacturing world" (Chesbrough & Spohrer, 2006), the service SMEs became

the economic engine for industrial and knowledge-based organizations. Merchant and Gaur, 2008; Oliveira and Fortunato, 2008 emphasized various sectors, and it has been observed that the service sector industry has been inadequately studied compared to the manufacturing sector.

1.2.1 ERP used in developed countries

ERP is vastly used in developed countries, and service and manufacturing industries adopt ERP systems to automate and streamline the process to reach global competitiveness. USA was ERP development's prime target, having 66% revenues for the vendors. Before 2000 there was a significant problem regarding Y2K, and many changes were incorporated into the ERP system. As a result, industries included e-commerce within the ERP system and added features such that the ERP can communicate well with the customers and suppliers (Zhenyu & Prashant, 2001).

In the ERP market, Europe holds the second position as it has a target of 22%. SAG, Baan, JBA International, AG, and Intentia only started their business in Europe (Zhenyu & Prashant, 2001).

Another developed country like Japan has a big ERP market, but many Japanese companies export their products to other Asian countries where ERP is not used massively. As Japan's associated countries are not very interested in using ERP, Japan has lesser ERP usage. Another reason behind this is the excessive population that leads the country to improve human involvement rather than shifting everything to an integrated system. Japan's organizational culture and the local environment are somewhat responsible for this situation. Though in Japan, ERP use is not vast, the supply chain market indicates a great hike. In 2021, there were 403 private transactions between Japanese corporations and foreign companies for over $67 billion, compared to 37 public transactions of $21 billion (M&A Report 2022: Japan). In April 2022, retail sales in Japan increased by 2.9 percent year over year, beating market expectations of 2.6 percent and following a downwardly revised 1.7 percent gain the month before (M&A Report 2022: Japan).

As North America and Europe, both have booming IT industries, adopting all the new technologies are very much essential for the firms. Among the developed countries in North America, Europe has occupied a vast ERP market with an environmental and national perspective and a robust economic base. In developed countries companies focus on SMEs,

and ERP includes electronic commerce, supply chain management and decision support mechanisms (Mahmood & Khan & Bokhari, 2019).

1.2.2 ERP used in developing countries

However, it is clear from research studies that developing countries confront additional hurdles, such as infrastructure, economic, and cultural issues resulting in a high rate of ERP deployment failure (Sun, Ni, and Lam, 2015). Only 10 to 15 percent of ERP research was conducted in developing nations; the majority of research investigations were conducted in industrialized nations. However, the number of ERP implementations is increasing. In emerging countries, such as India, the predicted market is worth Rs. 400,000 million, with an expected increase. Though ERP implementation is significant, it involves high risk and high cost.

Vendors of ERP software are expanding globally. The countries of Asia-Pacific and Latin America are leading the way. The Asia-Pacific ERP market accounts for 9% of total revenue, while Latin America accounts for 3%. The main reason is economic expansion, particularly in Asian countries. Western corporations pressure firms in developing countries to pursue information technology aggressively. In developing countries, ERP is still in its infancy. Inadequate IT infrastructure, government policies, small company size, and lack of IT support significantly impact the decision to adopt.

In recent years, China's economy has grown at an unprecedented rate. It is undergoing a technological transformation, with the public and private sectors investing heavily in information technology. However, ERP systems are only used by a small number of businesses.

Indeed, cultural differences significantly influence the ERP system deployment in nations where the culture is vastly different from that of the ERP vendor. According to the literature, China is one of the countries with a high failure rate when it comes to implementing foreign - western - ERP systems (Zhang et al., 2005). When the enforced ERP culture differs from the users', it affects communication, organizational structure, how technology and business are regarded, and legal requirements. It produces resistance to change in all users (Zhang et al., 2005) and the "method of conducting business" (Simchi-Levi et al., 2000) can be influenced by country differences in national culture, language, administration style, politics, rules, and customs (Carton & Adam, 2003).

Many authors claim that organizational culture is essential during multisite ERP system rollouts and that it is required to recognize the unique social context, primarily when the ERP business model is based on western practices (Shah et al., 2011). Chinese business culture is very much different than western culture. Furthermore, failing to adapt ERP products to meet the national culture may result in project delays and overruns (Krumbholz et al., 2001). Significant challenges of China in implementing ERP are local culture, Management culture, Cultural change, Information flow, Communication culture, and language.

The 'guanxi' is one of the most critical aspects of Chinese culture, which means that company profiles can be affected due to interpersonal problems between individuals. However, the Chinese people use 'guanxi' as a lucky charm for business as the relationship between two enterprises or individuals provides benefits in the long run (Marble & Lu, 2007). For example, we can say that a supplier usually accepts emergency orders if the supplier is at the top of the priority list of customers.

Organizations in underdeveloped nations have several challenges in using ERP to improve their business processes and gain a competitive advantage. Heeks (2007) believed that the malfunctioning ICT sector substantially impacts organizational readiness in China, India, and Brazil. In many countries, the situation is even worse for Small and Medium Enterprises (SMEs). SMEs must usually invest in ERP systems to deal with significant vendors. Because ERP necessitates large investments to establish a well-integrated IT infrastructure, SMEs have difficulty financing such investments. These businesses are hampered by a fragmented infrastructure, a lack of funds, and a low IT maturity level (Seethamraju & Seethamraju, 2008). The fragmented infrastructure had acted as a roadblock to integrating business partners, notably improving communication with suppliers via SCM systems. According to Laukkanen et al., 2007, organizations in developing nations have challenges due to a lack of resources, funding, and infrastructure. Large businesses benefit frsom more significant infrastructure and ICT capabilities, which can significantly impact ERP installation (Mabert et al., 2003). Furthermore, Mahmood & Khan & Bokhari, 2019 stressed that the need for a managerial approach to enable “Business Process Reengineering-BPR” and organizational change would not be forthcoming without management's purpose to plan for and commit to change.

1.3 Implementation of ERP with special reference to SME sector

ERP is becoming a more widely recognized platform for SMEs. To reengineer corporate processes and obtain a competitive advantage ERP is a successful strategy (Gable & Stewart, 1999). ERP software is particularly effective for integrating a worldwide corporation and creating a "common language" across departments. To achieve product line synergy, companies must create data and common business applications which are consistent across all business divisions. The global economic slump has spotlighted numerous businesses of all sizes during the last few years. The situation also impacted small and medium businesses in India. On the other hand, large institutions have attempted to address the issue uniquely, and small businesses bear the brunt of the burden.

Small and medium businesses (SMBs) in India represent higher than 60 percent of the country's Gross Domestic Product (GDP). Because of their growth potential, ERP providers are focusing their efforts on SMBs by providing tailored and less expensive solutions from both an organizational and technology standpoint (Chen, 2001). The SME sector in India is a vibrant, dynamic, adaptable, and productive entity, with over 12 million units and about 30 million people employed. When quantitative restraints were lifted, it was widely anticipated that the industry would collapse under the onslaught of international goods (Basu et al., 2012). On the other hand, the industry immediately changed and reorganized to take on the competition. It adopted cutting-edge technology, embraced competitiveness and quality standards in industrial economy.

The great majority of SMB face many resource restrictions. There is a question that implementing ERP systems may aid in their growth, despite the fact that many Indian SMEs discount the advantages of doing so and assert that such software is out of their price range. According to a poll done by International Data Corporation (IDC), less than 35% of SMEs are aware of enterprise business applications, compared to over 80% of large firms. Compared to large businesses, SMEs have lower awareness of deploying enterprise business applications—less than 35%, according to the survey report by IDC. To raise labour and capital productivity, lower fixed costs, and boost overall business efficiency, there are some influencing business drivers for the SME market. According to studies and polls conducted by well-known IT vendors, business enterprises from different cities in India also need ERP systems. This is in line with research and surveys conducted by different vendors (Rana et al., 2011).

Many SMEs were able to expand the operations into other nations and many of these businesses have changed their ways by acquiring businesses in other countries or adopting sophisticated business methods due to financial crisis. In terms of increased competitiveness and efficiencies, such an approach has brought them closer to their more giant business conglomerates. Indian enterprise are allowing themselves to become significant players by incorporating technological solutions and this technological advancement improves their entire brand image among export partners while increasing their chances of expanding in the local market.

As ERP systems are designed to achieve internal process integration (Kemppainen, 2004) covering all of the company's functional areas, SMEs invest in an ERP system. According to Basu et al., 2012, SMEs are concentrating on customer service and expansion strategies and they are more likely to grow. SMEs help to scale their business and as customer service is a crucial factor for the organization's growth, the SMEs prefers to be operated in urban areas. Davenport, 2000; Sumner, 2000 mentioned that some SMEs faced ERP problem due to installation failures or deployment failure.

1.4 Business sustainability using ERP

This study's goal is to uncover the many post-implementation sustainability characteristics that, from the perspective of ERP users, will give them a prolonged competitive advantage. This study is significant because it determines actual efficiencies from the perspective of ERP users that can preserve the ERP competitive advantage. This goes beyond simply outlining how ERP systems can benefit a business. The research's conclusion will give much-needed insights into how the firm's realized ERP benefits are impacted by user acceptance of ERP value.

Sustainability is a topic of interest in both the academic and business realms (Goni et al., 2015), and the basic principles of sustainability include the goal to maintain ecological balance, stop from resource exploitation, and safeguard the environment (Chofreh et al., 2016b). Human life is affected by environmental issues such resource scarcity (Ingrao et al., 2017), workplace factors (Wang, Greasley & Albores, 2015), and environmental damage (Liu et al., 2017).

To develop an integrated methodology organizations links sustainability modelling and reporting, they incorporated a number of concepts in the analysis (Ahmed and Sundaram, 2012), including sustainability systems and BPR. They argued that adopting sustainability should be seen as an

integrative process in which the environmental, social, and economic sustainability components must be integrated within organisation concurrently (Hahn et al., 2015).

Additionally, research shows that firms with unsustainable ERP implementations have a variety of reasons for this. Organizations install ERP systems as compared to traditional information systems (Kedia & Rajgopal, 2011) but ERP programs are almost pricey, with a one to two-year implementation timeframe. The successful installation of ERP systems also necessitates competent planning and supervision since it involves technological implementation (Kedia & Rajgopal, 2011).

The time element appears to be a crucial component in the process of implementing ERP because it has been shown in numerous studies that projects can fail even before they reach the final go-live stage in organizations (Baykasoğlu & Gölcük, 2017; Shao, Feng, & Hu, 2016). There are much more ERP project failures than success stories. In some literature (Mitra & Mishra, 2016) failure in leadership and management styles is highlighted (Mitra & Mishra, 2016). Only 13% of businesses accomplish their goals, and more than 50% of businesses adopt ERP poorly (Panorama Consulting Group, 2009). Due to the high financial cost of implementing ERP projects, Maditinos et al. (2012) noted that the failure rate of ERP implementations was on the higher side and also discovered that somewhere ERP initiatives exceeded their budgets. In a later study, Garg and Agarwal (2014) found that 75% of ERP projects either failed or were not approved. Research by Panorama Consulting Group 2017 of 342 ERP projects revealed that 66% were delayed, 74% had exceeded their budgets, and 37% had obtained less than 50% of the projected benefits. Alsayat & Alenezi, 2018; Simone et al.,2018).

ERP deployment was deemed challenging by Alsayat & Alenezi, 2018; Reascos and Carvalho, 2018 as changing an established environment, re - engineering, and improving work procedures are the firm's top concerns. The risks of using ERP in businesses are substantial (Kazmi, 2018). For an ERP implementation to be successful, strategic planning is essential. These statistics suggest that implementing ERP systems is difficult, and its effectiveness is still in doubt. Despite improved ICT and a wealth of research, the complexity of ERP installation must still be grasped to reap the anticipated benefits. Some claim that adopting an organizational strategy is necessary for utilizing ERP systems and reaping their potential benefits (Kumar et al., 2003). In order to implement the ERP system successfully, a sustainable business model has to be adopted.

The business model outlines how a company might accomplish its objectives in order to achieve maximum profitability and expansion. Sustainability challenges can bring huge prospects for modernization and innovation in all aspects of business, starting from business formation to product delivery. In the process of creating the business concept the entire innovation strategy, development (Isoherranen & Majava, 2018), and design issues play an essential role in achieving the success of business models (Schaltegger et al., 2015). Sustainable business models can be defined as a process

through which innovation and decision-making strategies can be rolled out (Mitra et al., 2019). In this regard, the T-O-E framework was proposed by Tornatzky and Fleischer in the year 1990, and here this innovation adoption was influenced by numerous technologies, organizational conditions, and environment. According to Kauffman and Walden, 2001 adoption was influenced by technological growth, pilot test and visibility process (Awa et al., 2016), organization's business scope and culture (Chatterjee et al., 2002), top management support, and industry environment perspective (Kowath & Choon, 2001). Next to this technology acceptance model was evolved (Awa, Ukoha & Emecheta, 2012), and it proposed the "perceived usefulness-PU" technique and "perceived ease of use-PEOU" as well. This model can be treated as fundamental to IT adoption. Rask and Jensen, 2019 mentioned that a business model could be judged on how innovative and imitated the model. This area of research and development field includes systematic innovation in the design of business that can ensure sustainability (Jabnoun, 2019). Geissdoerfer et al., 2017 mentioned that the technique of business model innovation incorporates changes in the process of alteration, starting from one business model to another within the present company. It also includes the modification done after merging or creating new business innovations in start-ups. In addition, Jabnoun, 2019 mentioned that sustainable business models must emphasize sustainable value within the product-service system rotated among different stakeholders.

Though an extensive discussion regarding business model innovation has been started in the last decade (Chesbrough, 2007), the concept is comparatively very young in management studies. Though, according to Boons and Lüdeke-Freund, 2013 some model requires the techniques of successful market initiatives, the overall process of implementing a new business model is not yet discovered. Boons and Lüdeke-Freund, 2013 also emphasized that less research has been conducted in this area, and some concepts are still unexplored. Recently, some developed tools have been used to combine innovative ideas and influence the organization to reach sustainability goals (Schaltegger et al., 2016). He mentioned that along with other features, the strategies used in new technology should beat the environmental challenges, and the proposed user-centric approach of the product-service system can persuade the end-users (Tolkamp et al., 2018). Customer satisfaction is now the priority for small, medium and large businesses (Bocken, 2017) which is critical to a company's long-term viability and expansion (Luna-Perejon et al., 2019). As opposed to that, companies differ in their success in retaining consumer pleasure, which takes distinct forms for each.

1.5 Interrelation among these three

The Industry 4.0 revolution is changing the dynamics that propel competitiveness and growth, which is changing the economic environment (Schwab, 2017a). Due to the growing issues it is no longer possible to rely on efficiency and cost-cutting due to environmental degradation and the interruptions of the Industry 4.0 (Chofreh et al., 2019).

An organization needs to take a bold, rigorous, and comprehensive approach in order to compete with the environment, and society (Bocken & van Bogaert, 2016; Schwab, 2017b). Business models are being pushed to incorporate sustainable innovation (Boons and Ludeke-Freund, 2013).

Although there is much literature on the area of “business model-BM”, “business model innovation-BMI”, and SBMI, the categorization of SBMI is in early stages (LudekeFreund & Dembek, 2017). The term "sustainable business model innovation-SBMI” has not yet received universal adoption in the literature (Witjes & Lozano, 2016; Man & Strandhagen, 2017; Yang et al., 2017) and most importantly BMI is a significant modification of the current BM (Adams et al., 2016). Sustainability is becoming a crucial component of BM in investigating greener solutions due to the rising environmental consciousness (Bocken et al., 2014). Companies had to radically change how they used BMI because of using the triple bottom line to create value-chain (Clinton & Whisnant, 2019). The incorporation of sustainability into BM led the industries towards a sustainable form. Organizations are now postponing the adoption of sustainable solutions (Geissdoerfer et al., 2018). We still do not fully understand why organizations are reluctant to apply SBMI. The phrase SBMI was first used ten years ago and has since evolved (Stubbs & Cocklin, 2008). From a variety of angles, authors have explained the concept, including Taxonomies (Ludeke-Freund et al., 2018), concepts explained (Geissdoerfer et al., 2018), dividing up archetypes (Bocken et al., 2014), and tools and approaches for the advancement of SBMI components (Joyce & Paquin, 2016). The SBMI concept has drawn more attention in recent years, and it is now connected to other fields like BM, BMI, and SBM. A theory was put forth by Ludeke-Freund and Dembek in 2017 and Geissdoerfer et al. in 2018 to explain how SBMI differs from other well-established domains like BM. The SBMI concept has drawn more attention in recent years, and it is tied to other fields including BM, BMI, and SBM. A hypothesis for situating SBMI was proposed by Ludeke-Freund and Dembek in 2017 and by Geissdoerfer et al. in 2018 stating relationship between SBMI and other fields.

Although SBMI is a new subject, its nomenclature, classifications, and components do not overlap with previous sub-fields. A prior study has not identified the components of SBMI that have analogs in other sub-fields. França et al. (2017) made an effort to incorporate strategic development and innovation activities in business model framework to establish sustainability in BM.

1.6 Need of the study and chapter plan

The business models of the different industries that cannot adopt certain success factors remain unsustainable. Major industries are interested in implementing sustainable supply chain solutions because they provide increased risk improvement, flexibility in design modules, and value incorporation potential (Evans et al., 2009; Rashid et al., 2013; Geissdoerfer et al., 2017).

In this regard, a business model has been proposed for three different sectors like financial, IT/ITeS service sector and manufacturing sector considering strategic, organizational, technological, and environmental perspectives. Here in this study, “Literature Review” was described in chapter 2, where the past studies were considered. The chapter was started with Evolution of ERP, its implementation in developed and developing countries, the status of ERP, the success factors and its prioritization, conceptualization of Sustainable Business Model.

The authors discussed in the “Purpose of the Study” (Chapter 3) the research gap, research questions, problem statements, and the ERP Implementation Strategy conceptual model. In Chapter 4, "Research Objective," the formulated problem statement was mapped to the research gap and objective, and the correlation among different branches was there. In Chapter 5, "Research Design and Methodology," a structured questionnaire was developed based on the four identified domains, e.g., strategic and organizational. Technological, environmental, and surrogate measures of the four constructs were explored with the exhaustive study of past research studies and by interactions with industry experts in the relevant fields for the incorporation of the same, which would be significant in the context of Indian business. A pilot survey tested the validity and reliability of the questionnaire, and modifications to the questionnaire were made. Based on the responses analysis was made and the critical factors were estimated using structural equation modeling. In Chapter 6, the results of the financial sector were discussed, and a sustainable business model (SBM) was proposed for the financial industry. Chapter 7 discussed the IT/ITeS service sector findings and proposed an SBM. Similarly, in Chapter 8, the result of the manufacturing industry was discussed, and an SBM was submitted for the manufacturing sector.

Then, in Chapter 9, "Case Research," the authors visited five SMEs and the chapter is aimed to study and discuss pertinent factors influencing Indian organizations, especially SMEs, to adopt managerial strategies for creating a sustainable business model.

Chapter 2

Literature Review

ERP systems are one type of complicated information system, and modern firms are investing here to implement a successful business model. Majority of ERP projects fail despite their alleged benefits (Chang et al., 2008). A closer examination of the cited issues shows emphatically that the problems with the ERP deployment go beyond technical concerns to include broader behavioral issues (Skok & Doringer, 2001). In order to prepare staff, organizations must comprehend system adoption from the user's standpoint for new problems and effectively teach people in using technology (Chang et al., 2008). Joint ventures have allowed Indian enterprises to adopt advanced information technology (IT) in their operations. Initiatives for technology transfer were made possible by a rise in global trade and commerce. Organizational and cultural issues have generally arisen in Indian firms throughout adopting and deploying new IT (Baskarada et al., 2013). Therefore, it is essential to comprehend how different factors affect ERP adoption in the Indian context. This study was done to identify some of the elements that drive ERP adoption in India and their impact on the adoption and utilization of ERP based on the analysis of the literature already published.

ERP connects many corporate processes, including supply chain, human resources; sales, finance, planning, and customer service (Baskarada et al., 2013). They result in expensive customizing software and packages (Doom, Milis, Poelmans, & Bloemen, 2010). According to (Saatcioglu, 2007) other advantages of ERP systems include their full integration with entire company procedures, a reduction in data entry, upgradeable technology that can be transferred to other systems, and their utilisation of best practises. However, the anticipated advantages of increased productivity and competitive advantage would not materialize without properly implementing the system (Addo-Tenkorang & Helo, 2011). This necessitates modifications to procedures, other social dimensions, and member coordination in addition to system changes (Kwahk & Kim, 2008). Chang et al., 2008 mentioned that when ERP systems are implemented, organizational structure and work practices frequently undergo significant changes (Kallunki, Laitinen, & Silvola, 2011). Additional to the challenges experienced by industrialized nations, emerging nations also confront unique challenges while implementing ERP systems (Ali, Edghiem,& Alkhalifah, 2022) and it implies that some techniques must be adopted to accommodate various cultural background (Ekren et al., 2019).

While earlier study examined a variety of business process change-related issues, there has not much consideration given to the individual employee or to what motivates employees to adopt new processes, what causes resistance, or how complex technology solutions like ERP affect employees as a result of a process change (Venkatesh, 2006). There is necessity to comprehend how various elements have influenced the use of information systems (IS) in Indian businesses, given that the Indian economy has changed, and this has caused the business environment to alter as well (Tarafdar

& Vaidya, 2006) that intricate adoption and implementation challenges faced by organizational stakeholders. (Schniederjans and Yadav, 2013).

As functional units need more and more cross-departmental data flow for decision-making, timely and effective part procurement, inventory management, accounting, human resources, and product distribution, today's dynamic business is becoming more and more complex. In this situation, effective information systems would increase competitiveness through cost reduction and improved logistics (Holland C & Light B., 1999). To provide goods and services that satisfy customer requests, a greater degree of communication between suppliers and customers has also been emphasized (Welti N., 1999; Norris et al., 2000). In order to gain a competitive edge in a dynamic corporate environment, ERP is a strategic tool that synchronises, and automates an organization's data and activities into a single system.

Here literature review describes essential details of the evolution of the ERP system, its implementation in developed and developing countries, the success factors, and the conceptualization of sustainable development of the business model. Sources were considered from scholarly journal articles, conference proceedings, book chapters, standard reports, etc. The literature study established the research gap, and research questions and problem statements were found.

2.1 Evolution of ERP

Businesses systematically manage the active part of their business through a concept known as inventory control (Jacobs & Weston (2007). Organizations started to create applications to maintain inventory, help with material orders, and generate finished things since 1960s. Applications for Materials Requirements Planning-MRP were created to make it possible for businesses to make purchases, make forecasts, and plan production, leading to the formation of J. D. Edwards and SAP are examples of industry companies (Egdair, Rajemi, & Nadarajan 2015; Singh & Nagpal, 2014) Considering how many businesses are putting forth more demands to cut J. D. Edwards improved the MRP programs to include closed-loop scheduling to reduce their overhead costs.

Over the last four decades, ERP has matured into a strategic instrument. This is because of ongoing improvements to the strategies available at the time to conduct business more efficiently, as well as discoveries and inventions in the field of information technology. The ERP system has emerged from the Material Planning System. This process of evolution has gone through several stages. All the stages of ERP development concerning time are described below.

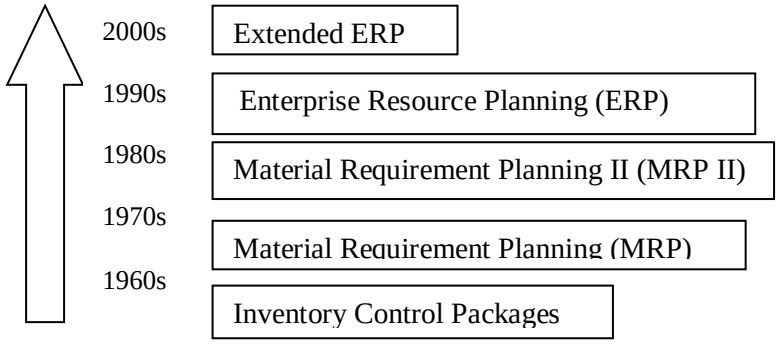


Figure 2-1: Evolution of ERP

- **Inventory Control Packages:**

  In 1960 the concept of inventory management evolved; the software job was to control inventory. Inventory management considers inventory requirements based on inventory status as reported and the target to manage inventory. Next to that, in 1970, the idea of Material Requirement Planning (MRP) came up. It is about production requirements and present inventory status. Based on conventional inventory concepts, the software was designed to handle inventory. In the 1970s, the focal point was shifted to Material Requirement Planning (MRP) systems. In 1980 the idea of MRP-II came up, which was the extended version of MRP. In 1990, MRP-II was extended to focus on finance, project management, HR, and engineering.

- **Material Requirements Planning (MRP):**

Manufacturing systems have been built on classic inventory management concepts since the 1960s, and most software packages are based on conventional inventory processes. MRP is the initial computerized information systems, one of the strategies available in operations management for planning and controlling actual inventory. They were created to identify the raw materials necessary for production by working backward from sales orders. Since 1975, MRP has evolved from a simple MRP tool to the standard MRP II, which addresses some of the most critical operational issues like Total Quality Management-TQM, just-in-time-JIT, and work-in-progress inventories-WIP (Salimi, Dankbaar & Davidrajuh, 2006).

- **Manufacturing Resource Planning (MRP-II):**

MRP II was an early ERP package that served as an instrument for inventory management, production control, and procurement planning and suppliers maintenance. MRP II created a closed loop structure when establishing production schedules by linking the facility to resource requirements. It converted the Master Schedule created for requirements, planning and acquiring sub assemblies, components, and raw materials. (Chung & Snyder, 2000). Most ERP software is founded on the MRP II paradigm. ERP included tangible and intangible tasks, such as service-focused pursuits. The primary divergence between MRP II and ERP systems is that ERP systems include features of regulatory control, quality, supply chain management components, decision support applications, human resource planning, and maintenance support that are not typically included in MRP II (Yusuf & Little, 1998). ERP supporters assert that unlike MRP and MRP II, ERP can incorporate business operational efficiencies and IT solutions together into unified system solution (Chung & Snyder, 2000).

- **Enterprise Resource Planning (ERP) –**

By the 1980s, the critical ERP suppliers like SAP, IBM, J. D. Edwards, Baan, PeopleSoft, and Oracle had emerged as their executives started to use technology to help with decision-making for regular operations (Razzhivina, Yakimovich, & Korshunov, 2015). Since they allowed decision-makers to have better clarity into their production and inventory levels, organizations sought out enterprise applications designed to differentiate themselves from competitors.

In the 1990s, as the market became increasingly competitive, the major firms paid for a competitive edge and started to create apps that incorporated the operational data and accounting aspects of the business (Bhuiyan, Chowdhury, & Ferdous, 2014). ERP was first used by The Gartner Group to describe the key six business application providers for significant growth and as a result of this new technology advancement (Jacobs & Weston, 2007). ERP sector marketing urged businesses to hurry up with software installations as Y2K and the fear of the unknown neared the year 2000. This process leads to tremendous increase in ERP providers and products (Salimi, Dankbaar, & Davidrajuh, 2015; Brumberg et al., 2016). The whole IT sector was devastated in 2001 when the .com bubble crashed and technology was thrown into turmoil, forcing the leading corporations to downsize (Fadlalla & Amani, 2015; Palanisamy, Verville, & Taskin, 2015). Before the decade is over, Oracle had purchased J. D. Edwards and PeopleSoft, while Baan and IBM's MAPICS had been acquired by Infor Global Solutions (Banerjee, 2015;

Razzhivina, Yakimovich, & Korshunov, 2015) and now SAP, Oracle, and Infor becoming the top three ERP suppliers in the market.

As the industry became more competitive in the 1990s, the major competitors sought to gain a competitive edge. They started to create programs that combined the operational and accounting areas of the company (Bhuiyan, Chowdhury, & Ferdous, 2014). This new technological innovation has named by the Gartner Group that significantly accelerated the expansion of certain primary business application suppliers (Jacobs & Weston, 2007). ERP sector marketing was the cause of businesses to set up these applications due to Y2K's impending dread of the unknown, which resulted in a significant increase in ERP providers and services (Salimi, Dankbaar, & Davidrajuh, 2015; Brumberg et al., 2016).

- **Enterprise Resource Planning(ERP II) –**

ERP II, often known as ERP/2 systems, is a term coined by Gartner Group in 2000 to describe the most recent expansions to ERP systems (Classe, 2001). It is essentially identical to Enterprise Commerce Management (ECM), as defined by AMR Research (Mello, 2001). The idea of Extended ERP is a general term that encompasses ERP II, ECM, and state-of-the-art ERP vendor systems. The material movement is a critical process in the Extended Enterprise. SCM has dominated the domains of logistics and production management. Whether SCM provides new insights on logistics or not (Cooper, Lambert, et al. 1997), the supply chain has been established in both enterprises and industries. SCM tackles supply chain management concerns, such as the internal perspective of managing supplier relationships (Olsen & Ellram, 1997) and the external perspective of building partnerships.

It was reported in 2016 that more businesses were switching from on-premise systems to cloud-based options (around 40% rise in businesses using cloud-based solutions from on-premise ones) as ERP vendors are upping application security to reduce the risk of security breaches. By shifting the hardware support to the cloud, ERP decreases business information technology (IT) overhead.

2.2 ERP Implementation in developed and developing countries:

According to research, developing countries confront additional hurdles, such as infrastructure and socioeconomic challenges which result in a increasing levels of ERP installation failure (Panorama Consulting Solutions 2018; Sun, Ni, and Lam 2015). The majority of research investigations were conducted in wealthy countries, with approximately 10–15 percent of ERP research focusing on developing countries. On the other hand, ERP usage in emerging nations is rapidly increasing; by 2026, India's retail industry is predicted to grow to 1.7 trillion dollars, up from 883 billion dollars in 2020 (Statista Research Department, Mar 17, 2022).

ERP use is rising among businesses in many developing nations, including SMEs in India, as a result of improved service quality, outstanding interaction, faster development cycles, fewer defects, lower costs, and timely transmission of reliable information (Kale, Banwait, and Laroiya 2010). The correct ERP system increases the business and unifies the company's essential business processes (Jamie, 2013). Clare, 2007 claimed that some controls must be adapted to keep consultants on track to work for the benefit of the client business.

During ERP implementations complete failure suggests that the project failed before or during implementation, due to which the company incurs a substantial financial loss and partial failure happens due to improper execution of the project (Malik & Khan, 2020). Researchers looked into this area and identified the reasons behind this. Several well-known organizations, including FoxMeyer, Nike, and Hershey, have failed to deploy ERP Cotteleer (Cotteleer, 2002). Between 55 and 75% of established ERP systems don't produce the desired results, according to Kraemer (2012). Panorama Consulting Solutions, 2016 is a well-known consulting firm with expertise in ERP. The report from their survey, 2015 shows that more than 55% of ERP-related projects exceeded their budget and schedule projections and that more than 75% of respondents believed that ERP only delivered half of the benefits they had anticipated. Both practitioners and researchers paid intense attention to such a high failure rate.

2.3 Status of ERP in developed countries

As ERP is a prime tool of any business model, the revenue estimated for the global market was $65 billion in 2010 (Zare Ravasam & Mansouri, 2016). Per the Market Research Future report (MRFR), it is projected that the overall ERP software market will reach USD 66,389.7 million within 2026, with a growing rate of 8.2% CAGR. ERP software solutions have been a critical component of the industrial revolution from industry 4.0 to 5.0. Industry 5.0 strongly emphasizes integrating personalization into the industrial environment, allowing clients' unique requirements to be met. ERP software is projected to have a bright future since most industrial facilities are already gearing up to comply with industry 4.0 requirements. ERPs can deal with continual data in real-time, saving time and providing the detail required to see where and when specific events occurred. Humans could make better, faster judgments due to the synchronization of machine tools, software systems, and people's demands in a large, data-driven ecosystem.

Many researchers and practitioners consider ERP to be one of the major innovations of the recent decade because of its strong growth rate in the IT industry (Al-Mashari, 2002). Though ERP gives a competitive advantage to the firms by allowing them to implement creative business strategies, however, ERP adoption is low in developing nations due to prohibitive prices, cultural

differences, integration issues, and a lack of understanding among users (Jayantha & Peter, 2005; Malik & Khan,2020). This shift has been noticed in other areas as well.

2.4 Status of ERP in developing countries

Because an ERP system was built initially for European businesses, other businesses, particularly those in developing nations, suffer (Rajan & Baral, 2015). Furthermore, several examples exist when it comes to application in other countries where ERP was not sustained. One such research looked into how a Chinese firm deployed ERP, discovering later that the system environment did not fit their needs (Avison & Malaurent, 2007). Unlike developing countries, developed countries use ERP systems considerably, with North America and Europe accounting for 88 percent of the ERP market share (AMR, 2008). As a result, ERP providers have turned their attention to emerging countries, which are seen as promising markets (Huang & Palvia, 2008). According to Vantage Market Research's ERP Market is estimated to expand of 17.10 percent from USD 18,523.50 million in 2021 to USD 47,760.01 million by 2028 (Vantage Market Research, 2022). North America leads the global ERP software market. With a market value of USD 12.754.2 million, the region captured approximately 33.4 percent of the entire ERP software market in 2019. The market for ERP software is anticipated to grow at 7.6 percent CAGR in North America. In the worldwide ERP software market, Europe has moved up to second place, and here ERP software market was valued at USD 10.734.1 million in 2019, and it is predicted to increase at a 28.1 percent CAGR over the assessment period.

The Asia Pacific area has established itself as a booming market for ERP software solutions. The industry is expected to develop due to significant advancements in artificial intelligence (AI) and other similar technologies. The market's growth is influenced by the spread of cloud technology and the increasing strategic collaborations and investments by regional companies (Vantage Market Research, 2022). Furthermore, the market size is boosted by the increasing implementation of ERP software. Furthermore, the growing use of cloud computing boosts ERP market share, allowing firms to scale up their operations more efficiently.

2.5 Success factors and its prioritization

The factors that are constantly under managers' direct supervision and are primarily in charge of improving organizational performance are known as Critical Success Factors (CSFs), according to Jiwat et al., 2013 (Rockart et al., 1996). To put it another way, CSFs are the elements that can assist managers in achieving the specified goal (Saade & Nijher, 2016). Additionally, authors' concurred that CSFs, which was developed in 1960, strengthens social viewpoint by developing

an optimum model (Jiwat & Corkindale, 2014; Saade & Nijher, 2016). Although CSFs are closely tied to the information systems field, some ERP systems fail after a certain number of years due to improper identification. According to Zhang et al. (2012), many ERP initiatives failed for a variety of reasons, and researchers worked to pinpoint the causes of these failures. In numerous studies, researchers looked into the variables that might not exist in particular systems and without it, the successful implementation would become stuck.

At the organisational level, identifying CSFs and analysing those factors are common procedures. Jiwa et al. (2013) found a significant number of factors in various pieces of literature. Many writers employ subjective criteria to find CSFs in an effort to provide a conceptual framework that would help close the gap between ERP users and developers. Combining products and services across industries in a global setting is a growing trend (Mont, 2002, Erävala et al., 2021). Therefore, ERP can combine many company activities, such as sales, finance, supply chain, inventory, and customer services, to assist companies in reducing data duplication and needless time consumption (Govindan et al., 2017).

Nevertheless, the estimated benefits would not be impending without successfully implementing this. Rockhart J. (1979) was one of the pioneer researchers in identifying specific factors that can help an organization build a successful ERP system. Some researchers identified factors like *coordination problems, employee attitude, and organizational culture* responsible for a sustainable ERP system (Tolmay & Badenhorst-Weiss, 2018; Goel, 2021). Ranjan & Baral, 2015 also pointed out that certain factors like employee training and reward and organizational support must be incorporated within the system.

Besides *Strategic application, strategic decision, business process reengineering, the leadership and secretarial culture* can be added to the module to maximize the organization's benefit Ağaoğlu et al.,2015; Wang et al., 2016; Bildosola et al., 2020.

Due to improper identification of such success factors, many ERP systems could not sustain in the long run. Many researchers are working on the reasons for ERP systems' success, and failure of ERP systems but Kenge & Khan (2020) explained that the reports were insufficient, and even some were fragmented. Arabi et al. (2012) highlighted that many ERP systems had undergone significant failures. For example, Avis Europe Ltd. abandoned in 2004 after spending $54.5 million on ERP implementation; Ford Motors also spent $200 million, and then the ERP system deserted. In 1995 the renowned pharmaceutical company FoxMeyer Drugs faced a US$5 billion loss and inevitable ERP failure.

A good volume of research has been carried out to identify the reasons for the failure of the ERP system. The main challenge of the management is to identify the constructs and incorporate those in the package at the initial stage, making the organization sustainable Arabi et al. (2012). Critical

success factors (CSFs) are highly required to identify these factors, particularly in the post-implementation stage. Sutanto et al. (2009), Jagoda and Samaranayake (2017), and McFarlane and Lim (2018) highlighted that *change management, process knowledge, data quality,* and *availability of resources* must be considered when the supply chain is developing.

Basically, the entire development process of the software-ERP system is arduous. During the development of projected software, the project management team deals with complex problems, from planning to post-delivery phases. Baccarini and Collins (2003) mentioned that most companies added *corporate strategy* into their project management actions to ensure product delivery. Later, Alauddin & Chowdhury, 2015; Hoque et al., 2017 also supported that corporate strategy is a crucial factor that can enhance the performance of SME organizations as it includes proper marketing planning, adequate workforce flow, and other resources. To ensure the organization's profitability and sustainability, many companies focus on *entrepreneurial behavior, resource estimation, cost estimation, and networking between stakeholders* (Bangudu, 2013; Alauddin & Chowdhury, 2015; Hoque et al., 2017). To incorporate all these measures, organizations demand skilled employees (Sangwan et al., 2006). The *domain knowledge, analytical capability, and communication expertise* (Hoque et al., 2017) can determine the skill of an employee, which are the critical factors for the company's growth. As employees come from different backgrounds, *coordination* among employees and the *readiness of proactive management* are required to execute proper project governance (Freedman & Katz, 2007).

Along with these, many IT companies included *entrepreneurship education* (Wu et al., 2017) for the skill development of the employees. Another critical success factor in the service sector industry is *an organizational culture* that can make the business model robust (Obaji & Olugu, 2014; Hoque et al., 2017). Hoque, 2018 suggested that adopting these factors within the strategic planning of entrepreneurial marketing in the service sector is essential. In many kinds of literature like Wales, Gupta, & Mousa, 2011; Gummesson, 2017; Hoque, 2018; Hoque & Awang, 2019, it was found that although some organizations have considered *organizational culture* but many of the industries of developing countries did not consider this**.**

2.6 Conceptualization of Sustainable Business Model (SBM)

Rogers (1995) defined a SBM as a process through which innovation and decision-making strategy can be rolled out. A few years later, Wales, Gupta, & Mousa, 2011 wrote that the objective of a SBM is to redesign the prototype of a product or service to meet the competitive advantage of the market. Further, Osterwalder and Pigneur (2010) defined it as a measure of how

a firm can create, deliver, capture significance, and ensure practitioner's tool to keep the process operational. Lee and Casalegno (2010) admitted that the business model is a new-fangled pathway for sustainability initiatives. Frisk and Bannister, 2017 stated that the booming of digital technologies helps to accumulate and examine business data that can improve business performance. In order to achieve those, managers should adopt an updated collaborative decision-making policy.

The major challenge of the companies remains within the business model innovation strategy and design issues, and the failure to achieve these can lead to an untenable business model (Boons and Lüdeke-Freund, 2013; Upward and Jones, 2016). According to Stubbs and Cocklin, 2008 and Baumgartner and Korhonen, 2010 in some of the case studies sustainability perspective was not considered intensely as the planning and scope of those organizations were not analyzed thoroughly. Planning should be incorporated within the value chain, and proper delivery of the product should be ensured (Rohrbeck et al., 2013). Schaltegger et al., 2012 further suggested that systematic strategy should be taken care of, which can help the organization to promote beyond the traditional business model.

On the contrary, organizational sustainability depends on business model innovation which is critical to sustaining the competitive market (Baumgartner & Korhonen, 2010; Osterwalder & Pigneur, 2011; Kiron et al., 2013). SBM must ensure an efficient innovation strategy (Ali, Edghiem, Alkhalifah, 2022) that can accelerate the organization's business growth (Clinton & Whisnant, 2014; Bocken et al., 2014; Kurucz et al., 2016; Upward and Jones, 2016). Further, Naceur(2020) has mentioned that strategies following business excellence must be included in designing sustainable business models.

Sustainability challenges can bring huge prospects for modernization and innovation in all aspects of business, from business formation to product delivery. During the progress of the business model entire innovation strategy, development (Isoherranen & Majava, 2018), and design issues play an essential role in achieving the success of business models (Schaltegger et al., 2016). Sustainable business models can be defined as a process through which innovation and decision-making strategies can be rolled out (Mitra et al., 2019).

2.6.1. The technology acceptance model (TAM)

Davis et al., 1989 established the ‘technology acceptance model (TAM)’ and according to the authors, people's behavioral intention to utilize new technology is driven by its ‘perceived usefulness-PU’ and ‘Perceived ease-of-use-PEOU’ and these are influenced by various external factors. TAM is one of the most frequently used and moderate theoretical models of technology

acceptance and use. It has excellent explanatory power and is simple to understand, making it the most widely used model in various areas. In 2000, Venkatesh and Davis developed TAM2, which included social influence processes, cognitive instrumental processes, and a complete description of important dynamics underpinning judgments of perceived utility and behavioral intention (Venkatesh & Davis, 2000). Venkatesh and Bala (2008) proposed TAM3 in 2008, which was based on TAM2 but included the impacts of trust and perceived risk on system use. Various models have been used in a variety of situations. The preceding section's comparison of TAM, TAM2, UTAUT, and TAM3 leads to the conclusion that TAM has a broader application than the other models, which have more narrow definitions of external variables and are more suited to analyzing certain information technologies. Task-related information systems, e-commerce, and hedonic information systems are the three study areas where TAM has been most widely used (Hsiao & Yang, 2011). (Lee, Kozar, and Larsen, 2003 employed the structural equation model (SEM) to investigate the variables for ERP adoption. This study uses TAM as a foundation for enterprise acceptance; specified model variables will influence the external elements.

2.6.2 The Technology-Organization-Environment framework (TOE)

Tornatzky and Fleischer (1990) formed the TOE framework, which models the effects of technological, organizational, and environmental contexts on a firm's process of adopting and implementing technological advances. The technological context relates to the organization's current internal and external technologies and those that are available on the market but have not yet been implemented. The organizational context refers to the corporation's size, structure, and human resources. In contrast, the environmental context refers to aspects beyond the organization's control, such as competition, partners, and the industrial environment. The Technology-Organization-Environment framework (TOE) was utilized to select external factors of ERP adoption in this study. The TOE framework was developed to simulate the effects of technological, organizational, and environmental factors on a company's process of adopting and implementing technological improvements. The technological context refers to the company's present internal and external technologies and those on the market that have yet to be incorporated. The organizational context includes the company's size, structure, and human resources, whereas the environmental context includes factors outside the company's control, such as competition, partners, and the industrial environment.

According to Kauffman and Walden, 2001 adoption of ERP was influenced by technological growth, pilot test and visibility process (Awa et al., 2015), organization's business scope and culture (Chatterjee et al., 2002), top management support, and industry environment perspective

(Kowath & Choon, 2001). Rask and Jensen, 2019 mentioned that a business model could be judged on how innovative and imitated the model is. This area of research and development field includes systematic innovation in the design of business that can ensure sustainability (Naceur, 2019). According to Geissdoerfer et al., 2017 the technique of business model innovation incorporates changes in the process of alteration, starting from one business model to another within the present company. It also includes the modification done after merging or creating new business innovations in start-ups. In addition, Naceur, 2019 mentioned that sustainable business models must emphasize sustainable value within the product-service system rotated among different stakeholders.

Though an extensive discussion regarding business model innovation has been started in the last decade (Chesbrough, 2007), the concept is comparatively very young in management studies. Though, according to Boons and Lüdeke-Freund, 2013 some model requires the techniques of successful market initiatives, the overall process of implementing a new business model is not yet discovered. Boons and Lüdeke-Freund, 2013; Schaltegger et al., 2016 also emphasized that less research has been conducted in this area, and some concepts are still unexplored. Recently, some developed tools have been used that can combine innovative ideas and influence the organization to reach sustainability goals (Geissdoerfer et al., 2017). He mentioned that along with other features, the strategies used in new technology should beat the environmental challenges, and the proposed user-centric approach of the product-service system can persuade the end-users (Tolkamp et al., 2018).

2.7 Chapter Summary

We explained at the outset of the literature study that we had begun the relevant work from the invention of ERP and its evolution over time, how ERP was applied, and its current state in both developed and developing countries. The discussion that followed focused on the key elements of an effective ERP system that were discovered in the literature and helped to create a successful business model. Two well-known models—the Technology-Organization-Environment framework (TOE) and the Technology Acceptance Model (TAM)—were examined in this regard. At the end of subsequent chapter 3 the conceptual model of ERP implementation strategy is discussed. In the chapter 4 research gap, research question and problem statement were mapped.

Chapter 3

Purpose of the Study

3.1 Exploration of research gap

Top-level managers have assessed the CSFs for ERP deployment projects in their business because organisations are the primary units of analysis in the bulk of studies on CSFs. Consequently, the project's users' perception is not taken into account. To understand the success in ERP implementation and to avoid failure, active employee participation in the process is highly required. Literature review shows that though good numbers of researches on ERP were undertaken, little research was carried out on successful business model implementation. The discussion on the business model is very fresh as it started a few years ago (Teece & David, 2010). Researchers have given opinions regarding the failure of the business model. Hughes, 2011 analyzed that up to 70% of business model fails due to a lack of innovation. Many practitioners tried to find the root cause of failure, but unfortunately, insufficient research evidence was found.

Based on the literature review, the identified research gaps are summarized as follows:

RG1: Existing business model TAM (Technology Acceptance Model, proposed by Davis et al., 1989) and TOE (Technology, Organizational, Environmental frameworks, which was proposed by Tornatzky and Fleischer, 1990) were there, but strategic and organizational perspectives were not considered together.

RG2: Researches were so fragmented that all relevant observed variables were not considered.

RG4: It's been noticed that considering four pillars (strategic, organizational, technological, and environmental), no study was not done in the Indian context precisely.

RG5: The latent factors found after EFA from each of the four perspectives (strategic, organizational, technological, and environmental) were not validated by CFA.

RG6: In much literature, it was found that the existing business model faces challenges in achieving sustainability in ERP implementation.

RG7: Though the SME sector is a significant contributor to the Indian economy, the concept of a SBM in the SME sector is not at all practiced.

3.2 Research questions

The objective of this research is to propose a sustainable business model, particularly for Indian firms, and in order to achieve this, the following research questions were framed.

RQ1: What perspectives should be considered to develop the generic model for Information System (IS) implementation?

RQ2: As a result of IS development, what are the variables to be considered under each perspective?

RQ3: How to design the survey questionnaire to get feedback from the executives who have been using ERP for more than seven years?
RQ4: What Factors emerged from the survey dataset?
RQ5: How can we validate the emerged factors found from EFA?
RQ6: How sustainable business model can be proposed based on the CSFs?
RQ7: How does the model be validated by specifying the manufacturing SME sector for their productivity and performance development?

3.3 Problem statement

An attempt has been made in the present study to investigate the CSFs emerged from different perspectives to establish a SBM. Moreover, the organizations' ability to increase business performance is aided by their impact on ERP deployment success from the users' point of view.

The following list could be the problem statement for this piece of work:

a) Identifying the variables to define all the perspectives of the proposed SOTE (Strategic, Organizational, Technological, Environmental perspectives) model.

b) Estimating the latent constructs corresponding to individual perspectives.

c) Advancing a framework for formulating the business model using the observables to implement ERP for Financial service sector.

d) Expanding a framework for formulating the business model using the observables to implement ERP for IT/ITeS service sector.

e) Developing a framework for formulating the business model using the observables to implement ERP for manufacturing sector.

f) Establish a SBM by undertaking the case study of the organizations in the manufacturing sector

3.4 Conceptual Model of ERP Implementation Strategy

Our proposed model for implementing integrated system, (presented in Fig.2.1) synthesized from the literature and experienced work proposes that successful ERP implementation across the value chain requires careful analysis of all four of the major integration domains: strategic, organizational, technological, and environmental.

The model here represented (presented in Figure 3-1) has a different focus on ERP system implementation.

i) Strategic Domain: Every organization should use a variety of views to develop a comprehensive understanding of the business. Strategic domain fosters a competitive mindset and it is particularly crucial. With this organization can fix up its goals, can acquire techniques to achieve competitive advantages, information broadcasting among the channel partners, integrated sustainable approach within the manufacturing and service sector employees. As a whole, organization can create a variety of strategies for dealing with typical commercial challenges including brand awareness and market penetration.

ii) Organizational Domain: It deals with organizational issue, top management outlook, integration of people and their ideas, decision taking capability of employees and action plan set by management to achieve organizational goal. This factor has a significant influence on design and needs to be carefully examined from a physical standpoint.

iii) Technological Domain: Organizations' performance may be greatly impacted by technological change. It is also crucial to comprehending the possibilities of dynamic organizational structures. Therefore, it is essential to have a thorough understanding of continuous improvement of knowledge and skills to produce innovative products. The technological perspective is application of technical factors like innovativeness, customization, accuracy level which results in improvement of services.

iv) Environmental Domain: Environmental perspective means how business environment influence the organization’s supply chain. It mainly focuses on optimization of resources, consumption of energy, and assessment of environmental risk and use of alternative energy sources.

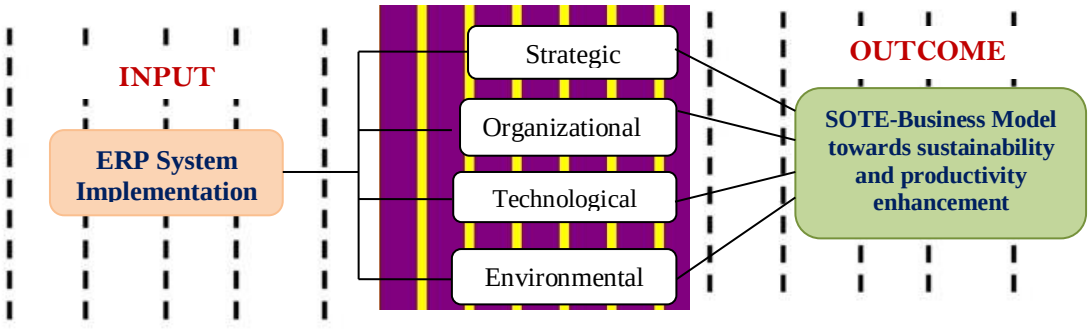


Figure 3-1: Domain of Integration

Chapter 4

Research Objective

4.1 Objective of Study

Although there has been much research on ERP, the primary focus was not only to determine the impact of end users' adoption of ERP, according to previous studies on our research. There are numerous studies on ERP adoption, however relatively few of them are carried out in developing nations like India. External variables were taken into account in earlier study, but there was no discernible pattern in the selection of the exogenous factors (Legris, Ingham, & Collerette, 2003).

We understand that much more emphasis has been given to the technological and strategic issues in the IS integration to improve the firm's productivity. The academic body of research, focuses on technical and rational strategic approaches to IS planning design and development. We fail to recognize the organizational difficulties of implementing integrated IS. Developing organizational theories and practices connected to implementing integrated IS and creating workable analytic techniques and tools to foresee the social and cultural effects of deploying new information technologies receive relatively little cumulative effort. We suggest a theoretical framework for the research model based on this knowledge gap to investigate the implications of strategic, organizational, technological, and environmental perspectives on the use of ERP and its effects on employee attitude and behavior.

We propose that complex organizational, social and environmental sustainability issues must be acknowledged at the beginning of the model development, pro-actively addressed during the designing of the survey process, and tools and techniques that facilitate a better understanding of the human and the organizational eco-system. In the present research study, using literature and empirical research, a theoretical framework has been presented for deploying integrated IS.

A theoretical framework has been synthesized from the literature and empirical work for implementing ERP successfully by carefully identifying and analyzing all four major domains: strategic, organizational, technological and environmental. The present researcher has explored the variables to define the constructs, namely, the four domains. From the beginning, equal emphasis has been given to all four domains and all the surrogate measures to understand the real challenges of implementing the ERP system in the Indian context.

The next attempt has been made to test the proposed model and validate the same. The study's primary focus was on the end users of ERP systems in a few Indian companies mainly

on three sectors of Business: Manufacturing, Financial Sector, and IT/ITes Sector. The end-users' perceptions were captured using the structured questionnaire, and the structured questionnaire was developed considering all parameters/ variables identified in the previous exercise. The organizations were selected from the database of the Indian Organizations (CMIE-Centre of Monitoring of Indian Economy), and the basis of the selection was those enterprises that had deployed ERP systems in time frame of more than seven years.

The next aim of the study is to identify and investigate the CSFs for each domain of the three mentioned sectors. The study will help managers effectively oversee the organization-wide implementation of the ERP system. When an information system, such as ERP, is deployed in the business, organizations should recognize and comprehend elements in strategic, organizational, technological, and environmental domain.

Three separate business model for three sectors has been developed, for each sector based on emerged factors which were also elaborately analyzed and discussed. The business model proposed for the three different sectors was used to formulate the strategy of successful planning and implementation of ERP and is also believed to enhance the business process efficiency, effectiveness, and flexibility (Mustafa Ağaoğlu, E. SerraYurtkoruAslı and Küçükaslan Ekmekçi 2015) leading to the sustainability of the business.

The present researcher has also attempted to propose a SBM for the ERP system's successful implementation and shall gain accrued benefits in the business process, mainly for the Small & Medium Enterprises of Indian Origin. ERP is one of the solutions for Small and Medium Enterprises (SMEs) to meet the challenges of the global marketplace by increasing productivity and overall business performance. An effort has been made to validate the proposed sustainable business model by undertaking the Case Study of the organizations in the manufacturing units of SME sector. The SMEs can set the precedence of factors for obtaining the benefits of ERP adoption with the aid of the model created through quantitative analysis utilizing SPSS. The present research study shall also explore the gaps between the desired benefits to be achieved and accrued benefits by present practice and it will be helpful for them to take necessary measures to meet the gap.

The research objectives can be summarized as follows:

RO1: To propose a theoretical framework considering strategic, organizational, technological, and environmental perspectives

RO2: To identify the variables associated with strategic, organizational, technological, and environmental perspectives

RO3: To survey the employees using the multi-item questionnaire and to identify the latent construct to propose sustainable business models for Financial sector having successful ERP implementation

RO4: To survey the employees using the multi-item questionnaire and to identify the latent construct to propose sustainable business models for IT/ITeS sector having successful ERP implementation

RO5: To survey the employees and to identify the latent construct to propose sustainable business models for manufacturing sector having successful ERP implementation

RO6: To validate the proposed sustainable business model by undertaking the Case Study of the organizations in the manufacturing sector

4.2 **Research Gap Mapped with Problem Statement, Objective and Different chapters**

Research Gap	**Problem Statement**	**Objective**	**Chapter Number and Title**
RG1: Existing business model TAM (Technology Acceptance Model, proposed by Davis et al., 1989) and TOE (Technology, Organizational, Environmental frameworks, proposed by Tornatzky and Fleischer, 1990) were there, but strategic and organizational perspectives were not considered together.	1. Identifying the variables to define all the perspectives of the proposed SOTE (Strategic, Organizational, Technological, Environmental perspectives) model.	1. To propose a theoretical framework considering strategic, organizational, technological, and environmental perspectives	Chapter 5: Research Design and Methodology
RG2: Researches were so fragmented that all relevant observed variables were not considered.	2. Estimating the latent constructs corresponding to individual perspectives.	2. To identify the variables associated with strategic, organizational, technological, and environmental	

		perspectives	
RG3: It has been observed that considering four pillars (strategic, organizational, technological, and environmental), no study was done in the Indian financial sector precisely.	3. Advancing a framework for formulating the business model using the observables to implement ERP for Financial service sector.	3. To survey the employees and to identify the latent construct to propose sustainable business models for Financial sector having successful ERP implementation	Chapter 6: Result & Analysis of Financial Sector
RG4: It has been observed that considering four pillars (strategic, organizational, technological, and environmental), no SBM was framed for IT/ITeS service sector.	4. Expanding a framework for formulating the business model using the observables to implement ERP for IT/ITeS service sector.	4. To survey the employees and to identify the latent construct to propose sustainable business models for IT/ITeS sector having successful ERP implementation	Chapter 7: Result & Analysis of IT/ITeS Sector
RG5: In much literature, it was found that the existing business model faces challenges in achieving sustainability in manufacturing sector and considering four pillars (strategic, organizational, technological, and environmental), no SBM was framed for manufacturing sector	5. Developing a framework for formulating the business model using the observables to implement ERP for manufacturing sector.	5. To survey the employees and to identify the latent construct to propose sustainable business models for manufacturing sector having successful ERP implementation	Chapter 8: Result & Analysis of manufacturing Sector
RG6: Though the SME sector is a significant contributor to the Indian	6. Establish a sustainable business model by	6. To validate the proposed sustainable business model by	Chapter 9: Case Research

economy, the concept of a sustainable business model in the SME sector is not at all practiced.	undertaking the Case Study of the organizations in the manufacturing sector	undertaking the Case Study of the organizations in the manufacturing sector	

Chapter 5

Research Design and Methodology

The creation of a questionnaire is the first step in the research's design. The assertions for the questionnaire are framed by the observable antecedents of ERP implementation approach, which are covered in chapter 2. The current chapter additionally discusses the outcomes of the pilot study that was carried out to validate the questionnaire. The revisions made to arrive at the final survey questionnaire are reported along with the findings of the tests for validity and reliability. At this point, it seems appropriate to talk about the overall direction of the research.

5.1 **Stages in the Research Design**

Schematic representation of the research separately for three sectors, e.g. Financial, IT/ITeS Services Sector and Manufacturing sector is represented below:

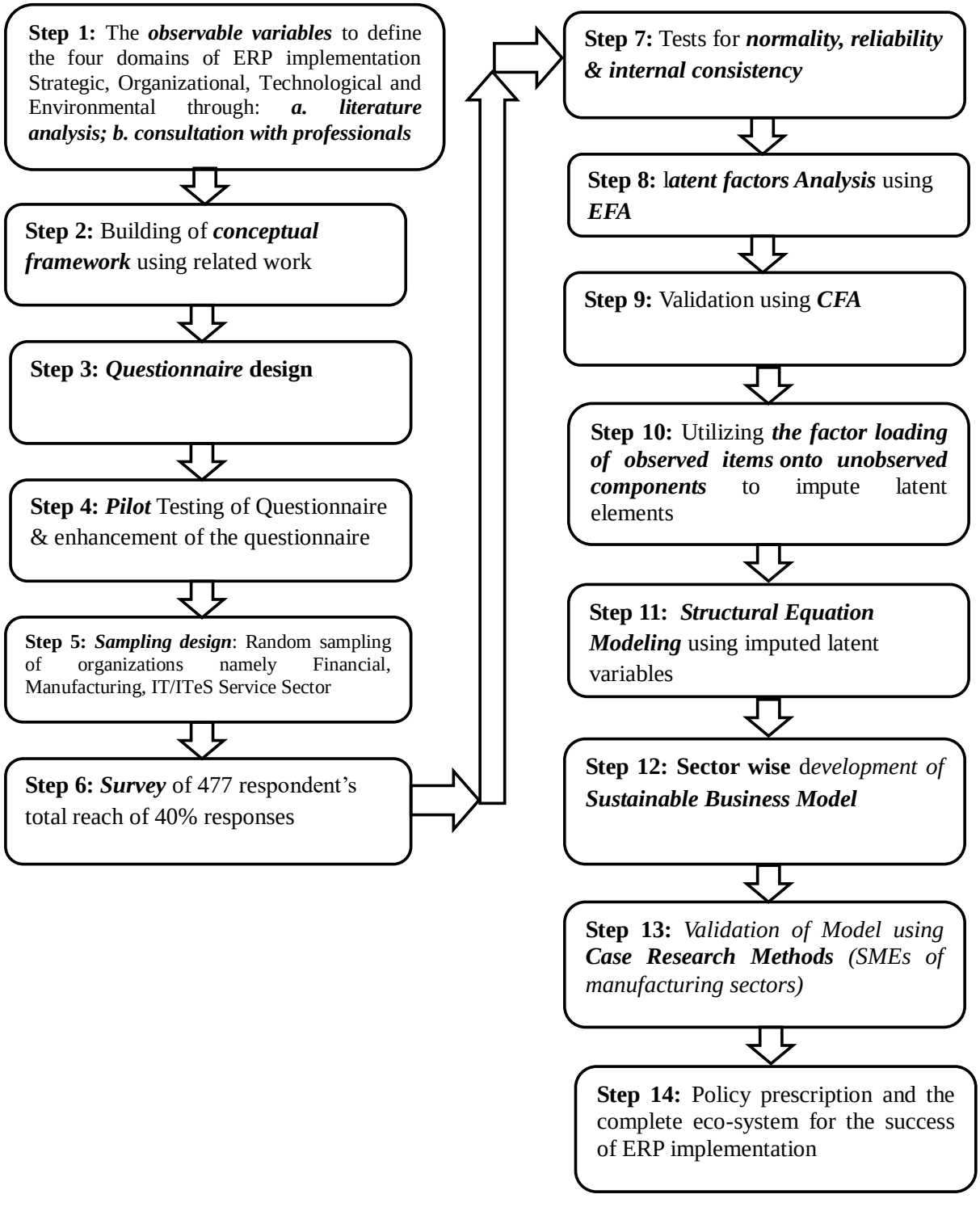


Figure 5-1: Schematic representation of the research, separately for three sectors, e.g. Financial, IT/ITeS Services Sector and Manufacturing sector

5.2 Development of theoretical framework:

The observable variables to define the four domains of ERP implementation, such as Strategic, Organizational, Technological and Environmental (SOTE) were identified through: a. review of the literature; b. consultation with experts. The components of the questionnaire are described in Table 5-1.

Table 5-1: Components & Sub-components of the Proposed Model with sample citation

Constructs	Items (code)	Research Statement	Sources
Strategic Perspective	Entrepreneurial Activity (bp101)	Entrepreneurial activity within the organization facilitated by the top management.	Bocken et. al., 2014
	Corporate goals and strategy (bp102)	Formulation of corporate goals and strategy fixed by the top management only	MacFarlance et. al.,2018
	Degree of problem faced by functional team (bp103)	Non-functioning of cross- functional team creates the inconvenience in operations	Holland et. al.,2000
	Sharing information on system implementation (bp104)	Emphasis given on relevant business information within the department for achieving the high performance	Holland et. al.,2000
	Degree of integrity (bp105)	Implementation of ERP strategy in a comprehensive and integrated way for the future prospects of the organization	Bocken et. al., 2014
	Level of concern for sustainable development (bp 106)	Concern of team leaders about the future business prospects of Enterprising System (ES)	Bocken et. al., 2014
	Level of involvement to make up coordination problem (bp 107)	Enforcement to resolve the coordination problems for the smooth implementation of ERP packages	Mitra et. al.,2019; Zimmermann et al., 2019
	Reward for leadership (bp108)	Based on performance managers and supervisors are rewarded for leadership quality to set examples in front of juniors	Burns, 1978, Mitra et. al.,2019
Organizational Perspective	Management readiness to change (bp 201)	The readiness of management regarding the change of the organization	Benjamin and Levinson, 1993
	Top management initiatives (bp 202)	Initiatives taken by higher level of management for scaling up the business model	Mitra et. al.,2019

Constructs	Items (code)	Research Statement	Sources
	Coordination (bp 203)	Coordination level among the employees help the organization to grow its business	Chang et al., 2008, Ranjan & Baral,2015
	Business plan/Vision of leader (bp 204)	Vision of leader for scaling up his/her firm	Ali & Miller,2017
	Project justification and tech. and economic feasibility (bp 205)	Team members analyze the feasibility of the project at the very beginning of their project	Maguire et. al.,2010
	Information sharing between organization and SCM (bp 206)	The sharing of information within the entire supply chain	Kiran & Reddy,2019
	Organization readiness to change (bp 207)	Organization must be ready to acquire new technology	Kwahk et.al.,2012
	Decision making on research based activity (bp 208)	Emphasis is given on research and data-based decision making	Wahyono (2018)
	Enhancement of Employee Skills (bp 209)	Programmers to be arranged regular basis for skill development of employees	Maguire et. al.,2010; Bocken et. al.,2014; Sherino and Bhatta, 2021
	Participation of new employees on decision making (bp 210)	Newly joined employees are encouraged to share their opinion in any relevant issue	Wahyono (2018)
	Proactive management (bp 211)	Initiatives taken by the management for the enhancement of the expertise of the employees	Bocken et. al.,2014
Technological Perspective	Degree of customization (bp 301)	For the development of sustainable business model customization of model is required	Ali et. al.,2017
	Level of accuracy of data (bp 302)	At implementation time different algorithms can be used and among those which gives better accuracy can be implemented	Ali et. al.,2017
	Degree of inter functional task forces (bp 303)	Formation of inter-functional task forces for better architecture designing of project.	Wahyono, (2018)
	Degree of enhancing business	Employees are encouraged to arrange training programs to enhance business	Maguire et. al.,2010

Constructs	Items (code)	Research Statement	Sources
	information (bp 304)	information	
	Degree of Innovativeness (bp 305)	Technological factors to be added to make the business model innovative	Bocken et. al.,2014
	Level of BPR	Change of mechanism regarding business process reengineering within the supply chain.	*Mustafa Ağaoğlu et al.,2015*
Environmental Perspective	Consumption of resources	Sustainable consumption of resources is required.	Wesselink et al., 2017
	Consumption of Energy	Optimized consumption of Energy is required for sustainable business model.	Ali et. al.,2017
	Recovery of the materials in manufacturing processes.	Support team must be competent enough to recover the faulty materials so that the work progress cannot be stalled for a long.	Ranjan & Baral, 2015
	Management mandate to follow the laws of environmental protection.	Circulation of mandate mentioning environmental protection laws	Fakeeh et. al.,2014
	Management's role towards selection of stakeholders to develop green supply chain model	Initiatives taken by the management for the selection of stakeholders especially vendors to ensure green supply chain model.	Kiran& Reddy, 2019
	Assessment of Environmental risk	Environmental risk assessment within the business process by risk assessment team.	Wahyono,. (2018).
	Process using Alternate source of energy	Alternative plan using alternate source of energy may be applied during the process development	Wesselink et al., 2017

5.3 Questionnaire Design

The survey's structure is based on Likert-scaled items (5-point scale) on a wide range of topics, including strategic, organizational, technological, and environmental viewpoints. The questions were mostly developed based on a survey of the literature. Next, it was approved by academic and business executives with relevant expertise in the design and execution of ERP systems' schema who were concerned with the issue.

All of the perspectives have some surrogate measures and the measures have emerged in the studies of past researchers. The present researchers take those items for developing the research instrument, i.e., the development of the questionnaire and the questionnaire itself is presented in Appendix A. To do the survey in online mode a google form was created and the link is:

https://forms.gle/hfr25ekNZkRkVyc99

5.4 Research Methodology

In order to get insight from the experiences of a sizable group of Indian businesses operating in the manufacturing, banking, and IT services sectors who have embraced ERP, we conducted a field study. Target respondents for the study were senior managers, including the chief executive officer (CEO), chief information officer (CIO), or chief technical officer (CTO), as well as business managers who were actively involved in ERP projects. The study's goal was to gather high-level information about the decision to adopt ERP. These respondents met the requirements for data collection for the study because they were anticipated to be knowledgeable about and play a part in the decision-making process for implementing strategic assets like ERP.

All of the study variables included in Table 5-1 was assessed using several reflective indicator questions on a five-point Likert-type scale, ranging from "low" (1) to "high" (5) in order to achieve strong construct validity. To ensure strong content validity and improve the comparability and reliability of study results, we repurposed the assessment items that had been operational zed and evaluated in prior empirical studies.

The survey instrument was pretested over the course of two phases. The instrument was tested in the initial stage with ten subject-matter experts from the academic and business worlds. Their comments on the survey questionnaire's substance, clarity of presentation, applicability, length, and structure led to significant adjustments in the instrument. The instrument was tested in the initial stage with ten subject-matter experts from the academic and business worlds. In order to fit the context of the current study, additional necessary alterations to the format and presentation arrangement were performed.

5.5 Survey and Data

The present research study uses the Centre of Monitoring Indian Economy (CMIE) database for the random selection of the organizations using random number table from the three identified sectors, namely, Manufacturing Sector, Banking Sector and IT Services sector. After selection of the organizations from the mentioned three sectors, the choice of the companies has been made based on the criterion that ERP system is installed or not and if yes, then only the organizations are taken into considerate set to conduct the survey work. Then, data on each business under consideration is gathered, including: the name, type, financial information and the contact details of concerned senior management

5.6 Pilot study

In the Eastern part of India, a list of managers employed in the manufacturing industry was put from the Centre of Monitoring Indian Economy (CMIE). Use of Cochran's (1977) for infinite population is therefore secure.

Cochran's (1977) formula for infinite population was used to calculate the necessary sample size of 120, using a confidence level of 92% (corresponding Z-score is 1.75 and confidence interval is 0.08) and a p value of 0.5.

Sample Size-SS for infinite population = $(\text{Z-score})^2 * p*(1-p) / (\text{Confidence Interval})^2$

$$= (1.75)^2 * 0.5*(1- 0.5) / (0.08)^2 = 120 = SS$$

SS is calculated using an assumption of infinite population

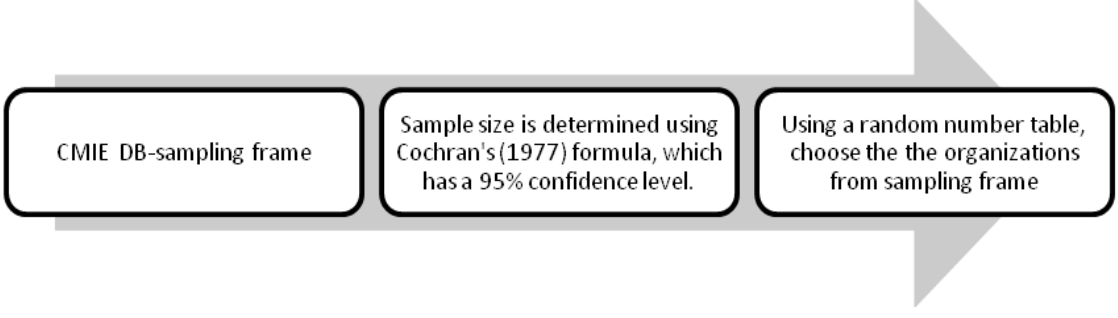
The pilot survey has been conducted only in the organizations of the manufacturing sector to find out the reliability of the questionnaire. The same questionnaire, then also, are used to conduct the survey in two other sectors.

The instrument and the sampling strategy described in the earlier discussions served as the foundation for the data collection. The poll was carried out between March 1, 2018, and September 30, 2019. The survey was carried out in-person, primarily at the locations where the participants are working, and also by providing the managers with a Google link to complete the survey.

Some changes to the questionnaire's phrasing were made in light of the findings.

The process is presented in Figure 5-2.

Figure 5-2: Sampling plan



5.7 Data Collection

The survey questionnaire was sent to the senior managers of the select organizations of the three mentioned sector. Given that the data was gathered from top management individuals in Indian firms who routinely get such requests, the survey produced response rate of about 40%, which is typical of similar studies. The length of the survey might have had an impact on the response rate.

Table 5-2 summarizes the analysis of respondents of the mentioned three sectors and the details are given in the Appendix B.

Table 5-2: Summary of Respondents of the mentioned three sectors

Sl. No	**Sector**	**No of Organizations within that sector**	**Number of Senior Managers contacted to participate**	**Number of responses received***	**% of Responses**
1	Banking Sector	11 banks (including private and public banks)	362	150	41.4
2	IT/ITeS Service Sector	34	370	152	41.08
3	Manufacturing Sector	36 (distinct one)	412	175	42.5
Total Sample Size				477	

* Responses with missing data were also not considered in the dataset.

Chapter 6

Financial Sector: Results & Discussion

The financial services industry offers financial services to both individuals and businesses. A wide range of financial businesses, including banks, investment houses, lenders, real estate brokers, and insurance companies. The technological advancements in the banking sector were much pronounced in the last decade and adoption of ERP has completely changed the business patterns of the Banking sector. Still, they are in the process of modification of the Information System for better customer service and for achieving that, a complete organizational restructuring is continually going on to meet the strategic goals of the Banking sector. To capture the sets of dynamism in the domain of technology, organizational and strategic in the competitive environment , the present research only select banking sector of India which undergone a series of turbulence in the recent past.

6.1 Exploratory Factor Analysis (EFA) of Financial Sector

6.1.1 Identifying latent determinants of ERP implementation strategy in the financial sector

The present chapter pertains to financial sector including public and private banks. The 32 items used to gauge the four domains namely, strategic, organizational, technological and environmental perspectives utilizing the main components approach and varimax rotation, were all subjected to EFA. The number of elements to be extracted has been verified using the Scree plot and Eigen values (Hair et al., 1998). Since many of the claims discovered by the banks executives' survey probably have similar underlying structures, EFA was designed to learn the potential elements on which the items loaded. Additionally, the items' convergent and discriminant validity, which together make up the instrument's construct validity, were evaluated (Brahma, 2009).

6.1.2 EFA for SOTE Model for the Financial Sector

The survey questionnaire was sent to 362 executives of financial sector who are having more than seven years of experience in the ERP domain. Some data were discarded due to missing information. Total of 150 responses from the public and private sectors were considered and among those 68% of executives were from the public sector and 32% were from private sector banks.

The acquired dataset was subjected to exploratory factor analysis (EFA) using SPSS 21.0, and confirmatory factor analysis (CFA) using AMOS version 23.0 was used to assess the construct's validity. Structural Equation Modeling has been used to estimate the reliability of the constructions (SEM). There is good internal consistency among the constructs, according to Cronbach's alpha, which is 0.9232. (Cronbach & Meehl, 1955).

6.1.2.1 EFA: Strategic Perspective

EFA is used to classify the relationship's structural elements in addition to condensing data to a smaller collection of variables. Figure 6-1 displays the scree plot, and Table 2 displays the EFA results. According to Table 6-1, the outcome showed that Kaiser-Meyer-Olkin (KMO) of the sampling adequacy was 0.848, which can account for 58.528 percent of the variation (Table 6-2). According to (Hutcheson & Sofroniou, 1999), the sample size can be taken into consideration if the KMO value is more than 0.50. Thus, the KMO value in this case is fairly good.

Table 6-1: KMO and Bartlett's Test(Strategic Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.848
Bartlett's Test of Sphericity	Approx. Chi-Square	381.019
	df	28
	Sig.	.000

Table 6-2: Total Variance Explained by two factor model(Strategic Domain)

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.670	45.881	45.881	3.670	45.881	45.881	3.652	45.649	45.649
2	1.012	12.647	58.528	1.012	12.647	58.528	1.030	12.879	58.528
3	.906	11.320	69.848						
4	.700	8.752	78.600						
5	.578	7.222	85.822						
6	.409	5.117	90.939						
7	.384	4.801	95.740						
8	.341	4.260	100.000						

Extraction Method: Principal Component Analysis.

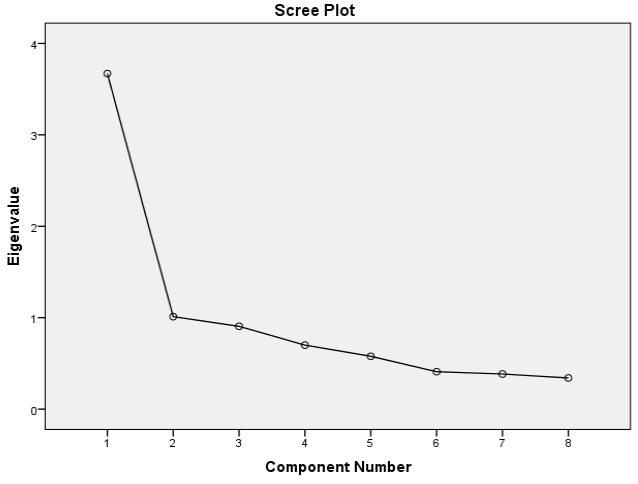


Figure 6-1: Scree plot – EFA (Strategic) using SPSS 21.0

6.1.2.1.1 Output factor analysis of strategic perspective

Table 6-3 lists the factor names together with the variables they are associated with. Two variables namely Vision & Policies (F_1) and Intradepartmental Integrity (F_2), emerged as important ones for developing sustainable supply chain management, according to the finding of factor analysis.

Table 6-3: Factor Matrix of strategic perspective using SPSS 21.0

Factor Name	**Factor Definition**	**Variable Coding**	**Variable Description**	**Factor Loading**	
Vision & Policies (F_1)	A company's long-term goals and strategies for sustainable development	bp102	Corporate goals and strategy	0.802	
		bp106	Level of concern for sustainable development	0.791	
		bp105	Degree of integrity	0.76	
		bp108	Reward for leadership	0.751	
		bp107	Level of participation to resolve coordination problem	0.705	
		bp101	Entrepreneurial Activity	0.675	
		bp103	Degree of inconvenience faced by non functioning of cross functional team	0.536	
Intradepartmental Integrity (F_2)	Intradepartmental Integrity is a crucial component for sharing information to sustain successful business growth over the long run.	bp104	Sharing information on system implementation		0.984

6.1.2.2 EFA: Organizational Perspective

Figure 6-2 displays the scree plot, and Table 6-4 displays the EFA results. Kaiser-Meyer-Olkin (KMO) of the sample adequacy was 0.643 in the result (table 6-4), and it may account for 61.631 percent of the variation (table 6-5). Hutcheson and Sofroniou (1999) state that if the KMO value is more than 0.60, the sample size can be taken into account. Thus, the KMO value in this case is fairly good.

Table 6-4: KMO and Bartlett's Test(Organizational Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.643
Bartlett's Test of Sphericity	Approx. Chi-Square	289.872
	df	55
	Sig.	.000

Table 6-5: Total Variance Explained by four factor model(Organizational Domain)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.676	24.328	24.328	2.676	24.328	24.328	2.251	20.462	20.462
2	1.732	15.748	40.075	1.732	15.748	40.075	1.958	17.803	38.265
3	1.319	11.991	52.066	1.319	11.991	52.066	1.294	11.767	50.032
4	1.052	9.564	61.631	1.052	9.564	61.631	1.276	11.598	61.631
5	.847	7.696	69.326						
6	.766	6.964	76.290						
7	.755	6.868	83.158						
8	.601	5.462	88.620						
9	.483	4.395	93.015						
10	.409	3.721	96.736						
11	.359	3.264	100.000						

Extraction Method: Principal Component Analysis.

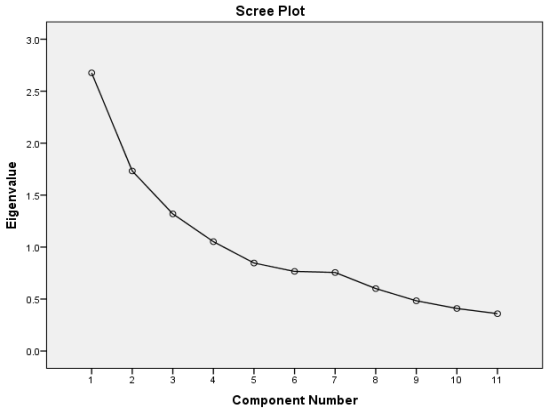


Figure 6-2: Scree plot – EFA (Organizational) using SPSS 21.0

6.1.2.2.1 Output Factor Analysis of Organizational Perspective:

Table 6-6 lists the factor names and the accompanying variables. The results of the factor analysis show that the following factors are crucial for establishing sustainable supply chain management: Management's initiative in decision-making and upgrading (F1), Techno-Economic Feasibility (F2), Management's business plan (F3), Technology advancement, and Network among Inter Organizations (F4).

Table 6-6: Factor Matrix of Organizational Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Description	Factor Loading			
Initiative of Management in decision making and upgradation(F_1)	Enterprise data integration enhances consistency and decision support for success.	bp210	Participation of new employees on decision making	0.766			
		bp211	Proactive management	0.702			
		bp207	Organization readiness to change	0.701			
		bp209	Enhancement of Employee Skills	0.508			
Techno-Economical Feasibility (F_2)	It is used to evaluate the project's hazards and risks to the project's technical and financial sustainability, to strengthen the coordination and to identify immediate measures that must be performed.	bp208	Decision making on research based activity		0.802		
		bp205	Project justification based on tech. and economic scale		0.761		
		bp203	Coordination		0.738		
Business plan of Management (F_3)	Business plan outlines company's aims and strategies for achieving company's operations, finances, and marketing.	bp204	Business plan/Vision of leader			0.702	
		bp201	Management readiness to change			0.668	
Technology advancement and Network among Inter organizations (F_4)	Management has taken initiative to share information across the supply chain	bp202	Top management initiatives				0.87
		bp206	Information sharing between organization and SCM				0.466

6.1.2.3 EFA: Technological Perspective

Figure 6-3 depicts the scree plot. According to Table 6-7, the result showed that Kaiser-Meyer-Olkin (KMO) of the sample adequacy was 0.602, which can account for 50.103 percent of the variation (Table 6-8). Hutcheson and Sofroniou (1999) state that if the KMO value is more than 0.60, the sample size can be taken into account. Thus, the KMO value in this case is fairly good.

Table 6-7: KMO and Bartlett's Test(Technological Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.602
Bartlett's Test of Sphericity	Approx. Chi-Square	66.912
	df	15
	Sig.	.000

Table 6-8: Total Variance Explained by two factor model (Technological Domain)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.773	29.556	29.556	1.773	29.556	29.556	1.663	27.718	27.718
2	1.233	20.546	50.103	1.233	20.546	50.103	1.343	22.384	50.103
3	.964	16.068	66.171						
4	.771	12.855	79.026						
5	.711	11.855	90.881						
6	.547	9.119	100.000						

Extraction Method: Principal Component Analysis.

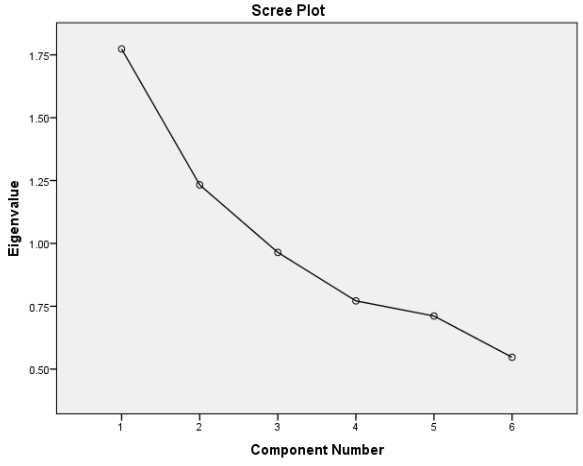


Figure 6-3: Scree plot–EFA (Technological) using SPSS 21.0

6.1.2.3.1 Output Factor Analysis of Technological Perspective:

Table 6-9 is a list of the factor names and the accompanying variables. The factor analysis results show that demand and correlation (F2), as well as innovativeness and testing features (F1), are crucial for building sustainable supply chain management.

Table 6-9: Factor Matrix of Technological Perspective by two factor model

Factor Name	Factor Definition	Variable Coding	Variable Description	Factor Loading	
Innovativeness and testing features (F_1)	Business innovation and testing features are the procedure used by a business to introduce novel concepts, procedures, reengineering methods, services, or goods.	bp 305	Degree of Innovativeness	0.793	
		bp 302	Level of accuracy of data	0.727	
		bp 304	Degree of enhancing business information	0.521	
		bp 306	Level of BPR	0.415	
Demand and co-relation (F_2)	Demand and Correlation is frequently used in financial analysis and to enhance decision-making in the business world to establish the relationship between data sets.	bp301	Degree of customization		0.767
		bp303	Level of formation of inter functional task forces		0.743

6.1.2.4 EFA: Environmental Perspective

The scree plot is shown in Figure 6-4, and the result exhibited Kaiser-Meyer-Olkin(KMO) of the sampling adequacy as 0.520 (Table 6-10) and can explain the variation at the level of 65.204 percent (Table 6-11).

Table 6-10: KMO and Bartlett's Test(Environmental Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.520
Bartlett's Test of Sphericity	Approx. Chi-Square	179.545
	df	21
	Sig.	.000

Table 6-11: Total Variance Explained by three factor model (Environmental Domain)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.970	28.147	28.147	1.970	28.147	28.147	1.821	26.021	26.021
2	1.534	21.909	50.055	1.534	21.909	50.055	1.682	24.024	50.045
3	1.060	15.149	65.204	1.060	15.149	65.204	1.061	15.159	65.204
4	.914	13.054	78.258						
5	.779	11.133	89.391						
6	.471	6.727	96.118						
7	.272	3.882	100.000						

Extraction Method: Principal Component Analysis.

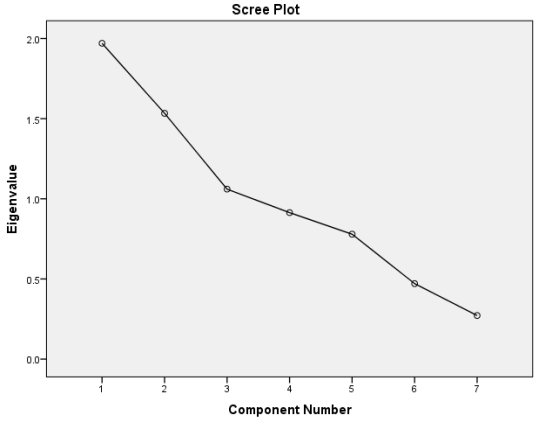


Figure 6-4*: Scree plot – EFA (Environmental) using SPSS 21.0*

6.1.2.4.1 Output Factor Analysis of Environmental Perspective:

Table 6-12 lists the factor names and the accompanying variables. According to the results of the factor analysis, three factors—Waste Reduction Strategy Toward Sustainability (F1), Supplier Selection Toward Processing Wastes in Cloud Server (F2), and Ecological Sustainability (F3)—have emerged as significant ones for establishing sustainable supply chain management.

Table 6-12: Factor Matrix of Environmental Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Description	Factor Loading		
Waste Reduction Strategy towards Sustainability (F_1)	Initiative of management handling waste generated in the process	bp 407	Degree of awareness towards elimination of hazardous waste	0.882		
		bp 405	Management's role towards sustainability	0.873		
		bp 402	Clients' review	0.459		
Supplier selection towards processing wastes in cloud server (F_2)	Utilizing data from the supplier selection process, the technique finds the managerial criteria and applies them to the supplier management process.	bp 406	Degree of selection of suppliers		0.846	
		bp 404	Degree of waste generation in cloud storage		0.841	
		bp 403	Degree of processing information		0.47	
Ecological Sustainability (F_3)	The foundation of ecological sustainability is a long-term outlook that can preserve ecosystem productivity and lessen influence on the environment.	bp 401	Level of sharing ecological information			0.924

6.2 Confirmatory Factor Analysis (CFA) & Structural Equation Modeling (SEM) of Financial Sector

For data from the financial sector, a CFA has been carried out using AMOS 23.0 to further assess the applicability of the survey instrument's items (Byrne, 2010). The original EFA solution has been implemented. One factor per item was permitted, and the measurement model was configured to include the number of latent variables discovered during EFA. The goodness of fit indicators has been calculated (presented in table 6-13, 6-16, 6-19, 6-22). The CFA diagrams, (output generated by AMOS), with non-standardized (presented in figure 6-5,6-7,6-9,6-11) and standardized estimates, (presented in Figure 6-6,6-8,6-10,6-12).

6.2.1 CFA & SEM: Strategic Perspectives

Table 6-13: Goodness of fit indicators in CFA for Strategic Domain

Indicators	Value of CFA
CMIN- Chi-square value	33.429
Probability Value P	P<0.0001
DF-Degrees of freedom	14
CMIN/DF- Ratio of Chi-square and the degree of freedom	2.388
CFI- Comparative-Fit-Index	0.946
IFI- Incremental Fit Index	0.947
TLI- Tucker–Lewis Index	0.920
GFI-Goodness of Fit Indicator	0.940

The goodness of fit means the extent to which the calculated model predicts the observed input matrix. According to Schreiber et al., 2006; Kline, 2011 all the values indicate a good fit.

A multivariate statistical analytic method, structural equation modeling (SEM), is employed to examine structural relationships. This method examines the structural link between measured variables and latent constructs by combining component and multiple regression analysis. The researcher favors this approach since it estimates numerous connected dependencies in a single investigation. Endogenous and exogenous variables are the two variables employed in this analysis. Endogenous variables are the same as both the independent and dependent variables.

Here figure 6-4 can explain the weightage of eight factors for strategic perspective in standardized coefficient format, respectively, while conducting Structural Equation Modeling.

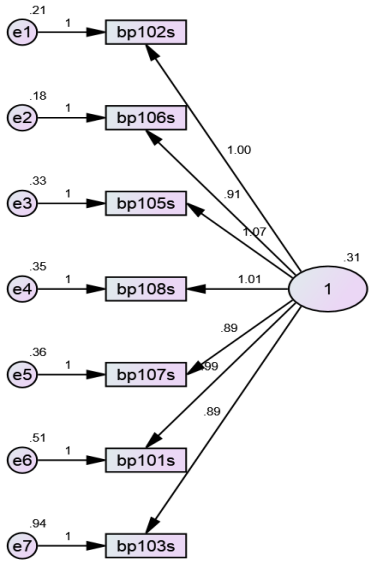


Figure 6-5: Non-standardized coefficients (Strategic Domain)

Table 6-14: Intercepts (Strategic Domain)

	Estimate	S.E.	C.R.	P	Label
bp102s <--- 1	1.000				
bp106s <--- 1	.912	.100	9.101	***	
bp105s <--- 1	1.067	.125	8.512	***	
bp108s <--- 1	1.006	.124	8.136	***	
bp107s <--- 1	.888	.118	7.504	***	
bp101s <--- 1	.987	.138	7.156	***	
bp103s <--- 1	.889	.170	5.236	***	

For example, figure 6-5 and table 6-14 describe that if factor 1 goes up by 1 standard deviation, then bp106 'Level of concern for sustainable development goes down by 0.91standard deviation.

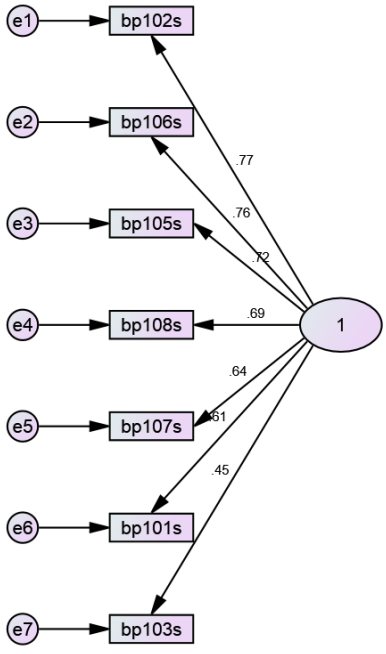


Figure 6-6: Standardized coefficients (Strategic Domain)

Here ovals are used to represent latent variables, whereas rectangles are used to display observable variables. Double-headed or single-headed arrows show residuals and variances and a circle. The latent IQ variance has been fixed at 1 to give the model size. This graph shows how measurement errors affect each indicator of latent accomplishment and latent intelligence. The indicators and their measurement errors are not modeled as impacting the latent variables, but they may if the researcher chooses to do so.

Table 6-15: Standardized Regression Weights (Strategic Domain)

	Estimate
bp102s <--- 1	.772
bp106s <--- 1	.763
bp105s <--- 1	.715
bp108s <--- 1	.686
bp107s <--- 1	.636
bp101s <--- 1	.608
bp103s <--- 1	.452

For example, figure 6-6 and table 6-15 describe that if factor 1 goes up by 1 standard deviation, then bp102 ‘Corporate goals and strategy’ goes down by 0.77standard deviation. Similarly, if factor 1 goes up by 1 standard deviation, then bp106 i.e., ‘Level of concern for sustainable development goes down by 0.76standard deviation.

6.2.2 CFA & SEM: Organizational Perspectives

Table 6-16: Goodness of fit indicators in CFA for Organizational Domain

Commonly reported fit measures	***Value of CFA***
Chi-square value (CMIN)	42.444
Probability Value P	P<0.0001
Degrees of Freedom (DF)	25
The ratio of Chi-square and the degree of freedom (CMIN/DF)	1.698
Comparative-Fit-Index (CFI)	.910
Incremental Fit Index (IFI)	0.915
Tucker–Lewis Index (TLI)	0.871
The Goodness of Fit Indicator (GFI)	0.941

CFA of Eleven components for the organisational perspective are broken down into standardised and non-standardized coefficient formats in Figures 6-7 and 6-8, respectively. The value of frequently used organisational perspective fit statistics using AMOS version 23.0 is shown in Table 6-16.

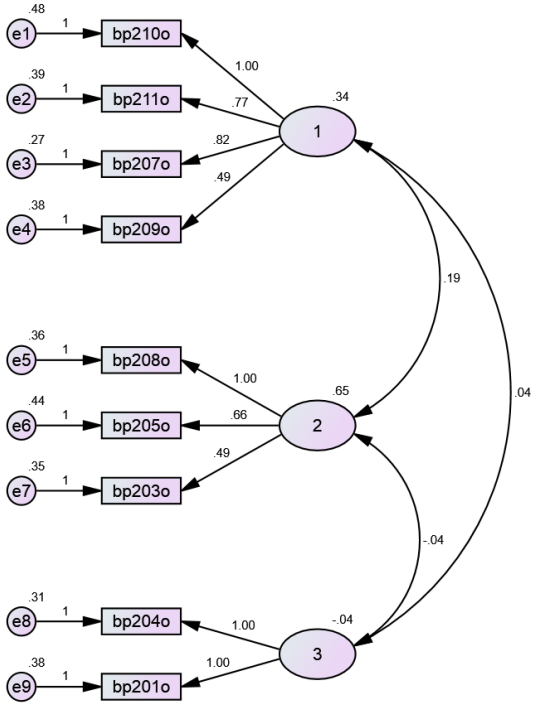


Figure 6-7: Non-standardized Coefficients (Organizational Domain)

Table 6-17: Intercepts *(Organizational Domain)*

	Estimate	S.E.	C.R.	P	Label
bp210o <--- 1	1.000				
bp211o <--- 1	.766	.154	4.965	***	
bp207o <--- 1	.820	.156	5.253	***	
bp209o <--- 1	.487	.125	3.898	***	
bp208o <--- 2	1.000				
bp205o <--- 2	.659	.125	5.248	***	
bp203o <--- 2	.485	.098	4.975	***	
bp204o <--- 3	1.000				
bp201o <--- 3	1.000				

For example, figure 6-7 and table 6-17 describe that if factor 1 goes up by one standard deviation, then bp211 'Proactive management' goes down by 0.77 standard deviation. Similarly, if factor 1 goes up by one standard deviation, then bp207, i.e., 'Organization readiness to change, goes down by 0.82standard deviation.

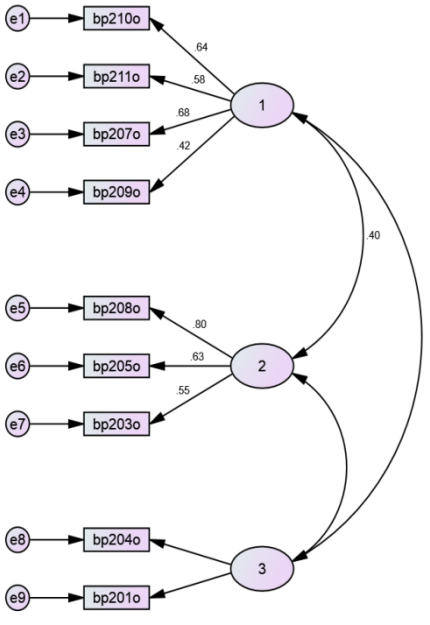


Figure 6-8: Standardized Coefficients (Organizational Domain)

Table 6-18: Standardized Regression Weights *(Organizational Domain)*

	Estimate
bp210o <--- 1	.643
bp211o <--- 1	.580
bp207o <--- 1	.677
bp209o <--- 1	.415
bp208o <--- 2	.802
bp205o <--- 2	.625
bp203o <--- 2	.551

For example, figure 6-8 and table 6-18 describe that if factor 1 goes up by 1 standard deviation, then bp210 'Participation of new employees on decision making' goes down by 0.64standard deviation. Similarly, if factor 1 goes up by 1 standard deviation, then bp211, i.e., 'Proactive Management,' goes down by 0.58 standard deviation.

6.2.3 CFA & SEM: Technological Perspectives

Table 6-19: Goodness of fit indicators in CFA for Technological Domain

Commonly reported fit measures	***Value of CFA***
Chi-square value (CMIN)	4.730
Probability Value P	P<0.0001
Degrees of Freedom (DF)	4
The ratio of Chi-square and the degree of freedom (CMIN/DF)	1.182
Comparative-Fit-Index (CFI)	.986
Incremental Fit Index (IFI)	0.987
Tucker–Lewis Index (TLI)	0.964
The Goodness of Fit Indicator (GFI)	0.988

The value of often cited fit statistics for the technical perspective utilizing confirmatory factor analysis for AMOS version 23.0 is presented in Table 6-19. Six factors for the technological perspective are broken down into non-standardized and standardized coefficient formats in Figures 6-9 and 6-10, respectively.

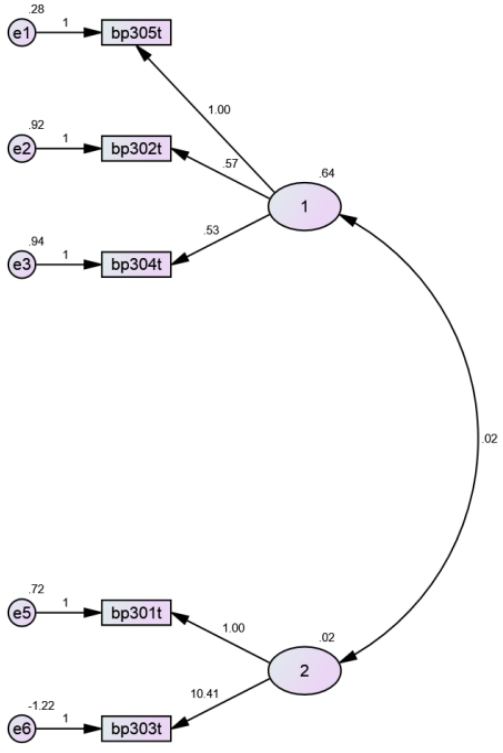


Figure 6-9: Non-standardized Coefficients (Technological)

Table 6-20: Intercepts (Technological)

	Estimate	S.E.	C.R.	P	Label
bp305t <--- 1	1.000				
bp302t <--- 1	.570	.212	2.694	.007	
bp304t <--- 1	.526	.199	2.641	.008	
bp301t <--- 2	1.000				
bp303t <--- 2	10.414	31.714	.328	.743	

For example, figure 6-9 and table 6-20 describe that if factor 1 goes up by 1 standard deviation, then bp302 ‘Level of the accuracy of data’ goes down by 0.57standard deviation. Similarly, if factor 1 goes up by 1 standard deviation, then bp304 ‘Degree of enhancing business information’ goes down by 0.53standard deviation.

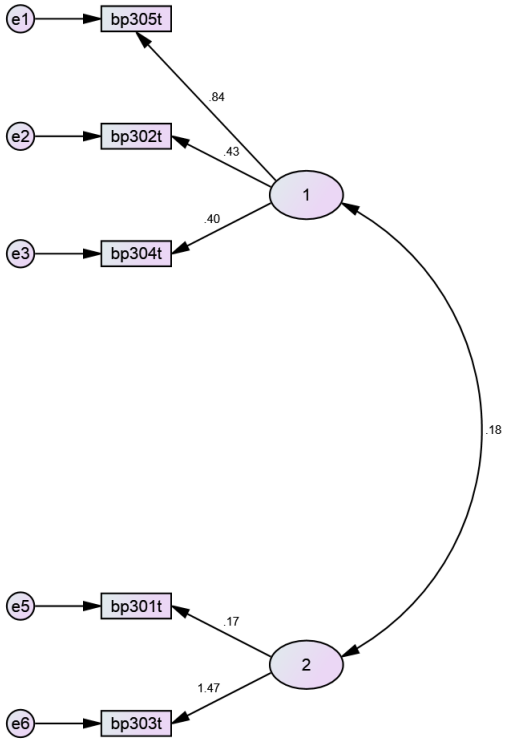


Figure 6-10: Standardized Coefficients (Technological)

Table 6-21: Standardized Regression Weights *(Technological)*

	Estimate
bp305t <--- 1	.835
bp302t <--- 1	.428
bp304t <--- 1	.397
bp301t <--- 2	.167
bp303t <--- 2	1.475

For example, figure 6-10 and table 6-21 describe that if factor 1 goes up by 1 standard deviation, then bp305 'Degree of Innovativeness' goes down by 0.84standard deviation. Similarly, if factor 1 goes up by 1 standard deviation, then bp302 i.e., 'Level of accuracy of data' goes down by 0.43standard deviation.

6.2.4 CFA & SEM: Environmental Perspectives

Table 6-22: Goodness of fit indicators in CFA for Environmental Domain

Commonly reported fit measures	***Value of CFA***
Chi-square value (CMIN)	5.480
Probability Value P	P<0.0001
Degrees of Freedom (DF)	2
The ratio of Chi-square and the degree of freedom (CMIN/DF)	2.740
Comparative-Fit-Index (CFI)	.976
Incremental Fit Index (IFI)	0.977
Tucker–Lewis Index (TLI)	0.929
The Goodness of Fit Indicator (GFI)	0.982

The value of often cited fit statistics for the environmental perspective using confirmatory factor analysis for AMOS version 23.0 is shown in Table 6-22. Seven parameters for the environmental perspective are broken down into non-standardized and standardized coefficient formats in Figures 6-11 and 6-12, respectively.

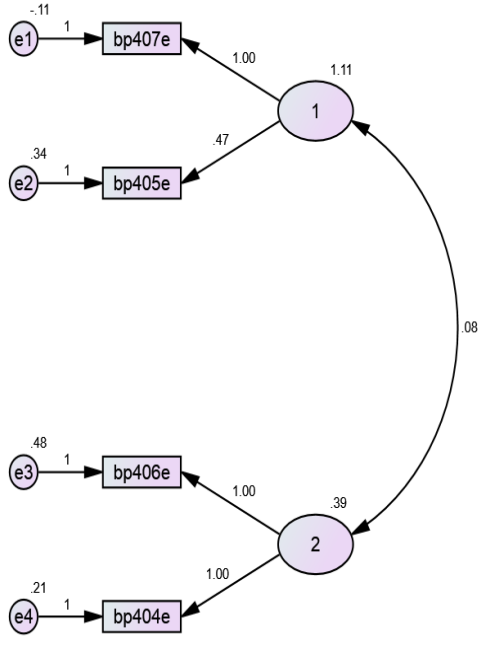


Figure 6-11: Non-standardized Coefficients (Environmental Domain)

Table 6-23: Intercepts (Environmental Domain)

	Estimate	S.E.	C.R.	P	Label
bp407e <--- 1	1.000				
bp405e <--- 1	.473	.421	1.123	.261	
bp406e <--- 2	1.000				
bp404e <--- 2	1.000				

For example, figure 6-12 and table 6-23 describe that if factor 1 goes up by 1 standard deviation, then bp405 ‘Management’s role towards sustainability’ goes down by 0.47standard deviation.

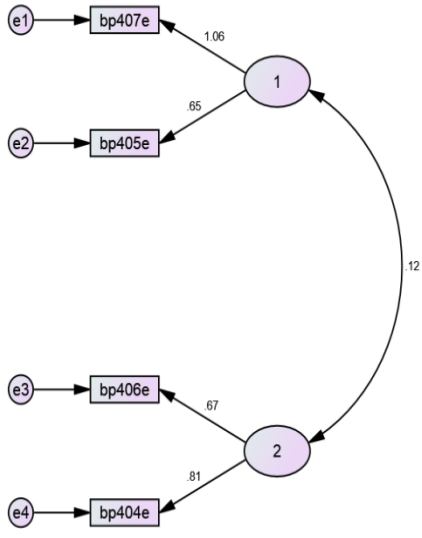


Figure 6-12: Standardized Coefficients (Environmental Domain)

Table 6-24: Standardized Regression Weights (Environmental Domain)

	Estimate
bp407e <--- 1	1.056
bp405e <--- 1	.651
bp406e <--- 2	.670
bp404e <--- 2	.806

For example, figure 6-12 and table 6-24 describe that if factor 1 goes up by 1 standard deviation, then bp405 ‘Management’s role towards sustainability’ goes down by 0.65standard deviation. Similarly, if factor 2 goes up by 1 standard deviation, then bp406, i.e., ‘Degree of selection of suppliers’, goes down by 0.67standard deviation.

6.3 Overall Discussion

Figure 6-6 suggests that ***business goals and strategy*** (bp102) have the greatest impact on the vision and regulations for ERP deployment in a financial sector organization (standardized regression weight of 0.77). With a normalized regression weight of 0.76, the impact of the observable variable level of concern for sustainable development (bp106) follows. According to the conclusions above, the goals and level of sustainability as stated by a financial sector

company have an impact on the vision and rules that are adopted for the ERP implementation within the organization.

According to organizational viewpoints, ***management's initiative in decision-making and advancement*** is most influenced by ***new employees' participation in decision-making*** (bp210, Figure 6-8). A financial sector organization's management is compelled to take sustainability concerns into consideration when making choices since the younger workforce is more aware of these issues. According to the standardized regression weight of 0.80 in Figure 6-8, decision-making regarding ***research-based activity*** (bp208, Figure 6-8) is the main factor influencing ***the degree of decision-making about research-based activity***.

The technical views identify the ***degree of innovativeness*** (bp305) as the observable variable with the highest influence on innovativeness and testing characteristics, as well as the amount to which BPR and expert training are used to produce error-free products (as seen from the standardized regression weight of 0.84, Figure 6-10). Since their standardized regression weights, as seen in Figure 10, are less than 0.5, it appears that the 'level of data correctness' (bp 302) or the '***degree of upgrading business information***' (bp 304) have no effect on the aforementioned latent factor.

Figure 6-12 demonstrates that the financial sector's waste reduction strategy has a greater standardized regression weight when compared to 'the degree of awareness toward the elimination of hazardous waste' (observable variable, bp407) (latent factor number 1 in Figure 13). Therefore, spreading sustainable business practices for waste reduction in ERP adoption in the financial sector may depend on raising the vendors of cloud storage's understanding of waste management. In the 'waste reduction plan for sustainability, management's role' (observable variable, bp405) also appears to play a significant effect (standardised regression weight, 0.65) (latent factor F1 in Figure 6-12). To boost management's effectiveness in reducing waste on cloud servers, the government may create particular policies. Additionally, user activism has been successful in pressuring management to take a bigger role in sustainability (Barclay & Miller, 2018).

The 'client's review' (observable variable, bp402), which seemed to have a significant loading during EFA (Table 8), didn't seem to have a major impact on the waste reduction strategy's sustainability (as it does not appear in SE, Figure 6-12).

Provider selection level (observable variable bp406) appears to have a significant impact on the factor "supplier selection towards processing wastes in cloud server" (latent factor F2 in Figure 13) (Standardized regression weight of 0.67). Such a conclusion is reasonable given that the financial sector organization's sustainability should logically benefit from the care taken in selecting cloud storage providers who minimize waste. Similar to this, Figure 6-12 illustrates how the organization's sustainability will be impacted by 'the amount of garbage generated in cloud storage' (bp404).

A framework that has been validated using the arguments and debates from above may be presented, as shown in Figure 6-13.

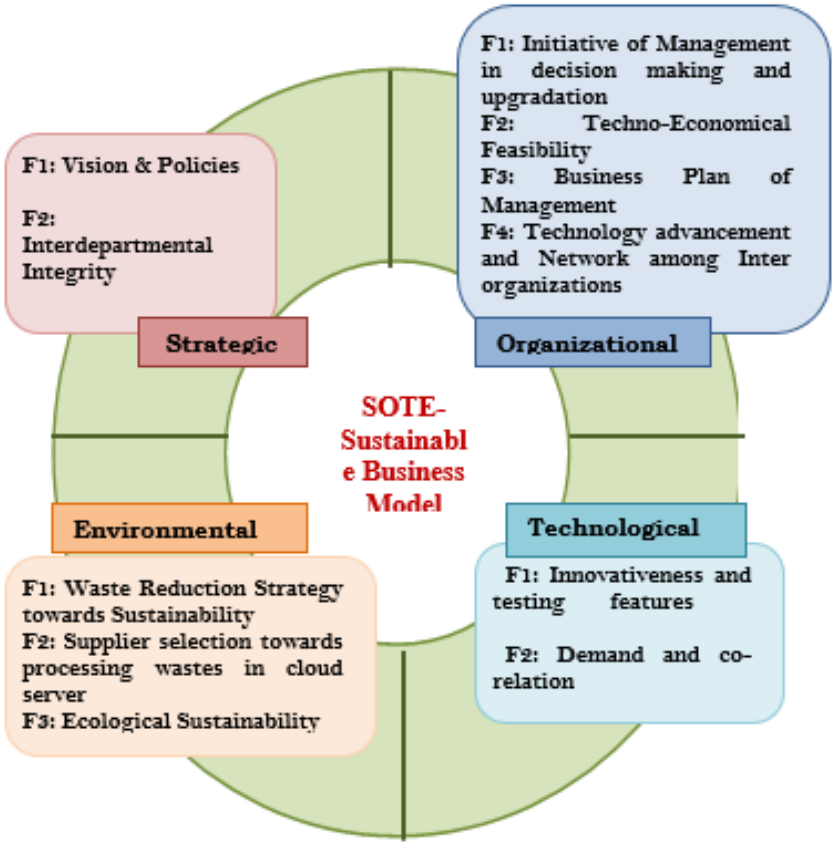


Figure 6-13: SOTE-Sustainable Business Model for Financial Sector

6.4 Chapter Summary

To ensure an organization's long-term success, a sustainable business model must be created. The purpose of the current study was to better understand the key elements involved in creating a sustainable business model using an ERP system. The contributing elements show how customers, staff, and supply chain participants feel about the long-term viability of financial institutions. These industries are aware of the important elements in creating a company plan. The framework is based on strategic organizational, technological, and environmental parameters; a successful business model supported by technology would not be possible until and unless management recognizes the challenges facing the company in the future and expresses their willingness to act accordingly.

The model (Figure 6-13) could be tested in future studies in sectors outside than finance. This research might add particular new parameters to the article's model. Since the current study exclusively considers the financial sector, this is where it also falls short. Due to the various countries' cultural differences, the study's conclusions could not be applicable to nations other than India.

Chapter 7

Results & Analysis of IT/ITeS Service Sector

7.1 Exploratory Factor Analysis (EFA) of IT/ITeS Service Sector

7.1.1 Identifying latent determinants of ERP implementation strategy in the IT/ITeS Service Sector

The present chapter pertains to IT/ITeS Service Sector and the 32 items used to gauge the four domains namely, strategic, organizational, technological and environmental perspectives utilizing the main components approach and varimax rotation, were all subjected to EFA. The number of elements to be extracted has been verified using the Scree plot and Eigen values (Hair et al., 1998). Given that many of the claims made in the CEOs' survey probably have the same underlying structures; EFA was designed to learn the potential elements on which the items loaded. Additionally, the items' convergent and discriminant validity, which together make up the instrument's construct validity, were evaluated (Brahma, 2009).

7.1.2 EFA for SOTE Model for of IT/ITeS Service Sector

The questionnaire was sent to 370 executives of IT/ITeS sector and among those total of 152 responses were considered for analysis as some were discarded due to invalid inputs. The senior level officers with more than seven years of experience in the ERP domain participated in the survey process. The acquired dataset was subjected to EFA using SPSS 21.0, and CFA using AMOS version 23.0 was used to assess the construct's validity. SEM has been used to estimate the reliability of the constructions. Cronbach's alpha = 0.9331 indicates that among the constructs, good internal consistency exists (Cronbach & Meehl, 1955).

7.1.2.1 EFA: Strategic Perspective

Figure 7-1 depicts the scree plot, and the result of Table 7-1 demonstrates the Kaiser-Meyer-Olkin (KMO) sampling adequacy, which is 0.826 and can account for a variation of 50.103 percent (Table 7-2). Hutcheson and Sofroniou (1999) state that if the KMO value is more than 0.60, the sample size can be taken into account. Thus, the KMO value in this case is fairly good.

Table 7-1: KMO and Bartlett's Test (Strategic) of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.826
Bartlett's Test of Sphericity	Approx. Chi-Square	242.002
	Df	28
	Sig.	.000

Table 7-2: Total Variance Explained by two factor model (Strategic Domain)

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.032	37.902	37.902	3.032	37.902	37.902	2.973	37.161	37.161
2	1.045	13.058	50.961	1.045	13.058	50.961	1.104	13.800	50.961
3	.954	11.926	62.887						
4	.853	10.658	73.545						
5	.644	8.049	81.594						
6	.570	7.122	88.716						
7	.483	6.032	94.748						
8	.420	5.252	100.000						

Extraction Method: Principal Component Analysis.

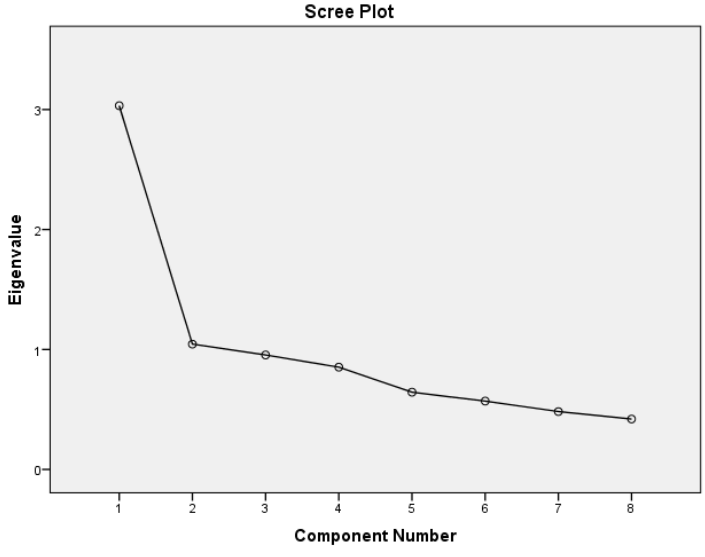


Figure 7-1: ScreePlot- EFA (Strategic) using SPSS 21.0

7.1.2.1.1 Output factor analysis of strategic perspective:

Table 7-3 lists the factor names together with the variables they belong to. Two variables, namely Strategy & Leadership (F1) and Supply-chain Planning (F2), emerged as significant for building sustainable supply chain management, according to the findings of the factor analysis.

Table 7-3: Factor Matrix of strategic perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Description	Factor Loading	
Corporate Strategy & Leadership (F_1)	This Factor is defined as the strategy and leadership activities fixed by the management for the sustainable growth of an organization	bp102	Corporate goals and strategy	0.780	
		bp106	Level of concern for sustainable development	0.724	
		bp105	Degree of integrity	0.711	
		bp108	Reward for leadership	0.697	
		bp101	Entrepreneurial Activity	0.679	
		bp107	Level of participation to resolve coordination problem	0.565	
Operational Efficiency of Interdepartmental Team (F_2)	This factor explores the need of inter departmental cross-functional team for smooth sharing of information	bp 104	Sharing information on system implementation		0.855
		bp 103	Degree of inconvenience faced by non functioning of cross functional team		0.555

7.1.2.2 EFA: Organizational Perspective

Figure 7-2 displays the scree plot, and Table 7-4 displays the EFA results. In table 7-4, the result showed Kaiser-Meyer-Olkin (KMO) of the sampling adequacy as 0.650, which can account for 59.513 percent of the variation (table 7-5).

Table 7-4: KMO and Bartlett's Test of Sphericity (Organizational domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.650
Bartlett's Test of Sphericity	Approx. Chi-Square	264.302
	Df	55
	Sig.	.000

Table 7-5: Total Variance Explained by four factor model (Organizational Domain)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.468	22.436	22.436	2.468	22.436	22.436	2.442	22.202	22.202
2	1.693	15.394	37.830	1.693	15.394	37.830	1.479	13.447	35.648
3	1.281	11.642	49.472	1.281	11.642	49.472	1.402	12.742	48.391
4	1.104	10.041	59.513	1.104	10.041	59.513	1.223	11.122	59.513
5	.927	8.423	67.936						
6	.828	7.523	75.459						
7	.740	6.723	82.183						
8	.713	6.482	88.665						
9	.499	4.539	93.204						
10	.416	3.780	96.984						
11	.332	3.016	100.000						

Extraction Method: Principal Component Analysis.

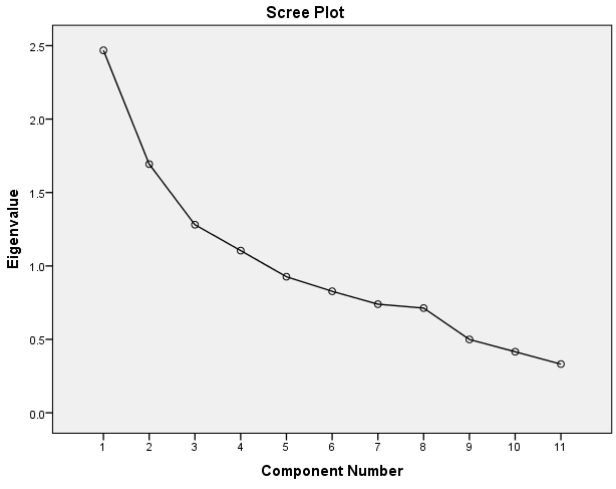


Figure 7-2: ScreePlot- EFA (Organizational) using SPSS 21.0

7.1.2.2.1 Output Factor Analysis of Organizational Perspective

Table 7-6 lists the factor names and the accompanying variables. The results of the factor analysis showed that the establishment of sustainable supply chain management relied on four factors: the Plan of Management in Decision Making (F1), Business Strategies (F2), Feasibility Analysis and SCM Strategies (F3), and Top Management Initiatives (F4).

Table 7-6: Factor Matrix of Organizational Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Description	Factor Loading			
Management Strategy in decision making(F_1)	This factor explains the proactive role taken by the management in decision making by using research based techniques and introducing new employees in the decision making team to get the new ideas and nurture them for the change management	bp208	Decision making on research based activity	0.739			
		bp 210	Participation of new employees on decision making	0.693			
		bp 211	Proactive management	0.629			
		bp 209	Enhancement of Employee Skills	0.624			
		bp 207	Organization readiness to change	0.609			
Organizational Focus and Implementation Strategy (F_2)	The factor has emphasized on the strong coordination of the team members for the implementation of the vision of the leader	bp 203	Coordination		0.828		
		bp204	Business plan/Vision of leader		0.617		
Project Feasibility and assessment of organizational Capacity (F_3)	The factor has made justification to conduct the feasibility analysis of the project and assessment of organizational capability to implement the same.	bp201	Management readiness to change			0.776	
		bp205	Project justification based on tech. and economic scale			0.598	
		bp206	Information sharing between organization and SCM			0.502	
Top management initiatives (F_4)	The factor defines as the initiatives taken by management	bp202	Top management initiatives				0.908

7.1.2.3 EFA: Technological Perspective

Figure 7-3 displays the scree plot in this instance, and table 7-7 displays the EFA results. The outcome demonstrated 0.724 Kaiser-Meyer-Olkin (KMO) sampling adequacy, which may account for 59.513 percent of the variation (table 7-8). Hutcheson and Sofroniou (1999) state that if the KMO value is more than 0.60, the sample size can be taken into account. Thus, the KMO value in this case is fairly good.

Table 7-7: **KMO and Bartlett's Test of Sphericity (Technological Domain)**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.724
Bartlett's Test of Sphericity	Approx. Chi-Square	123.496
	Df	15
	Sig.	.000

Table 7-8: Total Variance Explained by two factor model (Technological Domain)

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.295	38.258	38.258	2.295	38.258	38.258	1.958	32.636	32.636
2	1.022	17.029	55.286	1.022	17.029	55.286	1.359	22.650	55.286
3	.829	13.823	69.109						
4	.714	11.902	81.011						
5	.678	11.297	92.308						
6	.462	7.692	100.000						

Extraction Method: Principal Component Analysis.

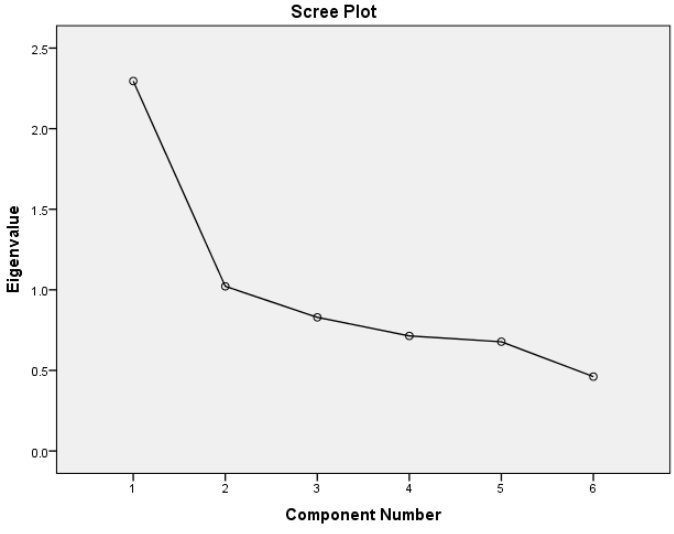


Figure 7-3: ScreePlot- EFA (Technological) using SPSS 21.0

7.1.2.3.1 Output Factor Analysis of Technological Perspective:

Table 7-9 lists the factor names and the related variables. Two variables, namely Resource optimization and delivery of optimized products (F1), Testing, and resource sustainability (F2), emerged as important for developing sustainable supply chain management, according to the findings of the factor analysis.

Table 7-9: Factor Matrix of Technological Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Description	F1	F2
Resource optimization & delivery of customized product(F_1)	This factor is defined as the degree of innovativeness, the extent of use of Inter functional task forces and the utmost customer satisfaction regarding end product.	bp 305	Degree of Innovativeness	0.748	
		bp303	Level of formation of inter functional task forces	0.705	
		bp301	Degree of customization	0.696	
		bp 304	Degree of enhancing business information	0.575	
Firm capability of reengineering its business process (F_2)	This factor is defined as the use of data accuracy from the business level to change the business process	bp 302	Level of accuracy of data		0.859
		bp 306	Level of BPR		0.682

7.1.2.4 EFA: Environmental Perspective

The scree plot is displayed in Figure 7-4, and table 7-10 displays the EFA results. According to Table 10's results, the sample adequacy Kaiser-Meyer-Olkin (KMO) value was 0.672, which may account for a variation of 65.204 percent (Table 7-11).

Table 7-10: KMO and Bartlett's Test of Sphericity(Environmental Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.672
Bartlett's Test of Sphericity	Approx. Chi-Square	108.434
	Df	21
	Sig.	.000

Table 7-11: Total Variance Explained by two factor model (Environmental Domain)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.099	29.988	29.988	2.099	29.988	29.988	2.058	29.398	29.398
2	1.063	15.190	45.178	1.063	15.190	45.178	1.105	15.780	45.178
3	.996	14.231	59.409						
4	.988	14.111	73.520						
5	.802	11.458	84.978						
6	.588	8.393	93.371						
7	.464	6.629	100.000						

Extraction Method: Principal Component Analysis.

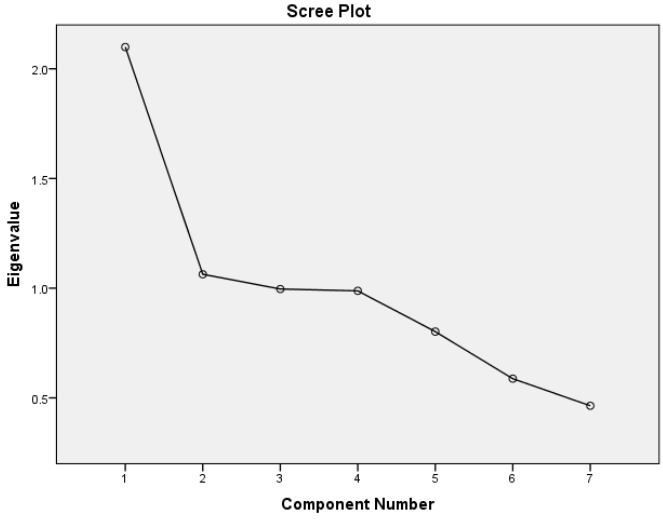


Figure 7-4: Scree plot – EFA (Environmental) using SPSS 21.0

7.1.2.4.1 Output Factor Analysis of Environmental Perspective:

Table 7–12 lists the factor names and the accompanying variables. According to the results of the factor analysis, three factors—Decisions regarding stakeholder's opinion and process flow (F1), environmental sustainability (F2), and sustainable supply chain management—have emerged as important.

Table 7-12: Factor Matrix of Environmental Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Description	Factor Loading	
Assessment of Stakeholders opinion towards waste minimization & sustainability (F_1)	The factor is defined as the decision strategy regarding stakeholder's opinion and process flow to run the business	bp 403	Degree of processing information	0.791	
		bp 405	Management's role towards sustainability	0.743	
		bp 404	Degree of waste generation in cloud storage	0.733	
		bp 402	Clients' review	0.578	
Strategy for Sustainable Development (F_2)	This factor is defined as the environmental information related to ecology, supplier and waste generation of the organization for the purpose to achieve high performance	bp 401	Level of sharing ecological information		0.734
		bp 406	Degree of selection of suppliers		0.686
		bp 407	Degree of awareness towards elimination of hazardous waste		0.225

7.2 Confirmatory Factor Analysis (CFA) & Structural Equation Modeling (SEM) of IT/ITeS Service Sector

To further evaluate the reliability of the survey instrument's items, a CFA has been carried out using AMOS 23.0 for the IT/ITeS service sector (Byrne, 2010). In this process one element per item was permitted, and the measurement model was configured to include the amount of latent variables discovered during EFA. The goodness of fit indicators has been determined (presented in table 7-13). The standardized estimations, AMOS output, and CFA diagrams (presented in Figure 7-5).

The rest are shown in Table 7-13, and a sample model fit for CFA of all four domains is detailed here.

7.2.1 CFA & SEM: Strategic Perspectives

In the table 7-13, the values found for strategic perspective is the Chi-square value (CMIN)=8.971, P<0.001, the ratio between Chi-square to the degree of freedom (CMIN/DF = 1.154) is less than 2, Goodness of Fit(GFI) indicator was 0.963, Tucker-Lewis Index (TLI) was 0.981 and Comparative-Fit-index (CFI) was 0.986. All the values indicate a satisfactory fit. For a model of the current complexity, it is recommended that the Root Mean Square Error of Approximation (RMSEA) should be less than 0.06. Here it is estimated to be 0.032.

7.2.2 CFA & SEM: Organizational Perspectives

In the table 7-13, the values found for organizational perspective is the Chi-square value (CMIN)= 45.341, P<0.001, the ratio between Chi-square to the degree of freedom (CMIN/DF = 1.511) is less than 2, Goodness of Fit(GFI) indicator was 0.952, Tucker-Lewis Index (TLI) was 0.884 and Comparative-Fit-index (CFI) was 0.923. All the values indicate a satisfactory fit. For a model of the current complexity, it is recommended that the Root Mean Square Error of Approximation (RMSEA) should be less than 0.06. Here it is estimated to be 0.058.

7.2.2 CFA & SEM: Technological Perspectives

In the table 7-13, the values found for technological perspective is the Chi-square value (CMIN)= 11.364, P<0.001, the ratio between Chi-square to the degree of freedom (CMIN/DF = 1.263) is less than 2, Goodness of Fit(GFI) indicator was 0.976, Tucker-Lewis Index (TLI) was 0.964 and Comparative-Fit-index (CFI) was 0.979. All the values indicate a satisfactory

fit. For a model of the current complexity, it is recommended that the Root Mean Square Error of Approximation (RMSEA) should be less than 0.06. Here it is estimated to be 0.042.

7.2.2 CFA & SEM: Environmental Perspectives

In the table 7-13, the values found for technological perspective is the Chi-square value (CMIN)= 12.192, P<0.001, the ratio between Chi-square to the degree of freedom (CMIN/DF = 0.938) is less than 2, Goodness of Fit(GFI) indicator was 0.978, Tucker-Lewis Index (TLI) was 1.015 and Comparative-Fit-index (CFI) was 1. All the values indicate a satisfactory fit. Therefore, the entire model seems to be a decent fit based on this parameter as well.

Table 7-13: Goodness of fit indicators for all CFAs of Strategic, Organizational, Technological and Environmental Domain

Strategic Domain					
CMIN					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	16	23.088	20	0.000	1.154
Saturated model	36	0	0		
Independence model	8	251.186	28	0	8.971
RMR, GFI					
Model	RMR	GFI	AGFI	PGFI	
Default model	0.043	0.963	0.934	0.535	
Saturated model	0	1			
Independence model	0.136	0.61	0.498	0.474	
Baseline Compa					

Organizational Domain					
CMIN					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	25	45.341	30	0.000	1.511
Saturated model	55	0	0		
Independence model	10	243.645	45	0	5.414
RMR, GFI					
Model	RMR	GFI	AGFI	PGFI	
Default model	0.026	0.952	0.912	0.519	
Saturated model	0	1			
Independence model	0.099	0.731	0.671	0.598	
Baseline Compa					

Technological Domain					
CMIN					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	12	11.364	9	0.000	1.263
Saturated model	21	0	0		
Independence model	6	125.858	15	0	8.391
RMR, GFI					
Model	RMR	GFI	AGFI	PGFI	
Default model	0.029	0.976	0.945	0.418	
Saturated model	0	1			
Independence model	0.126	0.733	0.626	0.524	
Baseline Compa					

Environmental Domain					
CMIN					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	15	12.192	13	0.000	0.938
Saturated model	28	0	0		
Independence model	7	110.757	21	0	5.274
RMR, GFI					
Model	RMR	GFI	AGFI	PGFI	
Default model	0.019	0.978	0.953	0.454	
Saturated model	0	1			
Independence model	0.092	0.804	0.738	0.603	
Baseline Compa					

risons					
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.908	0.871	0.987	0.981	0.986
Saturated model	1		1		1
Independence model	0	0	0	0	0
RMSEA					
Model	RMSEA	LO90	HI90	PCLOSE	
Default model	0.032	0	0.08	0.678	
Independence model	0.23	0.204	0.256	0	

risons					
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.814	0.721	0.928	0.884	0.923
Saturated model	1		1		1
Independence model	0	0	0	0	0
RMSEA					
Model	RMSEA	LO90	HI90	PCLOSE	
Default model	0.058	0.015	0.091	0.323	
Independence model	0.171	0.15	0.192	0	

risons					
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.91	0.85	0.98	0.964	0.979
Saturated model	1		1		1
Independence model	0	0	0	0	0
RMSEA					
Model	RMSEA	LO90	HI90	PCLOSE	
Default model	0.042	0	0.106	0.517	
Independence model	0.221	0.186	0.258	0	

risons					
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.89	0.822	1.008	1.015	1
Saturated model	1		1		1
Independence model	0	0	0	0	0
RMSEA					
Model	RMSEA	LO90	HI90	PCLOSE	
Default model	0	0	0.076	0.795	
Independence model	0.168	0.138	0.2	0	

These days, most IT organizations use pervasive technology that requires a significant dependence on the IT field that can correlate different political, organizational, social, technical, cultural, and environmental issues. Confirmatory Factor Analysis (CFA) was required to test the relationship between variables and latent constructs. It can be carried out by structural equation modeling (SEM), a process of sophisticated statistical analysis used to test hypothetical models on data.

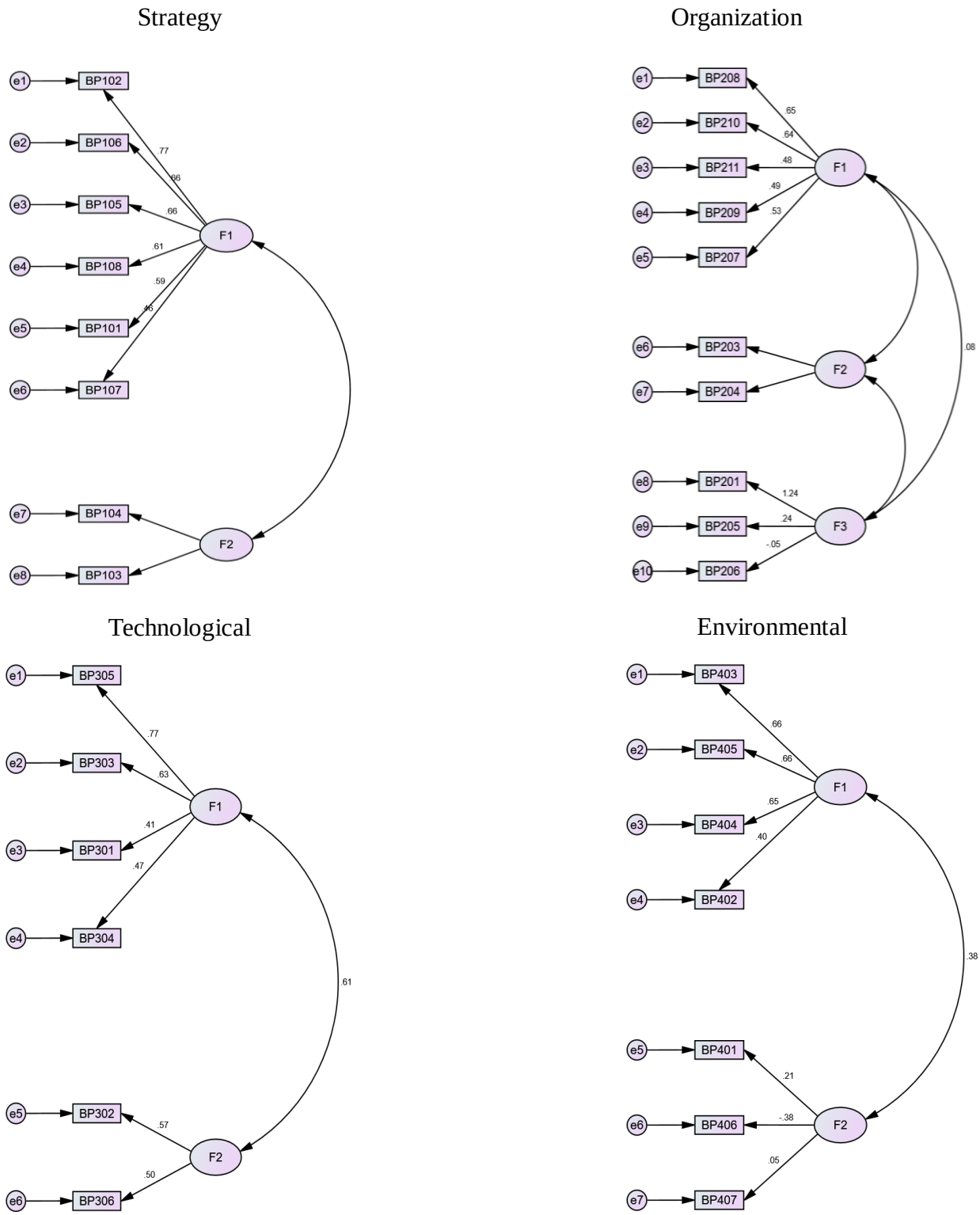


Figure 7-5: Standardized coefficients (Strategic, Organizational, Technological and Environmental Domain) of IT/ITeS sector using AMOS version 23.0

7.3 Overall Discussion

From Figure 7-5, the construct validity of this model was established. Here the attribute and error measures were represented by ellipses and circles. The direct effects indicate that the factors were evaluated from which observed variables. For example, in strategic perspective, ***'Corporate Strategy & Leadership (F_1)'*** was emerged from bp 102, bp 106, bp 105, bp 108, bp101 and bp 107. ***'Operational Efficiency of Interdepartmental Team (F_2)'*** was emerged from bp 104 and p 103. For organizational perspective of IT /ITeS sector ***Management Strategy in Decision Making (F_1)*** was emerged from bp 208, bp 210, bp 211, bp 209, bp 207. ***Organizational Focus and Implementation Strategy (F_2)*** was emerged from bp203, bp 204. The third factor Project Feasibility and assessment of organizational capacity (F_3) was found bp 201, bp 205 and bp 206. For technological perspective ***Resource optimization & delivery of customized product (F_1)*** was emerged from bp 305, bp 303, bp 301 and bp 304. ***F_2- Firm capability of reengineering its business process*** was found from bp 302 and bp 306. For Environmental perspective, ***'Assessment of Stakeholders opinion towards waste minimization & sustainability (F_1)'*** was found from bp 403, bp 405, bp 404 and bp 402. Factor 2 ***(F_2) 'Strategy for Sustainable Development'*** was found from bp 401, bp 406 and bp 407. In this regard, Dillon et al. (1996) illustrated convergent validity of brand factor though this issue of validity might not be related to SEMs. Whenever latent variables are being used, validity should be addressed.

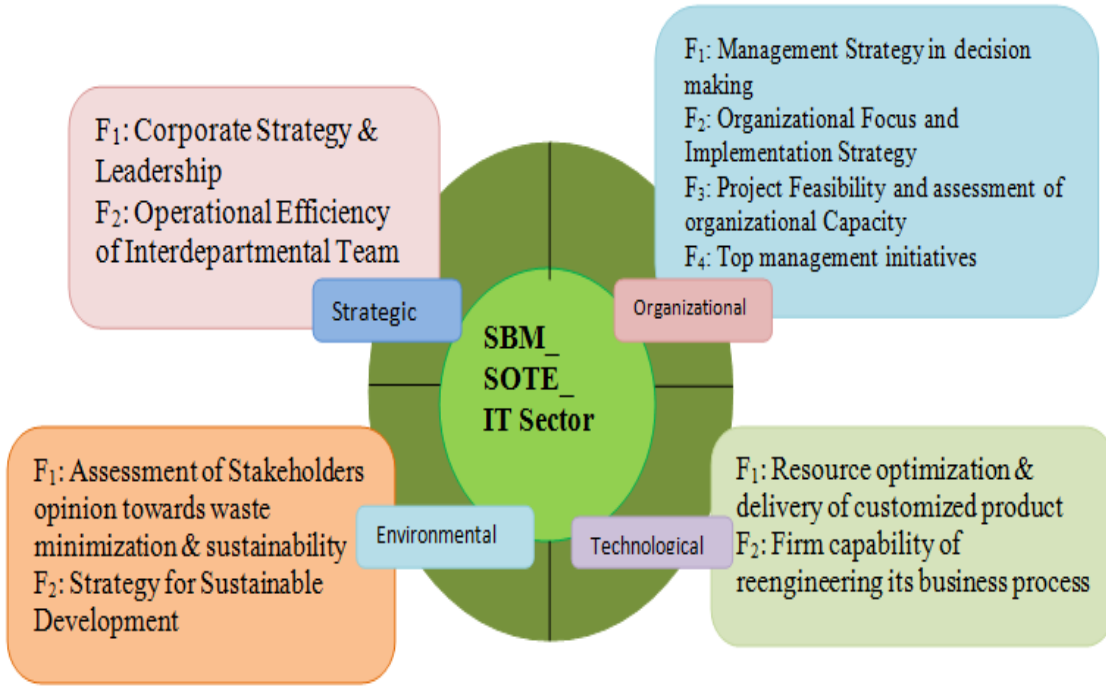


Figure 7-6: SOTE-Sustainable Business Model for IT/ITeS Service Sector

7.4 Chapter Summary

The development of the business model in the IT/ITeS sector is different from other innovations due to a variety of socio-technical issues, the complexity of the project execution, and the various end user types. This study has managerial ramifications regarding selecting specific factors that will help the organizations endure. The study findings also provide insights for managers to incorporate specific strategic, organizational, technological, and environmental skills. The emerged factors, like Corporate Strategy & Leadership, Operational Efficiency of Interdepartmental Team, Management Strategy in decision making, Organizational Focus and Implementation Strategy, Project Feasibility and assessment of organizational Capacity, Top management initiatives, Resource optimization & delivery of customized products, Firm capability of reengineering its business process, Assessment of Stakeholders opinion towards waste minimization and sustainability, Strategy for Sustainable Development, are the backbone of the proposed SOTE model for the IT/ITeS service sector industries. The model provided in this article might gain some new parameters as a result of this investigation.

Chapter 8

Results & Analysis of Manufacturing Sector

8.1 Exploratory Factor Analysis (EFA) of Manufacturing Sector

8.1.1 Identifying latent determinants of ERP implementation strategy in the manufacturing sector

The present chapter pertains to manufacturing sector. The 32 items used to gauge the four domains namely, strategic, organizational, technological and environmental perspectives by using the main components approach and varimax rotation, were all subjected to EFA. The number of elements to be extracted has been verified using the Scree plot and Eigen values (Hair et al., 1998).

8.1.2 EFA for SOTE Model for the Manufacturing Sector

The survey questionnaire was sent to 412 senior level officials of manufacturing sector who have more than seven years of experience in the ERP domain and from the responses 175 responses were taken into consideration.

The acquired dataset was subjected to exploratory factor analysis (EFA) using SPSS 21.0, and confirmatory factor analysis (CFA) using AMOS version 23.0 was used to assess the construct's validity. Structural Equation Modeling has been used to estimate the reliability of the constructions (SEM). Cronbach's alpha = 0.932 indicates that among the constructs, good internal consistency exists (Cronbach & Meehl, 1955).

8.1.2.1 EFA: Strategic Perspective

EFA is used to classify the relationship's structural elements in addition to condensing data to a smaller collection of variables. Figure 8-1 displays the scree plot, and Table 8-1 displays the EFA results. According to Table 8-1, the outcome showed that Kaiser-Meyer-Olkin (KMO) of the sampling adequacy was 0.794, which can account for 58.524 percent of the variation (Table 8-2). According to (Hutcheson & Sofroniou, 1999), the sample size can be taken into consideration if the KMO value is more than 0.50. Thus, the KMO value in this case is fairly good. Scree Plot (Figure 8-1) indicates that two principle components were found to do principal component analysis.

Table 8-1: KMO and Bartlett's Test (Strategic Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.794
Bartlett's Test of Sphericity	Approx. Chi-Square	223.405
	df	28
	Sig.	.000

Table 8-2: Total Variance Explained by two factor model(Strategic Domain)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.773	45.665	45.665	3.182	45.273	45.273	3.565	45.557	45.557
2	1.056	13.198	58.862	1.420	13.251	58.524	1.037	12.967	58.524
3	.993	12.412	68.274						
4	.876	10.945	71.219						
5	.663	8.288	79.507						
6	.620	7.755	87.262						
7	.554	6.930	94.192						
8	.465	5.808	100.000						

Extraction Method: Principal Axis Factoring.

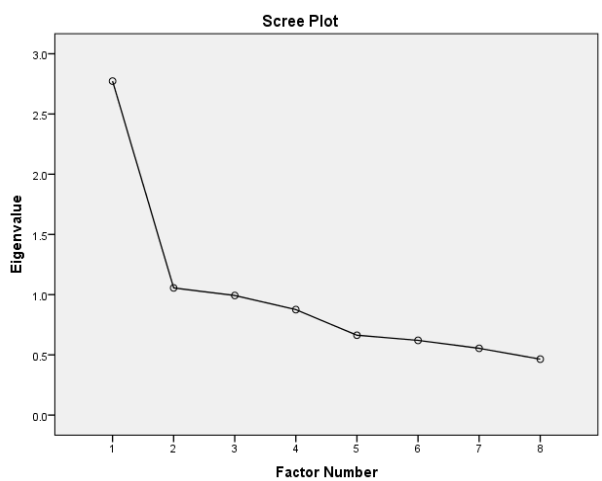


Figure 8-1: Scree plot – EFA(Strategic) using SPSS 21.0

8.1.2.1.1 Output factor analysis of strategic perspective

The result of the factor analysis shown in table 8-3 indicates that two factors, namely, Business Planning and Strategy (F1) and Innovation and Sustainable Strategy (F2), were critical for the manufacturing sector's strategic perspective.

Table 8-3: Factor Matrix of Strategic Perspective using SPSS 21.0

Factor Name	Factor Description	Variable Coding	Variable Name	Factor Loading	
Business Planning and Strategy (F_1)	Organization sets short term goals to execute strategic planning.	bp107	Level of participation to resolve coordination problem	0.714	
		bp105	Degree of integrity	0.636	
		bp108	Reward for leadership	0.506	
		bp102	Corporate goals and strategy	0.466	
		bp103	Degree of problem faced by functional team	0.465	
Innovation and Sustainable Strategy (F_2)	It defines that how an organization can effectively and strategically implies sustainability and innovation.	bp101	Entrepreneurial Activity		0.634
		bp106	Level of concern for sustainable development		0.470
		bp104	Sharing information on system implementation		0.467

8.1.2.2 EFA: Organizational Perspective

Figure 8-2 depicts the scree plot, and the four-factor solution, which accounts for 61.532 percent of the data set's overall variance, has a KMO value of sampling adequacy of 0.602 (Table 8-5). The use of factor analysis is supported by the Bartlett's test result (Table 8-4), which is less than 0.001. (Hutcheson & Sofroniou,1999).

Table 8-4: KMO and Bartlett's Test(Organizational Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.602
Bartlett's Test of Sphericity	Approx. Chi-Square	212.725
	df	55
	Sig.	.000

Table 8-5: Total Variance Explained by four factor model(Organizational Domain)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.170	24.730	24.730	2.567	24.730	24.730	2.269	20.538	20.538
2	1.696	15.420	40.150	1.092	15.420	40.150	1.137	17.339	38.877
3	1.311	11.921	52.072	1.598	11.921	52.072	1.787	11.158	50.035
4	1.041	9.460	61.532	1.472	9.460	61.532	1.535	11.863	61.532
5	.897	8.156	64.687						
6	.857	7.793	72.480						
7	.754	6.853	79.332						
8	.701	6.374	85.707						
9	.618	5.618	91.325						
10	.519	4.715	96.040						
11	.436	3.960	100.000						

Extraction Method: Principal Axis Factoring.

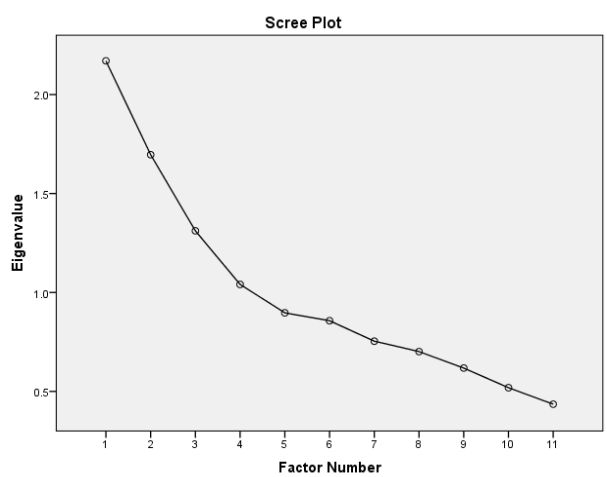


Figure 8-2: Scree Plot (Organizational)

8.1.2.2.1 Output Factor Analysis of Organizational Perspective:

The result of factor analysis (in Table 8-6) indicates four factors, namely, Organizational Flexibility (F1), Rationale and research-based Decision making (F2), Vision of Leader (F3), Information sharing among the Channel Members(F4) were found as success factors of the organizational perspective of the manufacturing sector.

Table 8-6: Factor Matrix of Organizational Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Name	Factor Loading			
Organizational Flexibility (F_1)	Organizations' ability to enhance organizational structures	bp 210	Participation of new employees on decision making	0.757			
		bp 211	Proactive management	0.539			
		bp 207	Organization readiness to change	0.457			
Rationale and research based Decision making (F_2)	Decision making ability among the employees to achieve optimize result at the end of project	bp 208	Decision making on research based activity		0.627		
		bp 205	Project justification and technology and economic feasibility		0.600		
		bp 203	Coordination		0.504		
Vision of Leader (F_3)	To grow an organization the outlook of leader is an important aspect	bp 204	Business plan/Vision of leader			0.617	
Information sharing among the Channel Members (F_4)	To improve supply chain efficiency management must aware regarding sharing of information among members	bp 202	Top management initiatives				0.541
		bp206	Information sharing between organization and SCM				0.466

8.1.2.3 EFA: Technological Perspective

Figure 8-3 depicts the scree plot, with a KMO measure of sampling adequacy of 0.629 and a two-factor solution explaining 50.408 percent of the data set's overall variance (Table 8-7). The

Bartlett's test (Table 8-5) looks into how closely related a construct's items are to one another. If the constructs are related to one another, the factor analysis can be done.

Table 8-7: KMO and Bartlett's Test(Technological Domain)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.629
Bartlett's Test of Sphericity	Approx. Chi-Square	76.321
	df	15
	Sig.	.000

Table 8-8: Total Variance Explained by two factor model (Technological Domain)

Factor	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.856	30.927	30.927	1.146	29.102	29.102	1.997	26.618	26.618
2	1.107	18.446	49.373	1.438	20.306	50.408	1.587	22.790	50.408
3	.959	15.975	65.348						
4	.788	13.138	78.486						
5	.708	11.806	90.292						
6	.582	9.708	100.000						

Extraction Method: Principal Axis Factoring.

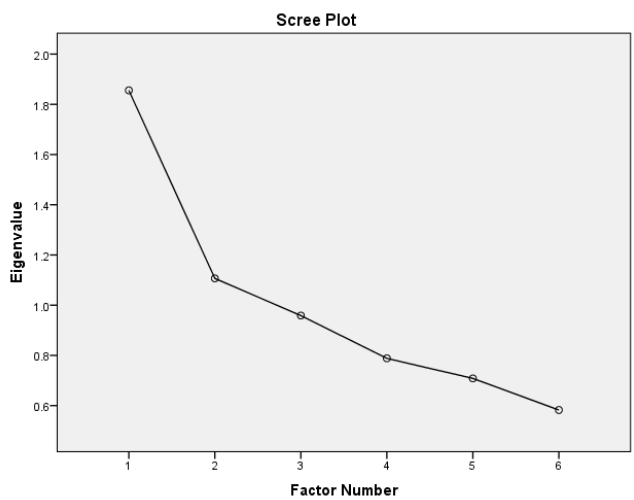


Figure 8-3: Scree plot–EFA (Technological) using SPSS 21.0

8.1.2.3.1 Output Factor Analysis of Technological Perspective:

The result of factor analysis (in table 8-9) indicates that two factors, namely, Technology Innovation & its Implementation (F1), Reengineering and Quality control for data accuracy (F2), were found as critical for the technological perspective of the manufacturing sector.

Table 8-9: Factor Matrix of Technological Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Name	Factor Loading	
Technology Innovation & its Implementation (F_1)	To satisfy customer-need, innovation in technology within the organization is highly required.	bp301	Degree of customization	0.664	
		bp305	Degree of Innovativeness()	0.453	
		bp303	Degree of inter functional task forces	0.444	
Reengineering and Quality control for data accuracy (F_2)	Data accuracy and reengineering of business processes are key attributes of measuring quality control of any business model	bp302	Level of accuracy of data		0.603
		bp306	Level of BPR		0.429

8.1.2.4 EFA: Environmental Perspective

The environmental perspective of the organization is all about how the organization is aware of environmental sustainability in terms of energy conservation and access to scarce resources. It can ensure how far the managers are concerned about the environment-friendly framework by mutually supporting variables of the external environment and natural one (Biloslavoet al., 2018).

Figure 8-4 displays the scree plot. With a KMO score of sampling adequacy of 0.625, the two-factor solution explained 72% of the data set's overall variance (Table 8-10). The Bartlett's test (Table 8–11) looks into how closely related a construct's items are to one another. Performing a factor analysis is possible if the constructions are related to one another.

Table 8-10: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.625
Bartlett's Test of Sphericity	Approx. Chi-Square	78.549
	df	19
	Sig.	.000

Table 8-11: Total Variance Explained by two factor model (Environmental Domain)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.779	25.415	25.415	1.394	29.907	29.907	1.859	27.276	27.276
2	1.329	18.988	44.403	1.646	21.223	65.265	1.839	15.989	65.265
3	1.008	14.402	58.805						
4	.941	13.447	72.252						
5	.870	12.428	84.680						
6	.663	9.476	94.156						
7	.409	5.844	100.000						

Extraction Method: Principal Axis Factoring.

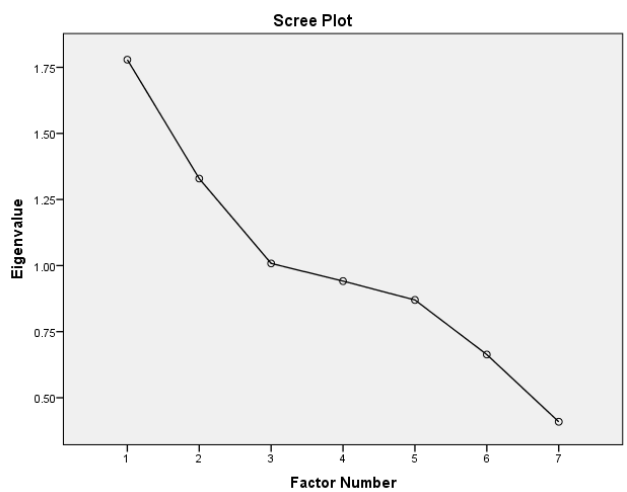


Figure 8-4*: Scree plot – EFA (Environmental) using SPSS 21.0*

8.1.2.4.1 Output Factor Analysis of Environmental Perspective:

The result of factor analysis (in Table 8-12) indicates two factors, namely, Energy restoration and green supply chain strategy (F1); practices for environmental protection (F2) were found as critical for the environmental perspective of the manufacturing sector.

Table 8-12: Factor Matrix of Environmental Perspective using SPSS 21.0

Factor Name	Factor Definition	Variable Coding	Variable Name	Factor Loading	
Energy restoration and green supply chain strategy (F_1)	Initiatives taken by the management to maintain green supply chain in order to establish sustainable business model	bp407	Process using Alternate source of energy	0.812	
		bp405	Management's role towards selection of stakeholders to develop green supply chain model	0.737	
Practices for environmental protection (F_2)	Best practices carried out by the company to protect the environment	bp404	Management mandate to follow the laws of environmental protection.		0.600
		bp406	Assessment of Environmental risk		0.454

8.2 Confirmatory Factor Analysis (CFA) & Structural Equation Modeling of Manufacturing Sector

8.2.1 CFA & SEM: Strategic Perspectives

A multivariate statistical approach is performed to determine how effectively the measured variables signify the number of constructs. It is employed to determine whether construct measures align with a researcher's knowledge of the type of the construct (or factor).

CFA is utilized in the current study to identify the variables that eventually affect how successfully the ERP is implemented in the manufacturing sector. A CFA was conducted using the AMOS 23.0 survey instrument for the manufacturing units (Byrne, 2010). The objective is to find out the relation of the observables with concerned factors.

One factor per item was permitted, and the model was configured to include the number of latent variable discovered during EFA. The figures of standardized and non-standardized coefficients

explained the underlying factors and the score measured on observed variables. The single-headed arrows represent the coefficient value.

Hence, CFA has been done for all the factors under strategic, organizational, technological, and environmental perspectives for the manufacturing sector units.

The indicators of CFA using AMOS 21.0 were used to measure the goodness of fit. Chi-square value (CMIN) was found as 14.565, Degrees of freedom (DF) was found as 9, CMIN/DF as 1.618, Comparative-Fit-Index (CFI) as 0.972, Incremental Fit Index(IFI) and Goodness of Fit Indicator(GFI)as 0.973, Tucker–Lewis Index(TLI) was found as 0.953. All the mentioned values specify a good fit (Kline, 2011).

Figures 8-5 and 8-6 can clarify the standardized and non-standardized coefficients diagram.

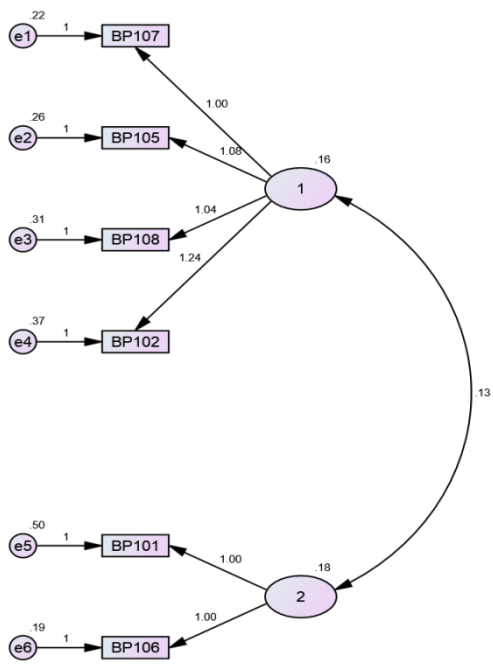


Figure 8-5: Non-standardized coefficients **(Strategic Domain)**

Table 8-13: Intercepts (Strategic Domain)

	Estimate	S.E.	C.R.	P	Label
BP107 <--- 1	1.000				
BP105 <--- 1	1.083	.173	6.270	***	
BP108 <--- 1	1.037	.174	5.955	***	
BP102 <--- 1	1.245	.202	6.173	***	
BP101 <--- 2	1.000				
BP106 <--- 2	1.000				

For example, figure 8-5 and table 8-13 describe that if factor 1 goes up by 1 standard deviation, then bp107 'Level of participation to resolve coordination problem' goes down by 1.00 deviation. Similarly, if factor 2 goes up by 1 standard deviation, then bp101 'Entrepreneurial A Activity' goes down by 1.00.

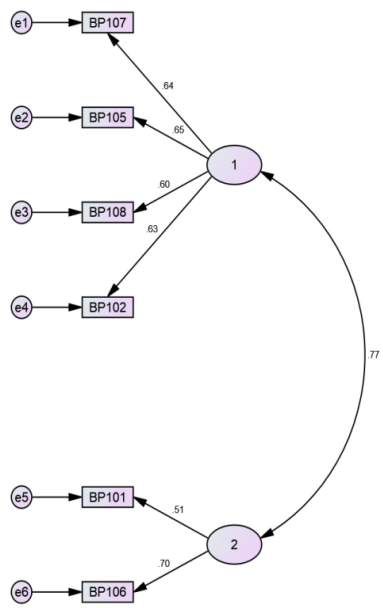


Figure 8-6: Standardized coefficients(Strategic)

This graph shows how measurement errors affect each indicator of latent accomplishment and latent intelligence. Here ovals are used to represent latent variables, whereas rectangles are used to display observable variables. Double-headed or single-headed arrows show

residuals and variances and a circle. The indicators and their measurement errors are not modeled as impacting the latent variables, but they may if the researcher chooses to do so.

Table 8-14: Standardized Regression Weights (Strategic Domain)

			Estimate
BP107	<---	1	.644
BP105	<---	1	.648
BP108	<---	1	.598
BP102	<---	1	.631
BP101	<---	2	.511
BP106	<---	2	.696

For example, figure 8-6 and table 8-14 describe that if factor 1 goes up by 1 standard deviation, then bp105 'Degree of integrity' goes down by 0.65standard deviation. Similarly, if factor 2 goes up by 1 standard deviation, then bp106, i.e., 'Level of concern for sustainable development goes down by 0.70 standard deviations.

8.2.2 CFA & SEM: Organizational Perspectives

The indicators of CFA using AMOS 21.0 were used to measure the goodness of fit. Chi-square value (CMIN) was found as 8.034, Degrees of freedom (DF) were found as 8, and CMIN/DF as 1.004,

Comparative-Fit-Index(CFI) and Incremental Fit Index(IFI) as 1.000, Tucker–Lewis Index(TLI) was found as 0.999, and Goodness of Fit Indicator(GFI) was 0.985. All the mentioned values specify a good fit (Kline, 2011). Figures 8-7 and 8-8 here clarify the standardized and non-standardized coefficients diagram.

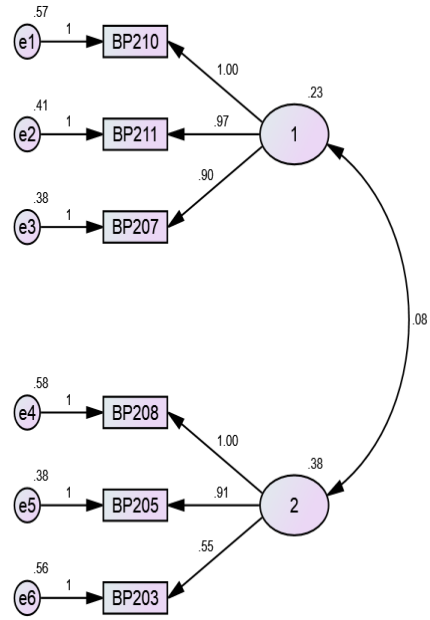


Figure 8-7: ***Non-standardized coefficients(Organizational)***

Table 8-15: Intercepts (Organization Domain)

	Estimate	S.E.	C.R.	P	Label
BP210 <--- 1	1.000				
BP211 <--- 1	.967	.254	3.810	***	
BP207 <--- 1	.904	.236	3.824	***	
BP208 <--- 2	1.000				
BP205 <--- 2	.910	.256	3.556	***	
BP203 <--- 2	.546	.154	3.552	***	

For example, figure 8-7 and table 8-15 describe that if factor 1 goes up by 1 standard deviation, then bp211 ‘Proactive management’ goes down by 0.97standard deviation. Similarly, if factor 2 goes up by 1 standard deviation, then bp205, i.e., ‘Project justification and technology and economic feasibility, goes down by 0.91standard deviation.

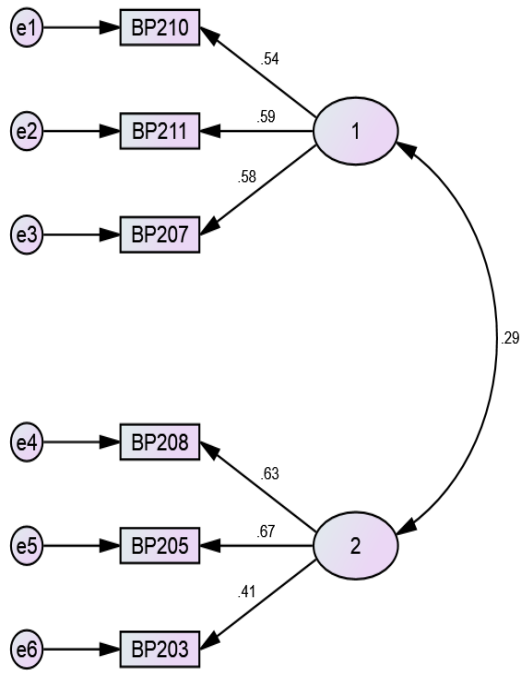


Figure 8-8: ***Standardized coefficients(Organizational)***

Table 8-16: Standardized Regression Weights (Organization Domain)

	Estimate
BP210 <--- 1	.540
BP211 <--- 1	.590
BP207 <--- 1	.579
BP208 <--- 2	.627
BP205 <--- 2	.672
BP203 <--- 2	.408

For example, figure 8-8 and table 8-16 describe that if factor 1 goes up by 1 standard deviation, then bp210 'Participation of new employees on decision making' goes down by 0.54standard deviation. Similarly, if factor 2 goes up by 1 standard deviation, then bp205, i.e., 'Project justification and technology and economic feasibility, goes down by 0.67standard deviation.

8.2.3CFA & SEM: Technological Perspectives

The indicators of CFA using AMOS version 23.0 were used to measure the goodness of fit. As finding Chi-square value(CMIN) was found as 6.190, Degrees of freedom(DF) were found as 5, and CMIN/DF as 1.238, Comparative-Fit-Index(CFI) as 0.978, Incremental Fit Index(IFI) as 0.980, Tucker–Lewis Index(TLI) was found as 0.956 and Goodness of Fit Indicator(GFI) as 0.985.

According to Schreiber et al., 2006; Kline, 2011 all the values indicate a good fit. Figures 8-9 and 8-10 here clarify the results of Structural Equation Modeling by showing non-standardized and standardized coefficients.

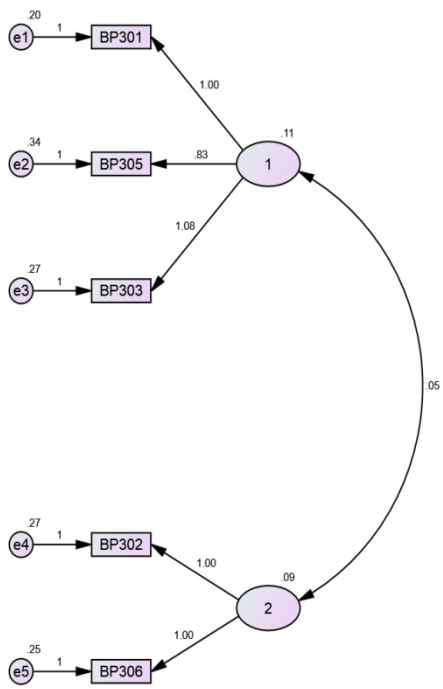


Figure 8-9: Non-standardized coefficients(Technological)

Table 8-17: Intercepts (Technological Domain)

	Estimate	S.E.	C.R.	P	Label
BP301 <--- 1	1.000				
BP305 <--- 1	.832	.263	3.158	.002	
BP303 <--- 1	1.084	.335	3.239	.001	
BP302 <--- 2	1.000				
BP306 <--- 2	1.000				

For example, figure 8 and table 11 describe that if factor 1 goes up by 1 standard deviation, then bp305 'Degree of Innovativeness' goes down by 0.83standard deviation. Similarly, if factor 2 goes up by 1 standard deviation, then bp302 'Level of the accuracy of data' goes down by 1.00standard deviation.

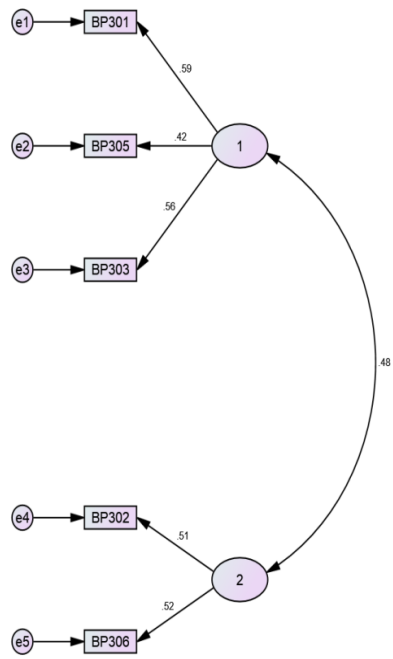


Figure 8-10: Standardized coefficients(Technological)

Table 8-18: Standardized Regression Weights (Technological Domain)

	Estimate
BP301 <--- 1	.590
BP305 <--- 1	.422
BP303 <--- 1	.563
BP302 <--- 2	.509
BP306 <--- 2	.522

For example, figure 8-10 and table 8-18 describe that if factor 1 goes up by 1 standard deviation, then BP301 ‘Degree of customization’ goes down by 0.59standard deviation. Similarly, if factor 2 goes up by 1 standard deviation, then BP302, i.e. ‘The level of the accuracy of data,’ goes down by 0.50standard deviation.

8.2.4 CFA & SEM: Environmental Perspectives

The indicators of CFA using AMOS version 23.0 were used to measure the goodness of fit. As finding Chi-square value (CMIN) was found as 2.631, Degrees of freedom (DF) were found as 3, and CMIN/DF as 0.877. Comparative-Fit-Index(CFI) as 1.000, Incremental Fit Index(IFI) as 1.010, Tucker–Lewis Index(TLI) as 1.022 and Goodness of Fit Indicator(GFI) as 0.993.

According to Schreiber et al., 2006; Kline, 2011 all the values indicate a good fit. Here Figures 6-11 and 8-12 can clarify the results of Structural Equation Modeling by showing non-standardized and standardized coefficients.

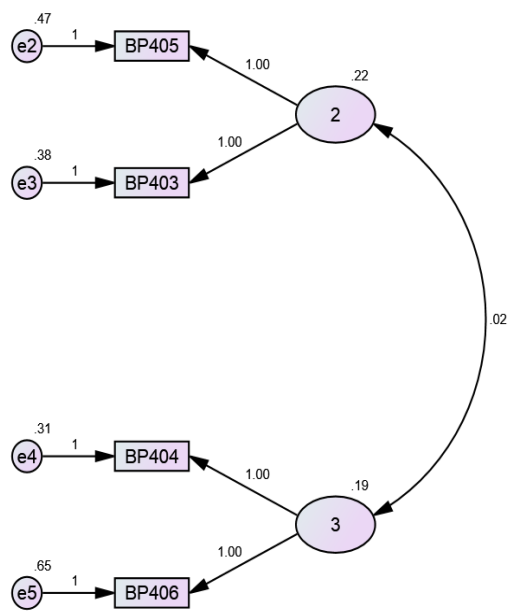


Figure 8- 11: Non-standardized coefficients(Environmental)

Table 8-19: Intercepts (Environmental Domain)

	Estimate	S.E.	C.R.	P	Label
BP405 <--- 2	1.000				
BP403 <--- 2	1.000				
BP404 <--- 3	1.000				
BP406 <--- 3	1.000				

For example, figure 8-11 and table 8-19 describe that if factor 1 goes up by 1 standard deviation, then bp405 'Management's role towards sustainability' goes down by 1.00standard deviation.

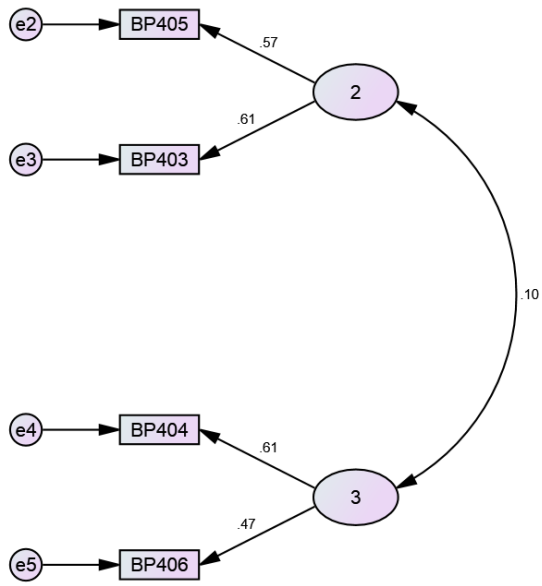


Figure 8-12: Standardized coefficients(Environmental)

Table 8-20: Standardized Regression Weights (Environmental Domain)

	Estimate
BP405 <--- 2	.566
BP403 <--- 2	.607
BP404 <--- 3	.609
BP406 <--- 3	.472

For example, figure 8-12 and table 8-20 describe that if factor 1 goes up by 1 standard deviation, then bp405' Management's role towards sustainability' goes down by 0.57standard deviation. Similarly, if factor 2 goes up by 1 standard deviation, then bp404, i.e., 'Management mandate to follow the laws of environmental protection goes down by 0.61standard deviation.

8.3 Overall Discussion:

A standard business model is required to ensure the sustainability of the Indian manufacturing sector. So, a framework for the SOTE model was built and validated by experts from academia and industries. The novelty of the model (Figure 8-13) is that the factors critical for India's manufacturing industries were considered in respective phases, which in turn can ensure the organization's overall sustainability.

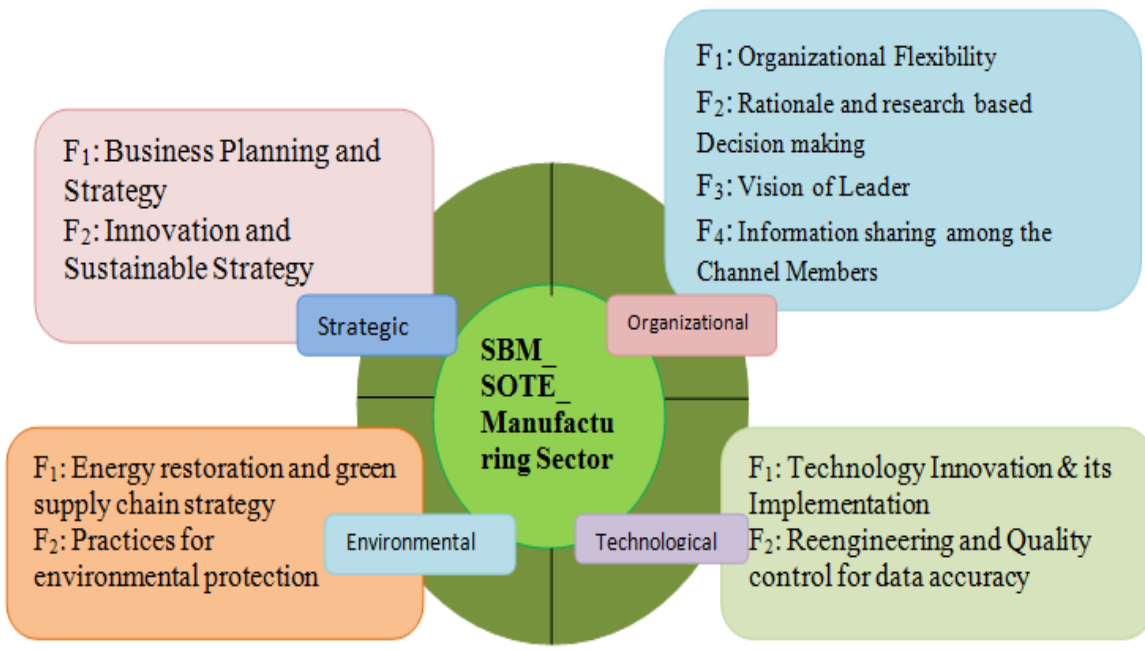


Figure 8- 13: SOTE Model (Sustainable Business Model for Manufacturing Sector)

8.4 Chapter Summary:

Many CSFs have been encountered for successful implementation of the ERP project. These factors should be treated carefully in the context of establishing a sustainable model for India's manufacturing sector. Our study makes several contributions. Firstly, our results show that Strategic, Organizational, Technological, and Environmental (SOTE) capabilities directly impact successful ERP implementation in manufacturing sector industries. The model's design flow and assessment enhance the organization's productivity, organizational readiness, and supply chain environment. The other contribution is that this model can be used as a base for building up any manufacturing sector's business model. Managers can set their action plan from the benefits of analyzing a large quantity of data by conducting in-depth qualitative data analysis and ensuring the firm's sustainability.

Although the number of examples analyzed was too small to conduct a thorough analysis of the variations discovered, the present researchers have sought to highlight the disparities in the sets of CSF for ERP installations in the manufacturing sector of India. Therefore, future research should concentrate on these variations and investigate them to ascertain their processes. To further comprehend the effects of CSFs that resulted from strategic, organizational, technological, and environmental perspectives for ERP installations in the industrial units, comparable research should be carried out in other nations. Therefore, the findings of this study should be viewed in light of the fact that we only looked at Indian enterprises.

Chapter 9

Case Research

9.1 Pretext of the Study

This section of our study is based on a qualitative study and relies on single and multiple case studies. A challenging topic is the deployment of enterprise resource planning (ERP) for Small and Medium Enterprises (SMEs) in developing nations. ERP system implementation is taken into account from both an organizational and a process perspective. Here, we looked at 5 SMEs that had already deployed ERP in the past and investigated the latent structures that had kept them going over the years. These research findings could be relevant for managerial decision-making regarding framework of adoption of sustainable business model.

9.2 Small and Medium Enterprises (SMEs)

The SME sector contributes 45 percent of industrial output and 40 percent of exports, making them fundamental to the Indian economy's growth (Basu et al., 2012). Every year, SMEs generate 106 million employments which are 40% of the Indian workforce, and over 8000 high-quality products. SMEs' contribution to GDP is approximately 6.11% of the manufacturing GDP, and the Service sector GDP is around 24.63%. The total number of SMEs is estimated to be around 42.50 million, including registered & unregistered organizations (Deshmukh & Kalamkar, 2015; *msme.gov.in/KPMG/CRISIL/CII*).

Due to trade liberalization, globalization, and the World Trade Organization regime, Indian SMEs have been having a difficult time. However, SMEs who have a strong technological foundation, a global business view, a competitive spirit, the courage to restructure their businesses, and a greater ability to survive current problems can help the Indian economy and progress toward sustainability. Each organization must have a durable competitive edge to stand out from the competition and outperform its rivals to survive in the market.

9.2.1 Issues of the implementation of ERP in SMEs

ERP solutions may give SMEs the foundation they need to grow, compete, and succeed over the long run. According to research studies, a thorough analysis of the requirements and operational procedures of the company is required for the successful implementation of ERP in SMEs.

Previous types of literature have described a number of issues with ERP implementation in Indian SMEs, including lack of awareness, the idea that ERP is only suitable for large businesses due to its high acquisition costs, the impact of customization on cost, and the requirement for less capital than larger competitors, change management, and a lack of in-house IT team resources.

9.3 Research Statement

Here, we undertake the case study method to understand the preparedness of the organization, their needs, and capacity for implementing the ERP / customized ERP and validate our proposed business model for the successful ERP implementation.

9.4 Methodology

Articles on Enterprise systems and their execution were the main subject of the research, with an emphasis on ERP variables under a broad domain like strategic, organizational, technological, and environmental perspectives affecting its implementation and small business. The selection of the CSFs for ERP implementation was identified in the SBM of the manufacturing sector (ref Chapter 8). Those factors were the instruments for developing the semi-structured questionnaire employed during the managers' and owners' interviews of the study's participating SMEs.

Three key topics of interest were covered by the interview questions. The first round of open-ended questions was focused upon the interviewee's management level and general firm information. The second set of inquiries looked into the reasons and phases of the implementation of the ERP system. When they pursued the deployment of an ERP system, the third series of inquiries aroused the various concerns linked to strategic, organizational, technological, and environmental viewpoints. The information for each of the crucial choices (emerging factors from four broad viewpoints) for ERP adoption was then gathered. The interview subjects were also questioned with the formula for success in each crucial choice.

Five participating SMEs were interviewed by the authors. These companies are in the industrial sector and are located in India. All of the companies that were chosen for the interviews had finished implementing ERP. These SMEs looked into ERP solutions in order to integrate key company processes and gain a competitive edge. These tasks include distribution, inventory

management, operations, production, human resources, and financial management. The interviewees are the respective vertical's chief executive officers or general managers. Executives of the companies were guaranteed anonymity, as well as the identities of their companies.

9.5 Case Research sample 1:

Case A: An automation company

Case A is a private limited automation company that supports pharmaceuticals, biomedical, electronics, electrical, and food/beverage companies. The company provides end-to-end services in industrial automation, mechanical solutions, electronics & control solutions, and software solutions and builds products for serialization, in-motion weighing, production tracker, and pick & place machines. This technical start-up also assists its clients in maximizing their business value and leveraging serialization to obtain a competitive advantage through regulatory compliance, supply chain security, process efficiency, consultation, and traceability.

The company has clients like Britania, TBS Mechatronics, Neptune Plastic, ITC Ltd., NeoTec HUB, BODCO home for Dairy, Cowala, GMP Dairy Limited, Kolkata Police Force, SIEMENS, and West Bengal Police.

The company mainly focuses on ***Business Planning and Strategy. So*** all of their functional modules like inventory management, purchase information, billing information, supplier, buyer, consumables, and stock maintenance are now being maintained through the ERP system. The purchase order is generated when the company gets an order from a third party. The inventory management under each head (mechanical items, electronics items, electrical items) checks the inventory status. For the items required for production and currently not in stock, purchase orders are being generated for those items. Based on the purchase order, specific vendors are being called, and the items can be procured.

Case A has done a market survey and found that product serialization is a challenge for FMCG companies. In this regard, to track and trace a single product in the market, the company decided to apply some i***nnovation and sustainable Strategy***. That is why they use a 2D bar code, by which the product gets a unique identification number, and the manufacturer can trace the product. Even with the help of QR codes, products can be traced from manufacturing to delivery to the customer. Another most significant problem in the FMCG market they identified is product counterfeiting, which eradicates the brand security of the product. The company installs a laser marking system, label applicator, or inkjet marker that can suit a particular product. They also create supplementary packaging lines and assign serial numbers to the shippers. Serial

numbers are assigned and marked to the pallets. They create end-to-end traceability, and the software is tailored to the specific requirements. They offer anti-counterfeiting mobile software to their clients, allowing them to check the product's authenticity simply by reading the product's QR code with their mobile device. They provide the ERP module allowing MIS reporting for serializing products for factory production, warehouse solutions, and sales. Case A also provides seamless support to prepare intelligent machines; whenever powered up, it connects to a secure server, and the teams can the remote support for seamless production. The common problem of FMCG industries is the weight variation of the product. If the customer receives an underweight or overweight product, customers deny accepting that, which is a loss of the company's brand image. So the team must be careful and get help from the in-motion weighing machine.

Figure 9-1: Motion Weighing Machine

It can be challenging to ascertain the accurate weight of ordered pipe produced in the manufacturing industry. Manufacturers often build slightly overweight pipes to avoid rejection, but it seems unknown to the manufacturer how much overweight pipe they are manufacturing. This startup company builds product-Pipe Weight Tracking- PWT-247, and this product is aimed at manufacturers of PVC or HDPE pipes. The machine PWT-247 assists in the monitoring and data tracking of each pipe using the weight manufacturer have built. This process helps to conserve raw materials and increase profits. It also helps to measure how much scrap was lost during production.

This company produces a heavy-duty automatic product packaging system that can be used in any food and non-food manufacturing line called *Pick and Place Automatic Packaging Machine*.

The company has built online production tracking software- PWT-247 and PWT-EC-247. Both models are connected to IoT and allow the customer to log into the system and check production data locally and remotely; with this technology, they built an online *pipe tracker system.*

Figure 9-2: Pick & Place Machine ordered by ITC

Figure 9-3: Working on Pick & Place Machine

It can be challenging to ascertain the accurate weight of ordered pipe produced in the manufacturing industry. Manufacturers often build slightly overweight pipes to avoid rejection, but it seems unknown to the manufacturer how much overweight pipe they are manufacturing. This startup company builds product-Pipe Weight Tracking- PWT-247, and this product is aimed at manufacturers of PVC or HDPE pipes. The machine PWT-247 assists in the monitoring and data tracking of each pipe using the weight manufacturer have built. This process helps to conserve raw materials and increase profits. It also helps to measure how much scrap was lost during production.

This company produces a heavy-duty automatic product packaging system that can be used in any food and non-food manufacturing line called *Pick and Place Automatic Packaging Machine*. The company has built online production tracking software- PWT-247 and PWT-EC-247. Both models are connected to IoT and allow the customer to log into the system and check prodWithin their ERP system MIS Report can be generated and available at the customer's fingertips. In the MIS report, all the weights of components, scrap to production ratio for a specific batch, and the frequency of the top five reasons for being overweight or underweight of a product are mentioned.

The company implemented an ERP system four years before, and within this short period, the company started offering world-class 3D machine design, plant design, and 3D animations. The business model this company is following is so robust, and the information sharing strategy among the Channel Members is so strong that clients only need to offer them their thoughts and some basic dimensions for the mechanical design. Accordingly, and under the design team's direction, the prototype's architecture can be prepared and sent to the clients. As the company has various kinds of steel fabrication and machining facilities units across India, they can supply their orders within the deadline. They provide a full range of fabrication capabilities, including Laser Cutting, CNC Bending, Punching, Gas Cutting, Welding, and more. They have a variety of manual and CNC lathes, VMCs, Shaping, Planers, Milling Machines, and other machines in the Machining Unit. Their business model is so customer-centric that skilled embedded programming support can be provided even if any clients have their board and wish to develop/firmware.

As an outcome, it can be concluded that case A organization implemented a successful business model and is in the leading position among Indian SMEs. The latter can provide any electronics consultancy, Multilayer PCB Designing, PCB Manufacturing, selection of ICs, microcontrollers, microprocessors, and component assembly board testing using mechanical and electrical automation. Auction data locally and remotely; with this technology, they built an online *pipe tracker system.*

Figure 9-4: Electrical work

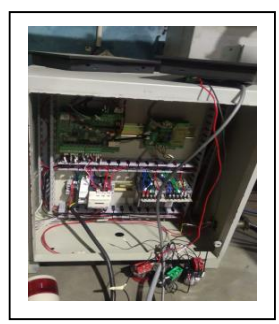


Figure 9-5: Panel for IPPT Project

Figure 9-6: Preparing Pick & Place Machine ordered by ITC

Figure 9-7: Welding work

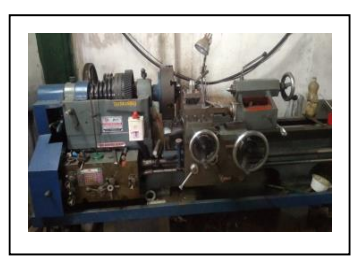


Figure 9-8: Tools Making Machine

Figure 9-9: Site Visit

9.6 Case Research Sample 2:

Case B: Fuel distribution pump manufacturing company

The business was founded in 1986 by manufacturing various spare parts for fuel distribution pumps across India. The company produces mobile fuel dispensing units, static fuel dispensing units, volumetric flow meters, pump units, meter units, register units, pipe line fittings & others. Later on, the company got specialization in various local items, which are alternatives to foreign products in the liquid handling sector, such as the KDM (Kerosene Dispensing Machine), Mobile Fuel Dispensing Machine, and others. Here the company produces flow meters that can help the customers to measure fuel, and here the measurement of the flow of fuel is with an accuracy of ± 0.1% (certified by the Legal Metrology Dept., Govt. of India). The mechanism is so robust that it can eliminate misuse, wastage, and losses in the refueling process.

The company produces mobile fuel dispensing units, static fuel dispensing units, volumetric flow meters, pump units, meter units, register units, pipe line fittings & others.

The company is IMS certified company (ISO 9001:2015, ISO 14001:2015, and BIS 18001:2007), a three-time National Award Winner, winner of the CII Industrial Innovation Awards for two years in a row, winner of the CII Institute of Quality's ICON Award.

The manufacturing company uses ERP to look after the supply chain, and the company applies the ***Reengineering and Quality control for data accuracy*** strategy using the '5S' concept for workplace improvement. During the production, they sort the materials used as raw materials, place all the components in the proper workplace, maintain everything, keep the work areas clean, and create a standard for the entire processes and the organization. They sustained new practices and conducted regular audits to maintain the quality of the work. For modernization of welding types of equipment, the company maintains the 3R concept. The company focused on some critical areas like coordination among employees, networking, the organization's spirit, and the customer's trust. The top-level authority focuses on the organization's innovation, thinking, association, and culture.

Lean and green practices were adopted across the supply chain. They achieved better consumption of machines by converting to the cellular layout of the machine shop and optimized

shop floor space utilization, which substantially reduced energy consumption within the facility. They adopted additive manufacturing philosophy for reduced raw material usage. With newer machines, a trained workforce, and innovative production processes, the company reduced waste radically by choosing its recycling operations suppliers. For that, they adapted the mechanism like in recent past the few old inefficient machines they disposed to the vendors they bring all those machines. After some minor revamping or adjustment, those machines can be remodeled.

9.7 Case Research Sample 3:

Case C: Cylinder Manufacturing Company

This manufacturing company is located in Andhra Pradesh, Visakhapatnam. The company manufactures gas cylinders including LPG, CNG, auto LPG, industrial and medical gas, multivalve, and particular high-pressure cascade, firefighting, and compact cylinders. The company has clients such as Indian Oil (IOCL), Hindustan Petroleum (HPCL), and Bharat Petroleum (BPCL). The major suppliers of steel are Tata Steels and Bhushan Steels.

The workflow company is maintained through an ERP system where the company uses global manufacturing practices to fulfill the constantly changing demands of domestic and international customers. Their ERP system incorporates inventory management, product manufacturing, product generation, vendor selection, and recycling techniques. In inventory management company always keeps a record of the raw materials, and if the raw material reaches below the threshold, the manager gets a notification. This organization supports a description of the number of cylinders manufactured per day. Suppose the company on an average per day produces 2000 cylinders and if that quantity is not being made any day, the manager will enquire about that. The company selects the vendors depending upon the requirement and the budget. As safety is the central issue in building cylinders, checking all the ordered components from vendors is very important. For example, steel sheets used for making both the parts of the cylinder grade IS6240 are used for maximum efficiency. For recycling, the steel scrap produced as a by-product can be reused as valve protection rings. The excess steel scraps this company sold after every six months can be treated as a portion of revenue generation.

LPG Cylinder Production comprises several sheet metal forming, surface treatment, and testing processes. The company applies ***Innovation and Sustainable Strategy*** within their making procedure, the beginning of the process is from blanking, deep drawing, piercing, trimming, and joggling. Next, the welding operations start for the valve boss, valve guard ring, foot ring, and the two halves. The finished cylinder is heat treated, tested, shot blasted, painted, and then the valve is attached and tested. The steps are mentioned below.

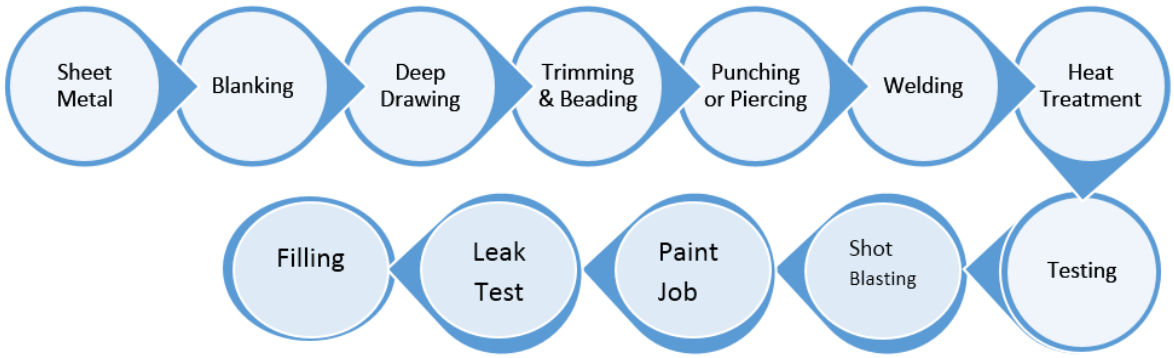


Figure 9-10: Steps of Cylinder Making

Manufacturing the LPG cylinder starts with the blanking operation of the steel sheet metal for the desired dimension of the cylinder body. The circular sheet metal blanks are then moved to a hydraulic press for the deep drawing operation. After the trimming and beading operation of the drawn sheet piercing, the cylinder body is done for the provision of the cylinder valve. Following this, the base ring, which provides support, and the guard ring, which protects the valve, are machine-welded to the two cylinder halves. The guard ring and base ring of the cylinders are made by rolling operations. The steel straps required for the valve protection guard rings are blanked from the remaining metal scrap after the circular blanking of the sheet is done. The cylinder is now delivered to the furnace for heat treatment to release all the stress created throughout the operation. This heat treatment makes the cylinder property uniform. Then the hydrostatic testing of the cylinders is done to check for pressure resistance under extreme loading. After that, the surface cleaning is done by shot blasting, and the cylinders are sent to the paint booth for painting operation. The valves are then fitted for filling purposes and sent for leak proof testing, which is done by dipping the cylinders in a water-filled container. Finally, all the quality checking and weighing are done, and then it is transported for the gas filling. The entire production process is highly automatic, and the rejection percentage for cylinders is significantly less after final testing, which is only 0.5%.

The only problem during this manufacturing process is a generation of paint sludge produced as a by-product that can create environmental hazards, polluting air and water. On average, the amount of paint Sludge is about 1.5 tons per month, which is a complete waste.

Fig: Steel Sheet Metal

Fig: Zinc Coating

Fig: Paint Booth

Fig: Paint Sludge (Waste)

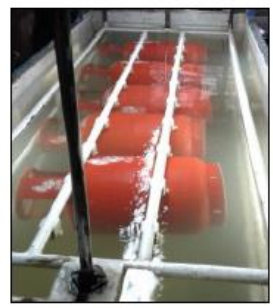


Fig: Leak Proof Testing

Figure 9-11: Different stages of testing of cylinder

9.8 Case Research Sample 4:

Case D: Valve, Pipe Manufacturing Company

This private limited company resides in Visakhapatnam, Andhra Pradesh. It manufactures pipes, pipe fittings, aviation engines, and aircraft components throughout India. Custom fittings, Glass Reinforced Piping (GRE), Heavy wall forgings, and fabrication of piping spools in unique materials such as P91 (the only Indian firm on BHEL's P91 fitting supplier list) are among the products available. The company is technically quite strong, and the best part about it is that it works for the defense sector, specifically for the Indian Navy. Hence, the management feels happy to be helping the country. Many high-end custom products are created that aren't produced by its competitors. Around 250 employees are working here, and yearly turnover is around 250 crores.

9.8.1 Products Manufactured

a) Fittings:

In addition to offering basic fittings, they are a full-service provider of piping/fitting packages requiring specialized or unique components, such as large sizes or hard-to-find materials. Customers all over the world can purchase a wide range of custom fittings from them. They are among the first businesses in India to offer titanium WP91 fittings. They were recently named their "Best Business Partner for Special Fittings" and are the only Indian company on BHEL's P91 fitting supplier list.

b) Aerospace components:

The company has extensive experience manufacturing, installing, and maintaining aerospace components. They have been offering a wide range of highly specialized products and services for a long time. The firm has a standardized quality management system as it is AS 9100 certified and specializes in forging and machining titanium components for aviation engines. The three of India's largest shipbuilding yards have well-established facilities, infrastructure, skilled employees, and a track record of recognized achievement on the most complex of projects.

c) Piping:

They created piping spools in unusual materials such as P91 and big diameter, heavy wall forgings. They work with non-standard materials and unique alloys, including Titanium, nickel, cupro-nickel alloys, and maraging steel, to design, develop, and manufacture personalized goods.

d) Valves:

The company manufactures and markets specialized valves from its production plant in India and France. They provide custom-made products with a short lead time that need a high level of technical understanding and are designed to transmit all types of material at high speeds. With great customization possibilities, traceability, design capabilities, and specialized alloys from their Casting and Forging department, they offer their customers a comprehensive and complete variety of industrial valves.

e) Marine:

They conduct business out of three sizable shipyards, several manufacturing facilities, and many partnerships that offer their customer's specialized products, services, and technology. Future pipe offers Glass Reinforced Piping (GRE) in various diameters and complete GRE systems.

f) Process Equipment:

According to ASME U-Stamp certification, they construct bespoke Vessels, Tanks, Heat Exchangers, and more in various materials, including Titanium. They design and build unique Heat Exchangers, Pressure Vessels, Columns, Towers, Coolers, Condensers, Screw Conveyors, Cement Equipment, and Soda Ash Equipment, as well as providing static and rotary equipment maintenance. They have well-equipped machining, fabrication, tooling, quality assurance/quality control, and calibration lab facilities.

Figure 9-12: Aerospace Components

Figure 9-13: Valves

Figure 9-14: Tube Heat Exchanger

Figure 9-15: Shell and Piping

9.8.2 Process Map for Pipe Fittings

The company selects one distributor for material storage, inventory control, and material handling. This company has an inventory of standard stainless steel pipe and pipe fittings. Individual projects might thus be planned, scheduled, and executed more efficiently and consistently. The risk of long lead times from mills and pipe makers was mitigated or avoided.

The company maintains its supply chain through the ERP system. The entire supply chain is depicted in the following diagram:

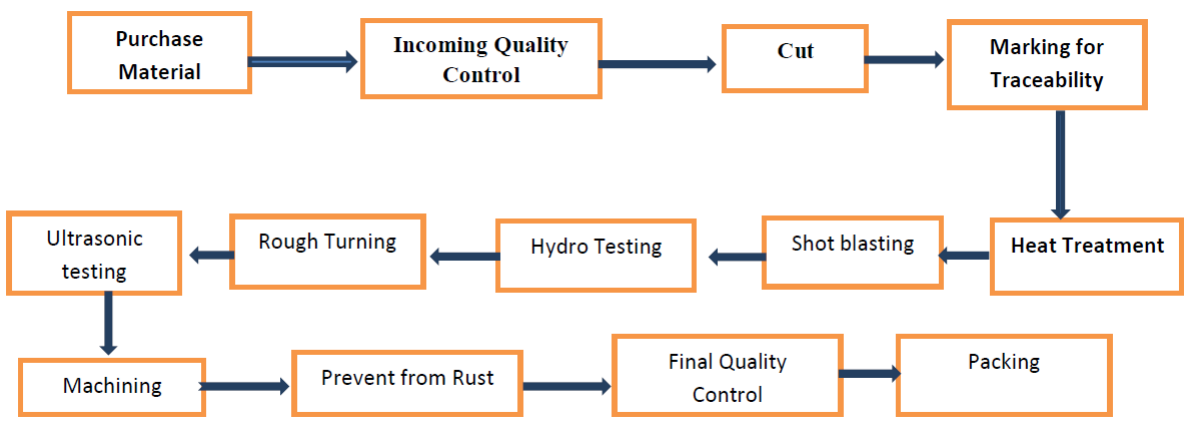


Figure 9-16: Process map for Pipe Fittings

During post ERP phases, they enhanced the interrelation between Information sharing among the Channel Members, and as a result, the product's final quality was improved. The company generates 10 tons of scrap per year, and those scraps are reused for further use as secondary raw

materials. The only challenge the company faces is the generation of too much dust and the use of excess water during the production of pipes and valves.

9.9 Case Research Sample 5:

Case E: Cake baking Company

The company was established in the year 1994 and started with the production of barley. From the year 2000, they have begun preparing fries. They surveyed the product that is in high demand. So they started producing pasta in 2016 and cake in 2019. They make bar cakes and cupcakes, and different companies give orders to them. Bar cakes are sent to tea stalls in the morning.

The company uses an ERP system to easily monitor the status of the raw materials like flour, sugar, cream, butter paper, tray, different essence, and different flavors. When the ERP indicates that any raw materials are at the last stage, the vendors are called and based upon the requirement, and a particular vendor gets the order.

Through ERP, the entire supply chain can be tracked, starting from stock maintenance to production to consumption and expenses.

The ERP managers open the opening stock daily, and based on that day's production requirement; they prepare the stock. After the entire production, he checks the inventory and modifies it if required. The manager is responsible for maintaining the list regularly.

Opening stock-consumption=closing stock

Every day closing stock should be updated so that if it indicates negative, it means the store has reached the bottom line. For that case, the concerned person of the organization will give an order per the vendor list available in the ERP.

9.9.1 Production Flow:

The company produces bar cakes, cupcakes, and fries, and they have two cake mixing machines, ovens, and a packaging machine. One supervisor is there who checks the raw materials every evening as per the order of the next day. Every morning he allocates the raw materials to specific staff, and they mix everything in a cake mixing machine; the cake mixing process can start in the early morning at 7 a.m. The supervisor monitors whether the given recipe is followed. Concerned persons put the mixture in the specified tray and the oven at around 11 a.m. In one batch company can produce 60 no. of average cupcakes and approximately 52 cartoon cupcakes

in a day. So roughly 3,120 no. of cupcakes can be prepared in a day. As it is a very tricky process, 15 laborers are assigned for the cake to put into the oven, and 30 laborers are dedicated to packaging. In the packaging area, the machine humidity control machine is there. Each day the no. of production of bar cake is around 150. For preparing bar cake, 20 laborers are allocated. They prepare 169 no. of bar cake, and about 12 batches can run in a day, so the total bar cake production in a day is 2028 nos. When the final product is out of the oven, they are kept for cooling. The cooling process takes around 3 to 4 hours, and soon after packaging of the cake can be started in the packaging machine. Here e**nergy restoration and green supply chain** strategy are taken care of by the top-level management to ensure optimized use and recycling of raw material.

The company hierarchy is like the top managing director is there to monitor everything. For each department, the individual manager is assigned like for the cupcake unit, slice cake unit, and fries unit, there are different managers. For operational work (e.g., production and packaging), managers assign supervisors who can control the staff and the labor. The company has 15-30 Lac sales per month. Overall yearly profit is 3-4%.

Figure 9-17: Cake Mixing Machine

Figure 9-18: Cream Mixing Machine

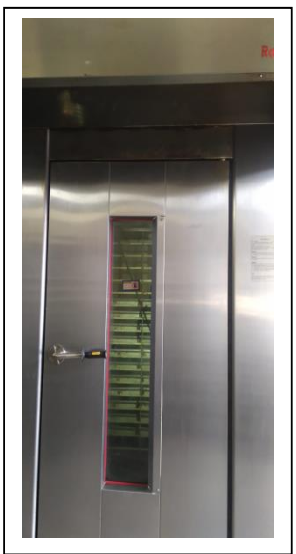


Figure 9-19: Cake preparing Oven

Figure 9-20: Cake Tray

Figure 9-21: Cake wrapping Machine

Figure 9-22: Cake packing Machine

Figure 9-23: Final products (Cake)

9.10 Chapter Summary:

The article aimed to study and discuss pertinent factors that can influence Indian organizations, especially SMEs, to adopt some managerial strategies for creating a sustainable business model. This study begins by illustrating the business model domains, namely, the value network, customer value proposition, and interface dimensions, within which the company can create the supply chain modules. The overall observations are as follows:

Firstly, the organizations fix their strategies in different domains. It has been observed that SMEs give their focus to settling strategic perspectives. Top management mainly focuses on Business Planning and Strategy, Innovation, and Sustainable Strategy when designing the supply chain. By offering integrated solutions to client's needs, the organization maximizes its capabilities and enables each institution to fulfill its strategic goals.

Secondly, management focuses on organizational perspectives to ensure sustainability in this domain, and companies must have proper planning in all areas. The majority of industrial firms have encountered new opportunities. As a consequence of globalization, organizational factors like Organizational Flexibility, Rationale, and research-based Decisions making, the Vision of the Leader, Information sharing among the Channel Members should be addressed to set new business dynamics and production concepts.

Thirdly, recent technology is a crucial feature of the supply chain. To promote integrated systems and tightly tied material flows in the course, organizations must acquire Technology Innovation & its Implementation, Re-engineering, and Quality control for data accuracy.

Lastly, this concern with sustainability may alter the highly competitive corporate environment. To do sustainable value generation company should include 'Delivery and sustainable value capture,' 'Energy restoration,' 'Green supply chain strategy and Practices for environmental protection within the supply chain of the business environment.'

Chapter 10

Conclusions and Policy Prescription

This study provided how ERP systems can be adopted to establish a sustainable business model.

10.1 Conclusions

The primary benefits of ERP systems are their ability to facilitate information sharing and considerably reduce the time required to perform business activities (Olhager & Selldin, 2003; Lee et al., 2010). Because they offer effective methods, businesses provide a better working environment for their employees. ERP systems may be technically installed effectively during the regular phase of the ERP lifecycle, but complete success depends on ERP users' intentions to use the given system (Boudreau, 2002; Kwahk& Lee, 2008). The selection and installation stages are the subjects of most TAM and TOE research on ERP systems. Studies with a post-implementation focus are rare and have just lately been published (Sun et al., 2015; Shih & Huang, 2009; Lee et al., 2010). Most studies only consider a small selection of variables that affect people's willingness to accept and use ERP systems. This study aimed to increase the number of elements that impact user acceptance and use during the routine or mature stage of the lifecycle. Though TAM is the most popular in IS implementation (Davis, 1989; Amoako-Gyampah & Salam, 2004; Lee et al., 2010), the strategic domain is an important aspect to be considered. Based on previous studies, we concentrated on external influences that affect the organizational business model and how they affect the actual use of ERP systems.

Due to the complexity of the deployment process at the organizational and technological levels as well as the variety of end users, ERP differs from other IT advancements. Both managers and organizations can benefit from this research. When establishing a complex information system like ERP, organizations should identify the determinants in terms of strategic, organizational, technological, and environmental features. Since it views utilization as a means rather than an end, the technology acceptance model (TAM) has been widely criticized. The idea is frequently referenced and advocated for use in ERP projects; however trust in its applicability should be constrained because it frequently lacks empirical support. This study aims to further the understanding of ERP deployment by examining the impact of CSFs across four different areas, including strategic, organizational, technological, and environmental on how users view the

success of ERP adoption. The study's conclusions offer managers guidance on how to effectively oversee the organization's adoption of the ERP system.

A sustainable business model must be created to ensure an organization's long-term success. Through the use of an ERP system, the current research has made an effort to determine the most important elements influencing the establishment of a sustainable business model. The contributing variables unequivocally demonstrate how customers, employees, and supply chain participants focus on ensuring the survival of different institutions of varied sectors like the financial, manufacturing, and service sector. These industries know the essential elements needed to build a company plan. Here, strategic, organizational, technological, and environmental aspects form the framework. The influential business model backed by technology would not be achievable until management recognizes the problems of the business in the future and expresses their readiness to respond accordingly.

In this research, our first objective was to propose a theoretical framework and to identify the variables associated with strategic, organizational, technological, and environmental perspectives. In this regard, the parameters were identified from the literature review, and later on, those were validated by ERP experts from academia and industries. Next to that, the objective was to survey the employees. Here, three sectors were identified: the manufacturing, financial, and IT/ITeS sectors, and the employees with strong ERP experience participated in the survey. The survey data were analyzed, and some feedback was discarded due to incomplete inputs. The next objective was to identify Critical Success Factors (CSFs) through Factor Analysis of four domains of three different sectors. Table 6-3, 6-6, 6-9, 6-12; table 7-3, 7-6, 7-9, 7-12; table 8-3,8-6,8-9, 8-12 are the list of CSFs for financial, IT/ITeS and manufacturing sector respectively which are the evidences for successful ERP Implementation or performance improvement.

The perceptual data, captured in the survey, was empirically analyzed using IBM SPSS 21.0 and AMOS 23.0 the initial factors identified using EFA are confirmed using confirmatory factor analysis (CFA). These validated factors found from different perspectives (strategic, organizational, technological, and environmental) were mapped to formulate business models for three different sectors: the financial, IT/ITeS and manufacturing sector, which can lead to sustainability. Our final objective was to validate the SOTE model by case research method,

taking into consideration the select SMEs of the Indian manufacturing sector. We have experienced the success and implementation of the SOTE model at the time of understanding the business of SMEs during our visit in their operational sites. Gaps of theorizing the model and practicing business were also critically analyzed by the fact-finding interactions with the key decision makers of the firms. The bottlenecks/ challenges of the implementation of ERP were also identified in the whole business supply chain. Improvisation in the business intelligence process would be required for further improvement of overall productivity and performance.

We understood that Indian SMEs are not gaining a competitive advantage for their limitation of implementation of ERP systems due to financial constraints and technological incapability. From the gained report, we can conclude that the Sustainable Business Model (SBM) developed for the manufacturing sector may be used as the guidelines for these SMEs.

10.2 Policy Prescriptions

Figures 6-13, 7-6, and 8-13 are the sustainable business model exclusively for the financial, IT/ITeS, and manufacturing sectors, respectively. The model described for the business model proposed in this research is exclusive to three different sectors. It is a policy prescription for the implementation of ERP for different sectors. These provide a complete ecosystem for its success of implementation.

The current researchers have attempted to draw attention to the differences in the sets of critical success criteria for ERP deployments in the units of India's SME sector, even though the number of examples analyzed was insufficient to carry out an in-depth study of the discrepancies discovered. Our research contributes in several ways. First, our findings demonstrate that SOTE (Strategic, Organizational, Technological, and Environmental) capabilities directly influence the effective deployment of ERP in the industrial sector. The model's design flow and assessment improve the supply chain environment, organizational readiness, and overall productivity. In order to identify the mechanisms underlying each of these variations, future studies should focus on them all.

10.3 Future Direction

Comparative research should be conducted in numerous countries to comprehend further the consequences of the critical success factors for ERP installations in the SME sector that emerged from strategic, organizational, technological, and environmental perspectives. Therefore, when analyzing the research's conclusions, it is crucial to keep in mind that we exclusively examined Indian firms. Another contribution is that any business model may be built on top of this model since it can serve as a foundation. Managers can base their action plan on the benefits of completing a thorough analysis and an action plan to ensure the business's long-term health.

Future research could examine the approach in sectors other than financial, manufacturing, and IT/ITeS service sector. Such research might modify the model described in this article by including a few new parameters. Since the current study exclusively considers these sectors, this is where it also falls short. Due to the cultural variances among the various nations, the study's conclusions could not apply to nations other than India.

Appendix A
Questionnaire Design

Strategic Perspective:

1. Indicate the level of encouragement of the entrepreneurial activity by the top management.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all
2. Responsibility of the formulation of corporate goals and strategy lies only in the top management.
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree
3. Indicate the degree of inconvenience faced by your organization for the non-functioning of cross- functional team.
   5 - Very Low 4 - Low 3 - Moderate 2- High 1 - Very High
4. The extent of sharing of relevant business information regarding system implementation within the department for the purpose of achieving high performance is not sufficient.
   5 - Very Much true 4 - Moderately True 3 - Generally True 2- Partially Untrue
   1 -Absolutely untrue
5. Indicate the level of comprehension and also level of integrity of your ERP implementation strategy in terms of future prospects of your organization.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all
6. Indicate the level of concern of the team leaders about the future business prospects, any expansion or diversification needs for the sustainable development using Enterprising System (ES) implementation of the organization.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all
7. Rate the level of participation of each individual to resolve the coordination problems for the smooth implementation ERP packages
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all
8. Managers and supervisors are always rewarded for practicing participative leadership in resolving core problems of the organization and improving the system quality.
   5 - Absolutely true 4 - Moderately True 3 - Generally True 2- Partially Untrue
   1 -Absolutely untrue

Organizational Perspectives:

1. The readiness of the organization to adapt and implement the enterprise system is quite high
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

2. The top management shows high level of commitment and involvement for technology up gradation and advancement
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

3. Coordination among the employees help to identify the right kind of technology for the organizational performance improvement
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

4. The professional knowledge of the Leader and his vision act as catalyst of technological change in the organization
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

5. The team members of the project team are quite competent to analyze the techno-economic feasibility at the first stage of the software development project
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

6. Indicate the extent of information sharing between the organization and the supply chain members.
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

7. As new technology is a burden on developers head, company should not go for latest Technologies.
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

8. Indicate the extent of emphasis on research and data-based decision making.
   5 - Strongly Agree 4 - Moderately Agree 3 - Generally Agree 2- Partially Agree
   1 - Strongly Disagree

9. Rate the extent of application of moral values in your organization.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

10. Indicate the level of participation and involvement of new employees in the decision Making of your organisation.
    5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

11. Indicate the level of initiatives taken by the management for the enhancement of the expertise of the employees.
    5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

Technological Perspectives:

1. Indicate the level of customization required for the development of sustainable business model.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

2. Indicate the level of accuracy of data which is essential for developing model.

5 - Very High 4 - High 3 - Moderate 2- Low1 - Not at all

3. Indicate the level of interest shown by top level management for the formation as well as smooth functioning of inter-functional task forces for designing innovation/ changes.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

4. Employees are encouraged to participate in training programmes organized by external agency/institutes.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

5. Indicate the level of decision making power that an employee has to deliver a project with innovative idea.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

6. Indicate the level of business process reengineering is needed for a successful business model.
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

Environmental Perspective:

1. The extent of sharing of relevant ecological information related to environmental challenges, goals etc. within the organization for the purpose of achieving high performance is not sufficient
   5 - Very Much true 4 - Moderately True 3 - Generally True 2- Partially Untrue
   1 -Absolutely untrue

2. Rate your organization with respect to the images among your customers
   5 - Excellent 4 - Very Good 3 - Good 2 - Poor 1 - Very Poor

3. Rate your organization in terms of efficiency of processing of the information regarding business environment related issues
   5 - Excellent 4 - Very Good 3 - Good 2 - Poor 1 - Very Poor

4. Rate your organization in terms of managing waste in the cloud storage.
   5 - Excellent 4 - Very Good 3 - Good 2 - Poor 1 - Very Poor

5. Management should take pivotal role to implement sustainable business model.
   5 - Excellent 4 - Very Good 3 - Good 2 - Poor 1 - Very Poor

6. Implementing environmental criteria to select suppliers in supply chain management
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

7. The intention of an organization to identify the emerging factors for the reduction of hazardous waste to be environmentally sustainable
   5 - Very High 4 - High 3 - Moderate 2- Low 1 - Not at all

Appendix B

Table: Summary of List of Companies & No. of Responses received

Sl. No.	Name of organization who responded	Firm ID	No. of Officials Participated
1	RAKE RKG 129	R	5
2	DBT-ICT 2G Ethanol Technology	DBTICT	10
3	Maharashtra Energy Development Agency	ED	1
4	Ahuja Engineering Services	A	1
5	AGR Technology: Organic Solid Waste Treatment and Concomitant Bioenergy Generation	AGR	10
6	Department of Solid Waste Management	DSWM	1
7	Noble Exchange Environment Solutions Pvt. Ltd.	N	7
8	Organic Recycling Systems Pvt. Ltd.	O	8
9	International Centrefor Genetic Enginerring and Biotechnolgy	ICGEB	1
10	DBT-IOC Centre for Advanced Bio Energy Research	DBTIOC	1
11	Innova Engg. & Fabrication	I	8
12	Karnataka State Bioenergy Development Board	K	6
13	Punjab Renewable Energy Systems Pvt. Ltd.	P	1
14	PRO Energy Resource Pvt. Ltd.	PRO	1
15	BARGAD NGO	BRN	2
16	Haritham Innovative Tech.	H	3
17	Shirke Energy	SE	1
18	ADOR Welding Ltd.	AD	1
19	Naveen Tools Mfg. Pvt. Ltd.	NTM	9
20	Banerjee Machines & Tools Co.	BMT	11
21	A.S.P. Manufacturing Pvt. Ltd.	ASPM	6
22	Amaresh Engg. Pvt. Ltd.	AEPL	7
23	Bhushan Power & Steel Ltd.	BPSL	4
24	United Engg. Enterprise	UEE	3
25	HCL	HCL	3
26	HP	HP	4
27	BMM Alloy Steels Pvt. Ltd.	BMMAS	7
28	S.R. Engg	SRE	5
29	S.M. Engg. Works	SME	4
30	J.M.Machine Tools	JMMT	4
31	S.D.Engg. & Trading Co.	SDETC	7
32	Sunrise Plastic Industries	SPI	3
33	Plasto Chem Pvt. Ltd.	PCPL	4
34	Olivine Mercantiles Pvt. Ltd.	OM	12
35	Chatterjee Rubber Manufacturing Company	CRMC	6
36	Neogi Technologies and Research Pvt. Ltd.	NTR	8

Total no. of respondents from manufacturing industry			**175**
37	State Bank of India	SBI	28
38	Bank of Baroda	BOB	12
39	United Bank of India	UBI	15
40	UCO Bank	UCO	11
41	Axis Bank	AXIS	12
42	Indian Bank	IB	14
43	Punjab National Bank	PNB	11
44	ICICI Bank	ICICI	11
45	HDFC Bank	HDFC	11
46	HSBC Bank	HSBC	13
47	Bandhan Bank	B	12
Total no. of respondents from private and public industry			**150**
48	Tata Consultancy Services	TCS	11
49	IBM	IBM	10
50	Capgemini	C	10
51	Cognizant Technologies	CTS	10
52	KPMG	KPMG	4
53	Tech Mahindra	TM	7
54	Price Water Copper	PWC	4
55	WIPRO	W	2
56	R/S Software	RS	6
57	Ministry of Skill Development & Entrepreneurship	SD	6
58	ODRways	OD	2
59	Whitelion Technologies Pvt.Ltd.	WT	2
60	AIR India	AIR	4
61	IBS S/W Pvt. Ltd.	IBS	3
62	Infosys	I	9
63	ITC Infotech	ITC	5
64	Linde	L	4
65	Seap Infotech (Aakavs Consulting, Inc)	SI	3
66	Airtel	AT	4
67	Persistent Systems Ltd.	PSL	2
68	Subex	S	4
69	Vodafone	V	3
70	Hexaware Technologies	H	5
71	Amazon	A	3
72	Irvine Infocom	II	4
73	CyberSWIFT	CS	2
74	Deloitte	DL	4
75	Mindtree	MT	3

76	Tata Medical Centre	TMC	3
77	VAP TECH. PVT. LTD.	VT	3
78	PEOL Technologies Pvt. Ltd	PEOL	3
79	CES LTD.	CES	4
80	Justdial	JD	2
81	BARGAD NGO	B	1
Total no. of respondents from IT service sector industry			**152**
Total no. of Respondents			**477**

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Reviewer's Comment & Action Taken

Reviewer's Comment	Action Taken	Chapter No. & Page no.
1. Chapter number (5-7) in Executive summary and Introduction is wrongly refereed for financial; IT/ITeS service sector and manufacturing sectors. They should be corrected as Chapters 6-8, respectively.	Thank you for the comment. Correction made as follows. In chapter 5 'Research Design and Methodology', in chapter 6 'Result & Analysis for Financial Sector', in chapter 7 'Result & Analysis for IT/ITeS Service Sector' and in chapter 8 'Result & Analysis for Manufacturing Sector' were described	Executive Summary Page 1-2
Introduction and literature review chapters: In many places, data is presented without proper references.	Appropriate references have been cited.	Chapter 1: Introduction Page 3-12 Chapter 2: Literature Review Page 13-24
Due to the lack of a plan/classification of literature at the beginning of the second chapter, it may be difficult for the reader to follow the evolution of issues in ERP implementation.	In the Literature Review Categorization has been made as follows: 2.1 Evolution of ERP 2.2 ERP Implementation in developed and developing countries 2.3 Status of ERP in developed countries 2.4 Status of ERP in developing countries 2.5 Success factors and its prioritization 2.6 Conceptualization of Sustainable Business Model 2.6.1 The technology acceptance model (TAM) 2.6.2 The Technology-Organization-Environment framework (TOE) The literature review starts with related work from the inception of ERP and its evolution over the years - how ERP was implemented and its recent status in developed and developing countries. Subsequently, critical factors for successful ERP system found from the literature review were discussed which helps in developing a framework of a successful business model. In this regard, two popular models, a) Technology acceptance model (TAM) and b) Technology-Organization-Environment framework (TOE) were discussed.	Chapter 2:Literature Review Page 13-24
At the end of Chapter 2,	The analysis of the literature review has been have	Chapter 2:

an analysis of the literature should be presented to identify research gaps in the next chapter. In general, it is difficult to establish logical connections between chapters.	included as chapter summary in 2.7 that can identify research gaps in the next chapter. It was described in the chapter as follows: **2.7 Chapter Summary** The literature review cited relevant works from the invention of ERP and its evolution over time, how ERP was applied, and its current state in both developed and developing countries. The discussion focuses on the key elements of an effective ERP system that were discovered in the literature review and helped to create a successful business model. Two well-known models—the Technology-Organization-Environment framework (TOE) and the Technology Acceptance Model (TAM)—were examined in this regard. At the end of subsequent chapter 3 the conceptual model of ERP implementation strategy is discussed. In the chapter 4 research gap, research question and problem statement were mapped.	Literature Review; 2.7 Chapter summary Page 24
Chapter-wise organization and conclusion should be included in each chapter.	Chapter summary is already included in each chapter as follows. Chapter 2: Literature Review; 2.7 Chapter summary Page no.24 Chapter 6: Result & Analysis for Financial Sector; 6.4 Chapter summary Page no.64 Chapter 7: Result & Analysis for IT/ITeS Service Sector; 7.4 Chapter summary Page no.80 Chapter 8: Result & Analysis for Manufacturing Sector; 8.4 Chapter summary Page no.100 Chapter 9: Case Research; 9.10 Chapter summary Page no.120	Sections: 2.7, Page no.24; 6.4, Page 64; 7.4, Page.80; 8.4, Page 100; 9.10, Page 120
Section 3.2: Research questions are repeated.	Deleted the repeated one.	Section 3.2: Research questions, Page 25
Section 5.1: Error! Reference source not found. Please write the references.	Deleted Error! This is the schematic representation of the research for three sectors, e.g. Financial, IT/ITeS Services Sector and Manufacturing sector; Hence, no citation is required.	Chapter 5: Section 5.1 Stages in the Research Design Page 34-35
Figure 5-1 is not cited anywhere in the text.	This is the schematic representation of the research for three sectors, e.g. Financial, IT/ITeS Services Sector and Manufacturing sector; Hence, no citation is required.	Chapter 5: Section 5.1 Stages in the Research Design Page 34-35

Wherever possible, tables and figures should be kept on the same page	Has been adhered to adjusting the page layout.	-
Why is only the banking sector considered to represent the financial sector?	Kindly refer to chapter 6, page 43 which is already mentions the reasons. "The financial services industry offers financial services to both individuals and businesses. A wide range of financial businesses, including banks, investment houses, lenders, real estate brokers, and insurance companies. The technological advancements in the banking sector were much pronounced in the last decade and adoption of ERP has completely changed the business patterns of the Banking sector. Still, they are in the process of modification of the Information System for better customer service and for achieving that, a complete organizational restructuring is continually going on to meet the strategic goals of the Banking sector. To capture the sets of dynamism in the domain of technology, organizational and strategic in the competitive environment, the present research only select banking sector of India which undergone a series of turbulence in the recent past."	Chapter 6: Financial Sector: Results & Discussion Page 43
A business model has been proposed for the financial, IT/ITeS service sector and manufacturing sectors, but why are manufacturing-based SMES selected for case studies? A proper and adequate justification should be mentioned at the end of Chapter 9. Otherwise, the validity of the proposed sustainable business model for other sectors remains questionable.	Kindly refer to section 9.1, Pretext of the Study Page no.101, chapter 9, which already mentions the reasons. "A challenging topic is the deployment of enterprise resource planning (ERP) for Small and Medium Enterprises (SMEs) in developing nations. ERP system implementation is taken into account from both an organizational and a process perspective. Here, we looked at 5 SMEs that had already deployed ERP in the past and investigated the latent structures that had kept them going over the years. These research findings actually validate that our findings are relevant to respective organization and could help for managerial decision-making regarding framework of adoption of sustainable business model."	Chapter 9: Case Research; 9.1 Pretext of the Study Page 101

International Journal of Sustainable Development and Planning
Vol. 15, No. 8, December, 2020, pp. 1313-1321
Journal homepage: http://iieta.org/journals/ijsdp

Development of Sustainable Business Model: A Conceptual Framework for the Financial Sector to Obtain Successful ERP

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https://doi.org/10.18280/ijsdp.150818

Received: 4 October 2020
Accepted: 1 December 2020

Keywords:
enterprise resource planning (ERP), financial sector, structural equation modeling (SEM), critical success factors, sustainable business model

ABSTRACT

The present study identifies the key antecedent factors for accomplishing the adoption stage of enterprise resource planning (ERP) systems in their business operations. Four potential antecedent factors of adoption were derived from the literature, and data were obtained from a sample of 200 executives of the banking organizations of the financial sector across India. A structural equation modeling (SEM) technique was used to examine the complex relationships between antecedents and the adoption decision. The authors survey the literature to discover and classify critical success factors that are potentially applicable to financial sector. Four broad parameters namely, strategic, organizational, technological, and environmental (SOTE) has been identified for the efficacious development of ERP system in the financial sector of India. 11 dimensions has emerged as significant one for the financial sector. The results show that most of the success factors found in the literature apply to the industry. Nevertheless, distinct differences were found as well. Some factors, such as innovativeness of the implementation strategy, formulation of sound business plan, integration within the departments, adaptation capability of the system etc. would become the key instruments for successful implementation of ERP in the financial sector. The findings can help the executives of the financial sector to focus their attention, priorities, resources and leadership on managing the success factors that have been established to be critical for achieving ERP project implementation and ultimately, leading to the development of the sustainable business model.

1. INTRODUCTION

In India, ERP has been implemented in various sectors for bigger transformation for globalization and deregulation of the economic prospect of our country [1]. Enterprise Resource Planning (ERP) systems impact the organizations in which they operate [2]. Like the ERP system which has centralized database with integration of different modules can represent the structure of any organization. Organizations and ERP systems have to be structurally aligned with each other [3]. During the implementation of ERP system, statistics says that 40-70% of ERP experienced some degree of failure [4]. The effect of the ongoing degradation of existing business models demand the redefining of parameters to achieve sustainable development. Successful businesses model enhances the constructs those are required to establish a business incorporating the challenges and opportunities faced towards sustainability [5]. Perera and Costa [6] affirmed that ERP implementation is often attended by significant socio-technical concerns. Top level executives of most companies have realized this and have started incorporating relevant parameters in respective departments regarding that. Sustainable business model basically describes that how customized models can be implemented with advanced technology to achieve any change in the system.

If organizations have their own Enterprise Resource Planning (ERP) system, they can adopt different business modules and can embed sustainability. But unfortunately, some business models are unable to introduce sustainable concept. According to WCED [7] sustainable business model requires the fulfillment of present needs but without neglecting the ability to satisfy the aspirations of future.

Montilva and Barrios [8] clearly explained regarding the modules those are integrated to establish a business model starting from organizational development to Business Process Reengineering. As Laudon et al. [9] and Nah et al. [10] stated that ERP system is a set of integrated software with a central database that have communication with necessary functional modules. To optimize the dynamic business model for successful ERP system, all the available constructs have been considered by developing an effective supply chain framework.

2. LITERATURE REVIEW

According to Jiwat et al. [11], the factors which are always under the direct attention of the managers and are primarily responsible for enhancing organizational performance are called Critical Success Factors (CSFs) [12]. In other words, CSFs are the factors those can help the managers to achieve the designated goal [13]. Jiwat and Corkindale [14], Rockart

Organizational Perspective of Critical Success Factor to Establish ERP as A Sustainable Solution

Ipsita Saha*, Dr Amit Kundu & Sadhan Kumar Ghosh*****

ABSTRACT

Recent organizations are making significant investments in enterprise resource planning (ERP) as it integrates different functional modules to accumulate data of various business areas within a particular group. Despite their benefits, more than two thirds of ERP system projects result in failure. The reason for the failure is not only technical, but some behavioural factors are also involved there. System adoption technique should be taken from users' perspective and employees should be ready to adopt new technology.

Indian organizations have encountered some organizational, technological, strategic problems during the adoption and implementation of ERP system. Hence, it is significant to understand the influence of the various factors for the acceptance of ERP in the Indian context. Based on the review of extant literature, an attempt has been in the present study to identify the factors that influence the acceptance of ERP in India and their effect on the acceptance and usage of ERP. Critical Success Factors (CSFs) is a prime thing that must go well to ensure success for a manager or an organization and, therefore, it represents those managerial or enterprise areas that must be given special and continual attention to bring about high performance. CSFs include issues vital to an organization's current operating activities and to its future success.

Based on exhaustive literature survey, parameters associated with several domains are critically analyzed and a sustainable solution is being proposed for the successful implementation of ERP system. The present research is aimed at finding out the relevant factors of organizational domain particularly focused on an Indian environment that can contribute to the success of ERP of financial sectors. It is expected that the theory and research findings presented in this study can identify the CSFs and can aid the development of the ERP research field. The findings provide practical guidance to managers implementing ERP systems for the Indian public and private banking sectors.

Keywords: ERP, CSFs, Organizational, Sustainable, Financial Sector

INTRODUCTION

ERP system is a tool of integrated software components and a central database that facilitates an organization to manage effective and efficient use of resources (materials, human resources, finance etc.) by automating and incorporating business processes, data sharing throughout the enterprise and enabling information access in real-time environment (Laudon and Laudon, 2013; Nah, Lau and Kuang, 2001). For huge success in ERP implementation previous studies have identified a large number of Critical Success Factors (CSFs).

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A Business Model for Enterprise Resource Planning (ERP) by Establishing a Sustainable Supply Chain Management

Ipsita Saha, Amit Kundu and Sadhan Kumar Ghosh

Abstract *Purpose* The eco-friendly approach has become an active component of sustainable strategy for both academia and industry. The concept of green SCM is relevant as it integrates ecological wisdom of any organization with organizational supply chain actions. *Methodology* A pilot survey was done through framed questionnaire, and from value chain analysis, we have developed a model for sustainable strategy. The data was collected and analyzed to identify the major components of sustainability. The valid data was analyzed with the help of regression and correlation analysis. Findings: Basically, the rapid industrial expansion has led to greenhouse gas emissions; toxic pollutants those as a whole reflect declined sustainable growth. So, this study suggests that green HR management can be taken as new initiative by providing training toward employees on how to adopt sustainability practices from the view point of customer and suppliers. *Research implications* Sustainable supply chain process has theoretical implication and practical significance as well to ensure overall sustainable development for any industry. This model suggests that management support is always required for implementing the sustainability strategy in the organization. This novel business model guides the managers for implementing sustainable supply chain management practices in the organization.

Keywords Supply chain management · Sustainable supply chain process · Sustainable supply chain process

1 Introduction

In India, it becomes very difficult to sustain in the competitive environment. In the supply chain process, the eco-friendly strategy should be maintained. By 2050, the combined GDP of the emerging economies will be more than 50% of the total GDP of the world. This growth rate results the obvious emission of carbon footprint and

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S. K. Ghosh (ed.), *Waste Management as Economic Industry Towards Circular Economy*,
https://10.1007/978-981-15-1620-7_5_10

Exploring the Rationale Between ERP and EPR in Asian Countries Using Cloud-Based Approach

Ipsita Saha, Amit Kundu and Sadhan Kumar Ghosh

Abstract In order to sustain in a competitive technological environment, every organization integrates all primary business processes to strengthen its ERP. ERP systems are designed to integrate business functions with global supply chain, and therefore, if it is not properly managed during its implementation may lead to resistance from the users. The featured functions of ERP comprise of the proficiency to keep and track the environmental data of raw materials from suppliers, to prepare an environmental report for each product from cradle to grave, to prepare report on logistics and transportation, and to comply with the ERP software used by third-party manufacturers. For successful ERP implementations and to that end research, two factors can be taken into considerations, namely business process re-engineering (BPR) and extended producer responsibility (EPR). Developing Asian countries are in process to apply the principles of EPR to electronics and electrical equipment waste (e-waste). As a result of booming electronic and electrical appliances, the consumers are ready to purchase the latest technological invention throughout the year. Hence, the old gadgets that can be treated as e-waste can produce toxic chemicals for the environment and people around them if those are not recycled properly. So EPR policy gives the responsibility to producer for the collection, disposal, segregation, and recycling of discarded electronic appliances. China and Thailand have enrolled regulations on the recycling of e-waste with common characteristics such as the financial responsibility of producers and subsidies for collection. The Indian Ministry of Environment, Forest and Climate Change, and the Confederation of Indian Industry (CII) recently (2016) updated its EPR regulations on e-waste and plastics. Due to the reason that e-waste is an article of trade, the proposed system is functional. Consumers and

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S. K. Ghosh (ed.), *Sustainable Waste Management: Policies and Case Studies*,
https://doi.org/10.1007/978-981-13-7071-7_2

A Study to Establish an Energy-Efficient Sustainable Business Model in Virtual ERP

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Abstract The present research is aimed at to do research on energy utilization by SMEs of virtual ERPs. Economic performances of the SME sector have proved its contribution to nation building through the increased contribution to GDP, huge employment generation, equitable allocation resources and facilitate inclusive growth. Based upon the backbone of SMEs, virtual ERP is rising rapidly. The business strategy that virtual ERP follows incorporates the production of huge amount of data. Hence, an attempt has been made in this research to identify the broad parameters which are indicative of the success of the virtual ERP implementation in the Indian context. The identified parameters of adoption of Enterprise Systems (ES) in the Indian organizations are needed to put as factors in developing generic model. The construct of the theoretical model would help us to develop the optimization model in terms of cost, energy efficiency and resource utilization. Loss of huge amount of energy in order to manage 'Big data' produced by the cloud ERPs is becoming a challenge towards the establishment of sustainable business model.

Keywords Sustainable business model · Virtual ERP · Cloud ERP SME · Big data · Cloud federation · Cloud broker

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S. K. Ghosh (ed.), *Waste Management and Resource Efficiency*,
https://doi.org/10.1007/978-981-10-7290-1_96

Sustainable Waste Transportation in Kolkata Using DBMS and Image Sensing

Rahul Baidya, Ipsita Saha, Tapobrata Bhattacharya and Sadhan Kumar Ghosh

Abstract The purpose of this study is to generate a robust waste transportation system for the city of Kolkata to the proposed waste-to-energy (WTE) plant and to the existing composting plant. WTE plants are concerned with generating power thus inorganic fragments is the primary concern, on the other hand composting plants primarily needs organic fragments. In this study, a database management system (DBMS) was developed for selecting the compactor waste which will be towed to the truck to be carried to the WTE plant or composting plant. The waste-to-energy plant will be able to identify the waste composition coming to the plant, thus making the supply chain more holistic and robust. The parameter was identified from literature review, and a field study was carried out to identify the composition of wastes dumped into compactor in different areas. The composition of the waste is then gauged by the image sensing process. The algorithm will have a predefined value based on which the truck destination will be decided. The data of different trucks carrying waste will be stored in the DBMS. The system will reduce the transportation cost considerably by making the decision as soon as the waste arrives at the compactor. The results if implemented could reduce the cycle time and could provide an effective solution to analyze the waste before it is transported to the plants. The DBMS-image sensing system (DBMS-ISS) will analyze the surface characteristics of the waste. Thus, this process will generate the approximate composition of the waste.

Keywords Waste · DBMS · Image sensing · Kolkata

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S. K. Ghosh (ed.), *Waste Management as Economic Industry Towards Circular Economy*,
https://10.1007/978-981-15-1620-7_5_13