STUDY OF FACTORS INFLUENCING THE PERFORMANCE OF SERVICE ORGANIZATIONS: A CASE OF TELECOM SERVICE PROVIDERS

A Thesis submitted to the Delhi Technological University, Delhi in fulfilment of the requirements for the award of the degree of

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By

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DECLARATION

I hereby declare that the thesis work entitled **"STUDY OF FACTORS INFLUENCING THE PERFORMANCE OF SERVICE ORGANIZATIONS: A CASE OF TELECOM SERVICE PROVIDERS"** is an original work carried out by me under the supervision of Dr. Pravin Kumar, Associate Professor, Department of Mechanical Engineering, Delhi Technological University, Delhi. This thesis has been prepared in conformity with the rules and regulations of the Delhi Technological University, Delhi. The research work presented and reported in the thesis has not been submitted either in part or full to any other university or institute for the award of any other degree or diploma.

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CERTIFICATE

This is to certify that the thesis entitled, "**STUDY OF FACTORS INFLUENCING THE PERFORMANCE OF SERVICE ORGANIZATIONS: A CASE OF TELECOM SERVICE PROVIDERS**" submitted by **Ms. Garima Sharma** to the Delhi Technological University, Delhi for the award of the degree of **Doctor of Philosophy in Mechanical Engineering** is a bona fide record of original research work carried out by him under our supervision in accordance with the rules and regulations of the institute. The results presented in this thesis have not been submitted, in part or full, to any University or Institute for the award of any degree or diploma.

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Dedicated

to

Mr. Yogesh Kumar Sharma

(Father)

&

Mr. Arvind Kumar Sharma

(Father in Law)

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ABSTRACT

The service industry constitutes a major part of the economy for most of the countries in the world. The services have been integrated with the day-to-day requirements of the people and contribute significantly to the GDP (Gross Domestic Product). The service industry has invited significant foreign investments in India, contributed significantly to exports, and generated a great employment opportunity. The service sector covers a wide range of business activities such as trade, warehousing, transport, healthcare, Information Technology, communication technology, hotels and restaurants, real estate, insurance, banking and finance, social and personal services, and other transformative services. In this thesis, mainly three service sectors (telecom sector, banking sector, healthcare sector) are given more priority.

Performance for any organization is a very important aspect. It is the result achieved by an individual, organization, team, or process. Performance measurement plays an important role in managing a business of service organizations. Performance measurement is the process of quantifying the efficiency and effectiveness of action and it provides the necessary information for decision-making and actions. In this research work all the major factors influencing the performance of service organizations are explored through the in-depth literature review. The interrelationship amongst these factors and their impact on service performance have been explored through the industrial survey. The data collected through the industrial survey are analysed through the structural equation modelling (PLS-SEM). Analytic Hierarchy Process and PROMETHEE, and Total Interpretative Structural Modelling (TISM).

Using the PLS-SEM the extent of influence of various factors on overall performance of service organization and its sustainability has been observed. AHP and PROMETHEE has been used to ranks the performance of the telecom companies working in different circles in India considering the various operational factors. Total interpretive structural modelling is used to find the causal relationships among the various factors.

It has been observed that the operational factors have highest influence on the service quality. The second important factor having the influence on service quality is Human resource related factors. Similarly, other factor influencing the service quality are market feedback related factors, information technology related factors, and financial factors. The sustainability of the service organization is influenced by service quality as well as overall performance of service organization. The sustainability includes environmental, social, and economical factors.

Using AHP and PROMETHEE Reliance JIO is observed as the best telecom service performer and second best performer is Airtel. The other telecom organizations having performance raking in sequence are Idea, Vodafone, BSNL and MTNL. Using TISM, it is observed that Top Management support, Use of IT, e-commerce, respect for rule of law, and corporate social responsibility have high driving power whereas quality improvement, lead time reduction, cost minimization, customer retention, brand image, and performance of service organization have high dependence on other factors. The other factors like flexibility, transparency in customer dealing, employee empowerment, job security, employee participation, and retention, and responsiveness of service providers have medium range of driving power and dependence.

Novelty of this research is to explore the multidimensional factors influencing the service performance and considering the three different industries having wide range of variations in service operations. In addition, the proposal of framework to compare the service performance and validation in telecom sector is the originality of the work.

List of Publications

International Journals:

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CHAPTER 1

INTRODUCTION

1.1 The Research Background

The service industry contributes significantly to the economic growth of many countries all over the world (Buckley and Mazumdar, 2018). The services have been interwoven into people's day-to-day needs, and they contribute significantly to the GDP (Gross Domestic Product) of the country. In India, the service sector has drawn significant foreign investment, contributed significantly to exports, and produced a large number of job possibilities. The service industry includes trade, banking and finance, real estate, warehousing, transportation, healthcare, information, and communication technology, hotels, and restaurants, insurance, social and personal services, as well as other corporate operations. For any organization, performance is an instrumental aspect. It is the result accomplished by an individual, organization, team, or process (Mahfouz, 2019). For managing a service organization, performance measurement is critical. It is a process of evaluating the efficacy and efficiency of action and providing the essential data for decision-making. A performance measure is a set of metrics used to evaluate an action's efficiency and/or effectiveness, as well as the qualities of outputs specified for evaluation purposes (Neely et al. 1995; Euske, 1984). Innumerable research studies are available on the performance measurement of manufacturing organizations versus service organizations. Even though scholars and practitioners dedicate a large amount of time and attention to developing a Performance Appraisal System, other procedures, such as implementation and review/update, are equally important (Franco-Braz et al. 2011; Nudurupati et al., 2011; Santos et al., 2007). Managers should

be able to employ a performance assessment system to handle financial, customer service, operational methods, as well as development and advancement challenges (Kaplan and Norton 1996). Improvement is impossible without an appropriate measurement system Kaplan (1990). It is essential to measure the appropriate things at the right time in a supply chain and virtual enterprise environment to take quick action (Gunasekaran and Kobu, 2007). Despite the diverse research available, literature on performance evaluation requires excellent supporting theories as well as rigorous and appropriate methods for evaluating employee performance (Franco-Santos et al., 2007; Micheli and Mari, 2014; Choong, 2013, 2014).

1.2 Manufacturing Sector versus Service Sector

The principal issues that service organizations face in trying to maintain and establish processes, the use of control and planning structures by management, and the performance metrics used by organizations are the fundamental differences between manufacturing and service businesses (Sinclair and Zairi, 1995).

The company keeps track of the effectiveness and quality of the offered service. For this reason, methods such as performance evaluation must be devised and implemented. The assessment of service delivery performance is critical in identifying future improvements for the service organization based on historical and current data (Meier et al., 2013). The global economy has changed dramatically as a result of the continual growth and advancement of information and communication technology (ICT) (Kumar and Sharma, 2019). Over the last three decades, communication and information technology have fueled the growth of the service sector (Busari and Koot, 2007). In developing nations, the importance of the service sector is growing faster than that of the manufacturing sector (Szirmai and Verspagen, 2010). Rapid urbanization, government sector expansion, and growing demand for consumer services are the leading drivers of the service

sector's rise and growth (Singh & Kaur, 2014). The expansion of the economy's primary and secondary activities is heavily reliant on tertiary activities (Soni and Parashar, 2013). The above-mentioned limits describe traditional services such as restaurants, hotels, public administration, and trade. Modern services, on the other hand, help to expand cross-border trade and benefit from economies of scale. Transportation, logistics, business process outsourcing (e.g., insurance payments, medical record transcription, call centers), and networking services are among these services. The structural change in diverse industries exemplifies the key aspect of economic progress. The service sector is growing, whereas the manufacturing sector is experiencing a downturn (Manyika et al., 2012). Technological advancements have accelerated development by providing more resources and greater capabilities; as a result, the industry now requires minimal personnel. The third industrial revolution has resulted in consistent growth in employment creation in industrialized countries over the previous decade, adding value to the service sector. This work generation has supported the industry by providing individuals with jobs that would otherwise have been lost. The degree of misalignment between service consumers' general expectations and their views of service delivery reveals the service quality planning (Parasuraman et al., 1985). One method to characterize service quality is to meet the wants and desires of the consumer (Smith, 1998). Tangibility, reliability, responsiveness, competence, civility, reputation, protection, access, communication, and customer understanding/knowledge are eleven service quality parameters that can be added to enhance the service quality. A 97-item questionnaire yielded these ten dimensions (Ladhari, 2009). The study of Parasuraman et al. (1988) has devised five criteria such as reliability, responsiveness, assurance, empathy, and tangibility to compute SERVQUAL, which is a measure of a customer's perceived value of quality of service. SERVQUAL evaluates service against corporations using the fulfilling expectations paradigm.

1.3 Service Sectors

A process is made up of a succession of intangible actions known as service. A service is a benefit or action that one person provides to another. Providing high-quality products and services to clients has several benefits, including increased customer loyalty, manufacturing efficiency, and the delivery of distinctive items, as well as lower marketing costs and higher company values. Service companies have realized that maintaining client relationships is one of the most critical parts of increasing service quality. One of the basic methods for a service company to set itself apart from its competition is to provide consistently high-quality service (Sehat et al. 2012). The association between service quality aspects and customer satisfaction was discovered by Ghafari et al. (2011). According to Hekmat Poor et al. (2012), in all domains, perception of quality vs accessible quality does not meet or exceed expectations of quality, particularly in health care industries where patient conditions are taken care of. The majority of flaws in several quality metrics were related to service accessibility. Service quality, according to Cronin & Taylor (2008), is the arrangement of client satisfaction, which has a substantial impact on purchase decisions.

The strategy and management procedures of service businesses must be evaluated and developed. Increasing competition, new business responsibilities, and changing external demand are the factors to be considered for the same (Michaela et al., 2012). Most businesses have discovered that understanding and monitoring firm performance at frequent intervals is critical for long-term success in a competitive environment that is constantly evolving. Corporate performance measurement has been considered a crucial component in enhancing business performance (Taticchi et al., 2010). In recent years, scholars and practitioners have paid a lot of attention to organizational success assessment methodologies and main variables (Gunasekaran et al., 2004).

There is wide variation in service organizations, way of performing, and measurement throughout the service organizations. Considering only one type of service organization for the analysis may not be sufficient for the reliable results. Thus, in this research three different types of service organizations, such as telecom organization, banking organization and healthcare organization are considered as case organizations.

The questionnaire survey was done in all the three types of organizations for the wide coverage of the factors influencing the service performances and their interrelationship. These three organizations have completely different types of service operations which may represent the service sector at large perspectives.

1.3.1 Telecom Industry

One of the world's fastest-growing industries is the telecom industry. Telecommunications firms in India are on the increase, and the sector has grown dramatically in the last decade. Across the globe, Indian telecommunication is the second largest one. The reason for this is not just because of the industry's unpredictable technological discoveries and practices, but also because of its phenomenal growth rate and significant contribution to the country's economy during the last few decades. The telecom sector is an exciting field to study. The international economy has altered substantially over the last two decades as a result of continuous development and up-gradation in information and communication technologies (ICT). The telecom industry, in particular, has been at the forefront of global development (Francis and Santosh, 2016; Debnath and Shankar, 2008; Barman and Sengupta, 2017). Making a phone call, using the internet, high-speed data transfer, satellite communications, faxing, video conferencing, and watching cable

television are just a few examples of how telecommunication has become an inseparable part of our daily lives. The telecommunications industry is booming, but it's also facing stiff competition. A telecom service provider (TSP) would struggle to prosper in the market unless it improves service quality and develops its operational plan. In India, the mobile phone industry has seen a golden age. Service providers will need to alter their marketing and operational strategies as the Indian telecom market continues to evolve (Dwivedi and Sharma, 2011). India's telecommunications business has evolved tremendously over the previous two decades (Kumar et al., 2017). Infrastructure based on telecommunications is crucial to a country's economic and industrial development. Telecommunications infrastructure is critical to a country's economic and industrial development. The number of phone users climbed by 0.70% in 3 months, according to TRAI (2021), from 1160.52 million at the end of June to 1168.66 million at the end of September 2020. In September, India's overall teledensity increased from 85.85% in June to 86.22%. Infrastructural investment in the country has been steadily increasing.

1.3.2 The Indian Banking Sector's Influencing Parameters

The growing diversity of consumer expectations, as well as technology advancements, are expected to have a substantial influence on bank management's capacity to retain and attract new customers and investors. If revenue, reputation, and the number of branch offices increase, bank management is forced to redefine banking services in terms of improving the performance of the banks.

Service quality, technological breakthroughs, innovative ideas, and transforming these abstract ideas into goods and services to create value for clients, as well as employee commitments, are all influential factors in the banking sector's growth and development (Chai et al, 2015). The dependent variable is the return on assets (ROA), whereas the independent factors are capital

adequacy ratio (CAR), operational efficiency, net interest margin (NIM), nonperforming loans (NPL), and loan to deposit ratio (LDR). According to the research, operational efficiency, NIM, and NPL are all critical factors that determine the performance of government banks. For private banks, CAR and operational efficiency are the deciding factors. The findings support the efficiency theory, signalling theory, and relative market power hypothesis.

Banks play a vital role in a country's financial and economic development. Banks provide financial and advisory services to small and medium-sized businesses as well as larger corporations. The banking sector's performance determines the performance of any economy to a considerable extent (Kumar et al., 2016). Previous studies on the impact of bank size on bank performance have produced mixed results, with the causality remaining unclear. Large banks are thought to be more effective than small banks because they can mobilize capital such as human resources, materials, and technologies to improve operational performance (Hughes et al, 2001). While some studies, like Bonin et al., (2005), Berger et al., (1987), Noulas et al., (1990), and Mester (1992), show a positive relationship between bank efficiency and bank size, others, like Berger et al., (2008), Wheelock and Wilson (2013), and Hassan and Marton (2003), show that larger banks are less productive in transition economies.

1.3.3 Indian Healthcare Sector

India's healthcare industry includes hospitals, medical devices and equipment, health insurance, clinical trials, telemedicine, and medical tourism. These market groups are expected to diversify as an older population and a growing middle class wants preventative healthcare. In addition, the rising prevalence of lifestyle problems such as high cholesterol, high blood pressure, obesity, poor diet, and alcohol consumption is pushing up the demand for specialist care services in urban regions. In addition to these demographic and epidemiological trends, COVID-19 is

expected to cause long-term changes in attitudes regarding personal health and hygiene, health insurance, fitness, and nutrition, as well as health monitoring and medical check-ups. The pandemic has accelerated the adoption of digital technologies such as telemedicine. These repercussions include the construction of infrastructure and facilities, the purchase of equipment, and the development of skills through education and training, all of which result in increased employment through direct manufacturing and service outputs.

In recent years, there has been a rising emphasis on enhancing the performance of the healthcare industry (Harlez and Malagueno, 2016). The healthcare sector in emerging India is witnessing growing demand (Mondal et al, 2015). This expansion is fueled by rising income levels, more health awareness, a higher priority for lifestyle diseases, and enhanced insurance coverage. In FY20, gross direct premium revenue from health insurance in India climbed 17.16% year on year to Rs 51,637.84 crore (US$ 7.39 billion). The demand for statistical health data is increasing as a result of digital networks. According to the United Nations, the world community has shifted its focus to achieving the Sustainable Development Goals' targets (Govt of India, 2015). (SDGs). In health care, more resources are being allocated towards the prevention and treatment of high-burden diseases including HIV/AIDS, tuberculosis, and malaria.

Diabetics currently number over 60 million in India, with that figure anticipated to rise to 90 million by 2025. In India, every fourth person over the age of 18 is thought to have hypertension. Every year, over 5.8 million Indians die from NCDs (heart and lung diseases, stroke, diabetes, and cancer). The rising burden of these diseases in India is predicted to cost the government USD 4.58 trillion by 2030 (nit.gov.in).

The healthcare industry in India has risen at a compound annual growth rate of around 22% since 2016. At this rate, it is expected to reach USD 372 billion in 2022. Healthcare has become

one of the most important areas of the Indian economy in terms of revenue and jobs. Healthcare overtook manufacturing as the fifth largest employer in 2015, directly employing 4.7 million people. According to the National Skill Development Corporation (NSDC), healthcare in India could add 2.7 million new jobs between 2017 and 2022, or over 500,000 new positions per year (Funding Indian healthcare, 2020). From 142 in 2014 to 63 in 2019, India improved 79 places in the Ease of Doing Business ranking. India has also climbed 33 places in the Global Innovation Index, from 81st in 2015 to 48th in 2020, to take first place in the Central and South Asian region (India Brand Equity Foundation, 2020).

Similar disparities occur in the delivery of healthcare services, with up to 60% of hospitals concentrated in only a few large cities across the country. Surgery is performed on 30% to 35% of patients in India, compared to 60 to 65% worldwide. Radiation therapy is administered to around 15% to 20% of patients in India, compared to 40% to 50% internationally. Closing the gap in overall cancer care will require correcting the imbalanced distribution and density of radiation installations across government establishments, as well as promoting the installation of linear accelerators in private institutes through a Public-Private Partnership (PPP) model. There are 1.3 hospital beds per 1,000 persons in India. There is also a scarcity of competent health workers, with 0.65 physicians per 1,000 people (the World Health Organization average is 1 per 1,000 people) and 1.3 nurses per 1,000 people. To achieve the goal of 3 beds per 1,000 persons by 2025, India will require an additional 3 million beds. Another 1.54 million doctors and 2.4 million nurses will be required to meet India's growing healthcare needs. Demand will be created by the growth of programs like Ayushman Bharat (PM-JAY), which will enhance the demand for health personnel not only in large cities but also in Tier 2 and Tier 3 cities and villages. India will need to raise the number of competent health workers in all categories to attain a ratio of at least 2.5 doctors and 5

nurses per 1,000 people by 2034 (Healthcare. Invest India. https://www.investindia.gov.in/sector/healthcare).

1.4 Performance measurement

Performance management of a service organization has been a difficulty due to the incorporation of human psychology and, as a result, the self-satisfaction of producers and consumers in commission creation and consumption. A performance measurement system (PMS) is a set of metrics used to quantify the efficiency and effectiveness of actions (Neely et al., 2005), where effectiveness refers to how well a customer's need is met and efficiency refers to how effectively the corporation's resources are used in service output. Some ways are offered within the literature for better performance management. Because of the organization's learning and advancement, Kaplan and Norton (1993) proposed a balanced scorecard for performance measurement that took into account all perspectives, including internal customer, financial, customer, and stakeholder. The Performance Measurement Questionnaire (PMQ) was used by Dixon et al. (1990) to identify the executioner's strengths and weaknesses. Shieh et al. (2020) used a four-stage DEA to assess the efficiency of life assurance businesses (Data Envelopment Analysis). Because it provides the info needed for decision-making and action, a performance assessment system is important for corporate management. "There will be no change unless interventions are made" (Kaplan, 1990) According to Hronec (1993) Performance metrics are the organization's vital signs, measuring how well the activities inside a process or the performance of a process achieve a certain goal. A performance measuring system attempts to compile the actions of a corporation's many levels and functions of management (Nair et al., 1989). A performance management system can be a "tool for managing numerous measures: expense, quality, and

timeliness throughout different levels of an organization, process, and other people," illustrating the value of integration (Hronec, 1993; Sinclair and Zairi, 1995).

Financial performance can be divided into three categories: (a) financial (profits, return on assets, return on investment, and so on); (b) quality (selling points, the share of the market, and so on); and (c) share price (total shareholder return, economic value-added, etc.). Organizational efficiency is one of the most fundamental themes in management science. Previous research has revealed a multimodal view of organizational success, with stakeholders, product market conditions, and time all playing important roles. Due to market rivalry for consumers, inputs, and capital, organizational efficiency is crucial to the long-term health and profitability of modern businesses. As a result, the ostensible goal of modern industrial activity has become this fiction. Marketing, logistics, human resources (HR), and policy are all evaluated on how well they contribute to the overall performance of the organization. Individual firm and manager conduct, as well as businesses, stand in contrast to their competitors, and how organizations expand and function through time, must all be examined by researchers and managers (Richard et al., 2009). Organizational effectiveness is a broad concept that includes organizational efficiency, internal performance results typically associated with more productive or profitable activities, and other external metrics that are related to factors other than economic valuation (by equity investors, administrators, or clients) (Richard et al., 2009).

1.5 Performance measurement in service organizations

According to performance measurement and specifically management control system literature Certain "generic contingency factors" or "organizational contingency factors" influence performance assessment in service operations. Organizational strategy (Brignall, 1997), organizational scale (Garengo and Bititci, 2007), industry (Jansen, 2004), and social practices are

examples of factors (Garengo and Bititci, 2007). Setting goals and analyzing results in these areas regularly ensures that the organization remains competitive, lucrative, and long-term viable. Managers may enhance productivity and inspire staff to achieve higher levels of success by aiding them in goal-setting. An effective enterprise performance management system allows for optimal control of the business process. The feedback is used to compare actual results to expectations, compare industry best practices, and identify areas for improvement. Businesses are obligated to monitor the effectiveness and efficiency of their service offerings (Meier et al., 2013).

Many firms' performance indicators have been found to be inadequately defined, resulting in a great deal of ambiguity and misunderstanding. Following the gathering of data for each metric of performance measurement, four tasks must be completed: data creation, data collecting, data analysis, and information delivery. The majority of performance measures are quantitative, which may be appropriate in the manufacturing industry, however numerous qualitative performance indicators are also employed in the service industry.

1.5.1 Service Initiatives

Regular reviews and a platform for employees to approach management with complaints and suggestions can help to enhance overall service efficiency. Two service programs that can promote efficiency and goal attainment are ongoing on-the-job training and peer-to-peer mentoring (Panda, 2011).

Another study, conducted by Njanja et al. (2013), looked at the influence of incentives on employee performance and suggested that future research should focus on the effect of different types of rewards on employee performance. Future research should focus on identifying other characteristics that affect employee performance. Ajila and Abiola (2004) proposed that further

research be done on the impact and link of rewards on employee performance utilizing a variety of commercial and public organizations.

According to Boyne (2010), Organizations must-have information on their employees' performance. Such companies will be able to see if they are deteriorating, stagnant, or improving as a result of this. It also helps them to adapt fast to improve their goods and services in order to ensure organizational growth and survival (Basheer et al, 2018). Performance evaluation has traditionally included five characteristics of performance: effectiveness, economy, efficiency, compliance, and service quality. Because performance is a fictitious term, it is frequently measured against some standard, such as stressing what has been accomplished in the company, comparing it to the budget, or ensuring compliance (Carin & Good, 2004).

Hamilton et al. (2003) emphasized the necessity of mutual monitoring and group norms in teams. The authors examine the relationship between team incentives, worker participation, worker heterogeneity, and production using empirical data.

1.5.2 Performance Indicators

In the service industry, high customer satisfaction scores, increased repeat business statistics, increased production/output, sales generation, and client referral numbers are all indicators (Chahar and Hatwal, 2018). Absenteeism, meeting deadlines, providing guidance, leading by example, trying something new, adhering to a budget, and working in a group context are all important variables to consider when evaluating performance. Individual performance management has typically been centered on performance measurement and remuneration allocation within businesses. Good performance is thought to be the result of motivation and individual talent working together. Individual performance is gradually being acknowledged as being influenced by an enabling environment and effective planning, with standards and

performance goals, advice and support from management, and suitable resources all being at the center (Alder & Tompkins, 1997).

Employees are an essential and integral part of any firm. The majority of employee productivity is reliant on a capable, skilled, and qualified workforce. Boosting employee behaviour involves enhancing employee performance, which benefits both the organization and the employees involved (Rounok & Pravin, 2011). In numerous studies, several criteria have been connected to performance. Mahmood et al. (2016) discovered links between performance-based compensation, career incentives, organizational perks, and employee performance in their research.

According to Mahmood et al. (2016) in order to improve employee motivation, the company should be aware of performance metrics that can influence their drive to generate new energy for their work. Employees in poor countries prefer financial benefits to survive their lives, and the impacts of reward vary depending on the sorts of incentives, how awards are dispersed, and how they use rewards to influence employees.

1.5.3 Performance Evaluation

Employees in the service business should be evaluated regularly for their purchasing behaviour, product and service expertise, and customer engagement observation. Employees can be evaluated depending on how well they achieve their goals (Teir and Zhang, 2016). Comprehensive improvement plans, mentoring, and ongoing service training should be implemented after unsatisfactory assessments if any. To acquire a complete picture of performance criteria, consider reverse assessments and peer-to-peer reviews.

Normally, corporations analyze the performance in order to assign prizes, which immediately enhances individual and work motivation. It begins with understanding the need for planning in order to ensure that motivation has a significant impact on organizational performance. If an organization wants to increase its performance and become more successful, trust plays a critical role in increasing employee motivation (Bhola & Raskar, 2013).

Most significantly, employee performance has a direct impact on the effectiveness of the firm. Enhance the link between staff development and performance as well. As a result, they become able to demonstrate a greater level of commitment to their work, and their overall performance will improve. When this is accomplished, the effectiveness of the organization will be assured (Champathes, 2006). People are now extremely important to an organization's success. Employee input is required for organizational planning and strategy to become a reality. People (workers) and the system, thus, play a role in an organization's success. Human capital possesses the necessary knowledge, competencies, and skills to carry out the organization's plans and strategies. As a result, these firms must be familiar with their employees and guarantee that they are encouraged to reach their maximum potential (Lawler, 2003).

There are numerous case studies available that deal with performance measurement issues and solutions in various service environments (Johnston and Pongatichat, 2008). The role of service characteristics in performance measurement is only mentioned in a few research papers. There are two distinct sorts of services, according to these studies: professional and mass services. Typical topics covered include measuring service quality and focusing on either the service process or the service result.

There are a variety of measurement purposes, including bigger strategic goals and more operational and granular goals. The necessity to define a tailored measurement system or a tailored

component in a larger measurement system is primarily tied to measurement purposes in this study. The objective of the measurement has a significant impact on the measurement items used. Measurement items are significant factors that an organization deems to be critical to its success. They might be both concrete and intangible, physical and monetary. Measures may be formulas and techniques that offer quantitative information about the state of measuring objects or their change (Kaplan and Norton, 2004).

Service management has been a topic of discussion, particularly in the marketing profession (Hill, 1977; Lovelock, 1983). Performance measurement in the service context has recently become a fascinating study topic (Bititci et al., 2012; Neely, 2008; Pawar et al., 2009). Various approaches to the problem have been taken. There is a growing body of research tying performance assessment and management control to the servitization movement (the shift from goods producer to service provider) (Baines et al., 2009; Laine et al., 2012; Neely et al., 2011). Numerous research has also been conducted on the need to establish better service performance measurements (Amir et al., 2010; Brun and Siegel, 2006). Furthermore, some studies provide methods for overcoming specific measurement issues, for example, customer experience in consumer services (Auzair and Langfield-Smith, 2005). A variety of tactics have been utilized, some of which are more linked to services marketing (focus on the consumer), while others are more tied to service operations (Lee and Park, 2008). However, due to its nearly limitless extent, following the scholarly conversation on service performance measurement is difficult. This could explain why linked research has such a disjointed range of themes (Johnston, 2005). Even though their other processes are generalizable, comprehension is required.

Competitions that evaluate and assess progress in important service areas regularly are open to organizations (Armstrong, 2015). A corporation may monitor customer service

behaviours, gather employee input, immediately identify problem areas, and rectify issues before they become costly with such a system in place.

1.5.4 Important pillars of Service organizations

Two fundamental pillars of service organizations are service providers and customers. The organization will be able to stay afloat in the market only if the clients are satisfied. Many studies have been undertaken on the factors that influence customer behaviour in a range of industries, such as financial services, travel, telecommunications, and airlines, quality fairness, pricing fairness, communication, dispute resolution, relational advantages, and customer care services are all factors that influence consumer satisfaction and loyalty.

Relationships between service providers and customers are critical for achieving high levels of customer satisfaction and loyalty. It is also crucial to the communication process. It is of equal importance in healthcare and banking organizations. Gittell (2002) discovered links between service providers and their influence on patients in a study of postsurgical therapy in nine hospitals. He determined that a good health service provider positively promotes patient satisfaction and loyalty. Managers should choose, train, and reward service providers in a way that encourages strong working relationships.

The banking industry has been reduced to a commodity. Because they have little room to compete on pricing, most banks offer the same services and products. However, experienced customers have a competitive advantage over other banks. Customers' happiness is dependent on the relationship between a bank and its clients. People deserve to be treated with respect and to feel privileged. They want to have a solid relationship with their bank, and they expect it to go above and above in providing exceptional service rather than simply pushing a product. In modern banking, customers can interact with a bank in a variety of methods, including online, mobile

banking, ATM, and phone banking. One of the most important things for customers is a consistent experience across networks. Whether it's transporting data quickly between networks or ensuring that deposit times are uniform regardless of how a deposit is made, these details are of immense importance. To provide an exceptional customer experience, banks must meet their clients' needs across all platforms.

In the telecommunications market, service providers compete by delivering high-quality services such as data plans, voice calling bundles, value-added services, and safer electronic transactions to increase their business scope and attract more clients. Given the increased competition among service providers, understanding the consumer's perspective on service quality is crucial. Mobile subscribers frequently inquire about customer service and product quality (Escobarand Carvajal, 201; Dzakiria et al., 2013). With such severe competition, mobile operators are always looking for innovative ways to improve their packages so that their customers have a positive experience.

1.5.5. Sustainability in Service Organizations

The techniques related to sustainability in service organizations are in developing stage compared to manufacturing organizations. The typical challenges on the service organization are to be productive and profitable while being sustainable. Sustainability in a service organization is relatively new area of research (Hussain et al., 2016). Few studies have focused on sustainability of service supply chain by considering the green practices of suppliers. Govindan et al. (2014) reviewed the research on green practices for evaluating the supplies. Grimm et al. (2013) studied food supply chains and observed the 14 factors for sub-supplier relationship. These factors are classified as focal firm related, relationship-related, supply-chain partner related and context-related.

1.6 The motivation for this Research

One of the most difficult tasks for top management in service is to attain and maintain excellence in performance. Inadequately defined performance measures are causing misinterpretation and gaps in many businesses confusing. For service sectors, the majority of performance measures are qualitative type. The choice of service quality is very subjective because it involves the well-being of customers, society, and employees. Performance assessment is critical for service organizations since it is difficult to measure. With the lowest share of services employment, India is one of the fastest developing service industry markets. The performance evaluations are carried out in the context of a certain industry, such as healthcare, finance, or telecommunications.

The Indian healthcare sector has seen significant growth in recent years. The hospital sector is expected to be valued at $372 billion in 2022. As a result, for the case study, it is critical to consider the healthcare sector's performance measurement.

Furthermore, banks play a vital role in the current global economy since they collect people's hard-earned money and invest them in various enterprises and marketplaces. Nationalized Banks play an essential part in a country's capital formation and contribute to the country's economic prosperity. As a result, it is essential to assess the banking sector's performance metrics.

The Telecom Regulatory Authority of India (TRAI) standardized the telecom industry by establishing a regulatory framework that fosters a healthy operating environment. The Indian government is working hard to promote India as a worldwide communications powerhouse. The telecommunications sector in the country has created opportunities for many international companies from different parts of the world and observed rapid growth, massive investment, robust

demand, and an increase in the teledensity of rural subscribers. The above-mentioned facts motivate to improve the performance of service organizations.

Due to a significant contribution of service sector in the country's economic development; the sustainability becomes an important part of the research. The social sustainability leads to the welfare of stakeholders as well as the entire society. Similarly, environmental sustainability leads to the health care, safety, environmental protection, waste treatment, etc. to save environmental and people. The economic sustainability may lead to the market survival of the organization as well as the purchasing power of the consumer. Thus, sustainability of service organization may be considered as a critical parameter of the research.

1.7 Research Gap

Following research, gaps have been found based on the literature review. In Chapter 2 of the thesis, the in-depth literature review is discussed.

Gap 1: Many performance measurement factors have been identified which vary from one firm to another. Most of the factors are focused on the specific service/product produced by the organization. Very few references have been found that consider the overall performance of a service organization.

Gap 2: Very few articles are available on sectoral disparities in organizational performance.

Gap 3: Very few research articles have been found in the literature that is focused on triple bottom line aspects of sustainability in service organizations.

Gap 4: The majority of studies on telecom service performance are focused on a single region or circle. Wide research is required to find the performance of the telecom service providers on the country level.

1.8 Research Objectives

This research project aims to investigate the various company-related elements that influence the performance of service organizations. The objectives of the research are as follows:

Objective 1: To explore and interrelate the factors influencing the performance of a service organization.

Objective 2: To find the sectoral disparities regarding the practices to improve the performance of service organizations.

Objective 3: To propose a performance measurement model for service organizations including the triple bottom line of sustainability.

Objective 4: To compare and rank the performance of telecom service providers in India.

1.9 Research Methodology

The following are the methodologies employed in this study:

(i) An in-depth literature review is conducted to explore the various issues in service organizations.

(ii) Using the literature review some major factors influencing the performance of service organization and hypotheses have been formulated.

(iii) A questionnaire has been developed and administered for testing of the hypotheses formulated and surveyed in Banking, Healthcare, and Telecom organizations.

(iv) Partial Least Square-Structural Equation Modeling (PLS-SEM) is used to test the hypotheses and results are demonstrated.

(v) Total Interpretive Structural Modeling (TISM) is proposed as a framework to find the hierarchical relationship among the factors.

(vi) An integrated model of Analytical Hierarchy Process (AHP) and Preference Ranking Organization Method for Enrichment Evaluation (PROMETHEE) is proposed to compare the performance of service organizations and for validation of this model telecom sector working in India is considered as a case study.

(vii) Finally, results were discussed and the study is concluded with some future scope of research, and limitations.

The research design framework is shown in Figure 1.1.

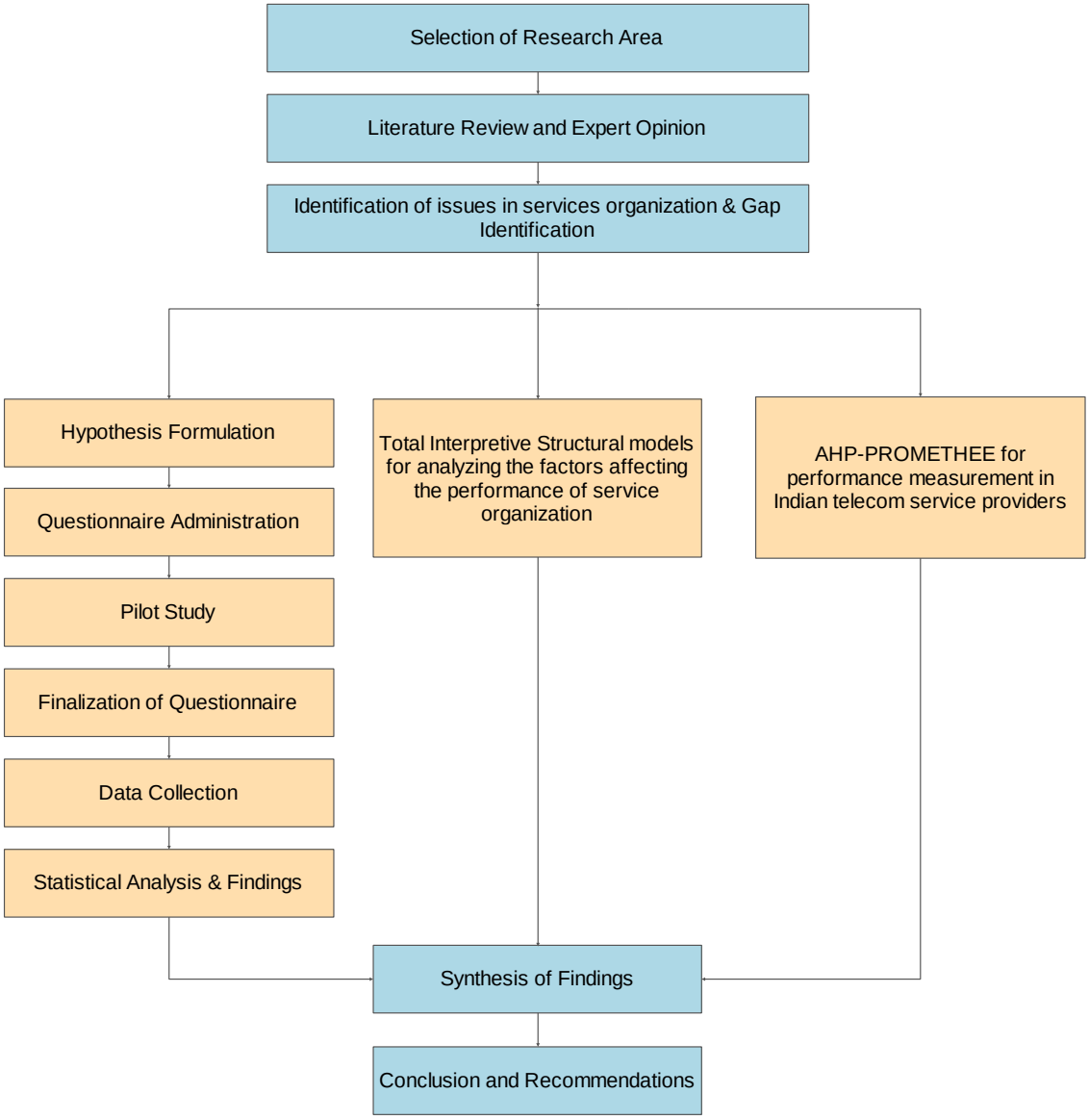


Figure 1.1: Research Methodology

Using data from a questionnaire survey, hypotheses were evaluated and validated using mathematical/statistical models. The literature review and industry experts' perspectives have been used to identify various factors that influence service organizations. The Cronbach alpha coefficient is used to assess these components' internal consistency and dependability. The hypotheses are studied and evaluated using SMART PLS software and the structural equation modelling method. The effects of a variety of factors on the long-term viability of service

organizations are investigated in this study, which employs Partial Least Squares Structural Equation Modelling (PLS-SEM to test the hypotheses given. The hypotheses are tested using a 95% confidence level and a 5% threshold of significance. The sectoral discrepancies are investigated using a one-way ANOVA test. The first four assumptions are based on disparities in sectors. This study also highlighted various other components of the survey, such as questionnaire formulation, administration, validity, and descriptive statistics.

A hierarchy-based framework based on the total interpretive structural modelling (TISM) approach is offered to comprehend the interrelation of many aspects influencing an organization's performance. The relative dependency and driving strength of the factors influencing the service organization can be better understood using this approach. The literature review helped to identify the factors that influence the services. Following the identification of the components, Total Interpretive Structural Modelling (TISM) was used to interpret the direct and substantial transitive links between them.

The AHP and PROMETHEE integrated methodologies were utilized in this study to compare the operational performance of cell phone service providers in India. This framework will be used to assess the operational performance of India's cellular mobile telecom service providers. This report is based on data collected by the Telecom Regulatory Authority of India from July to September 2020.

1.10 Significant Research Contributions

The following are the research's key contributions to the industry:

- This study may aid service organization managers in determining the essential factors that influence many dimensions of organizational performance.

- This research could aid in the development of criteria for evaluating the effectiveness of service organizations.
- The interaction between the components may aid the manager in determining the link between one factor and another to improve organizational performance.
- This study could be used to rank different service organizations in a specific industry.

The following are the research's key contributions to Academic:

- This research leads to the application of methods to interrelate the aspects that affect service performance.
- The purpose of this study is to develop a system for ranking service firms.
- The hypothesis testing in this study is done with SMART-PLS.

1.11 Organization of Thesis

The chapters are summarized as follows:

Chapter 1: It provides an overview of the full research project, including an overview of a service organization, performance measurement, research technique, and so on.

Chapter 2: The chapter includes a classification of literature relating to service organization performance measurements, factors impacting service organization performance, the interrelationship between factors utilizing Total Interpretive Structural Modelling methods (TISM) methods, Analytic Hierarchy Process (AHP), Preference Ranking Organization Method of Enrichment Evaluation (PROMETHEE), Partial Least Square Structural Equation Modelling (PLS-SEM), and a description of some service organizations. Gaps in the literature, as well as

related concerns in performance measurement and research techniques, were investigated through the literature review.

Chapter 3: The philosophical assumptions that underpin the research are presented in this chapter. It also defines the research approach and strategy, as well as the research technique that was used.

Chapter 4: This chapter covers the creation of hypotheses and the distribution of questionnaires. The questionnaire was created with a focus on the topics that are investigated in service organizations. The questionnaire was sent out to potential respondents in three service industries: banking, healthcare, and telecommunications.

Chapter 5: Using the one-way ANOVA test and PLS-SEM, this chapter offers the descriptive impressions of respondents from diverse sectors such as banking, healthcare, and telecommunication.

Chapter 6: Total interpretive structural modelling is introduced in this chapter to develop interrelationships among the variables driving service organization performance. The "dependence-driver power diagram" is used to determine the variable's reliance and driver power. A hierarchy-based framework based on Total Interpretive Structural Modelling (TISM) is offered to analyze the interaction among numerous aspects influencing an organization's performance.

Chapter 7: To compare the operational performance of Cellular mobile telephone service providers in India, the combined AHP-PROMETHEE techniques are employed. This analysis is based on data acquired through primary and secondary sources.

Chapter 8: This chapter summarizes the study's findings, as well as the survey's important findings and the study's principal conclusions.

Chapter 9: The study work and results are summarized in this chapter, along with limitations and future research directions.

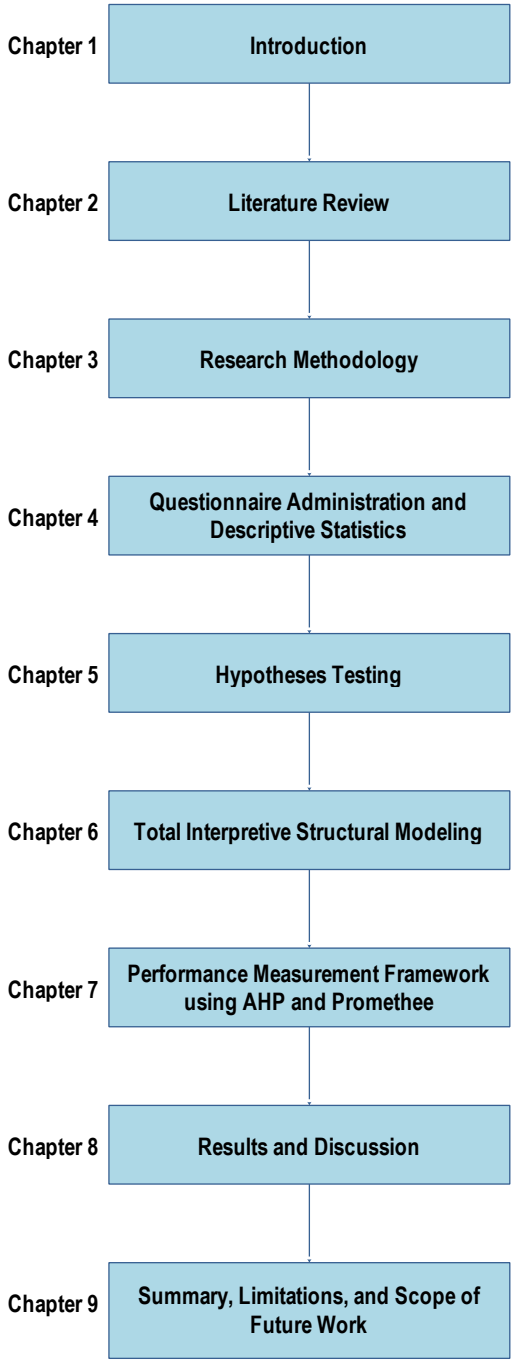


Figure 1.2: Structure of Thesis

1.12 Conclusion

This chapter provides an overview of the research. For performance evaluations, three different service industry sectors are evaluated namely, the finance, healthcare, and telecommunications industries. The rationale for the research, the research's aims, the methodology employed in the research, the research summary, major contributions, and the research's organization are all discussed. The hypotheses obtained from the framework that reflects key relationships were chosen, and we will be able to substantiate them with the literature reviewed in the following section of this thesis.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

Performance management of a service organization has been a difficult subject due to the integration of human psychology and fulfillment of expectations of producers and consumers regarding the service produced. The term performance measurement (PM) can be defined as the quantification of an action's efficiency and effectiveness where effectiveness refers to the extent to which a customer's need is met and efficiency refers to the rate at which the corporation's resources are used efficiently in service production (Neely et al., 1995). Performance measurement systems (PMS) are created and implemented to aid in the achievement of an organization's goals. The PMS is designed up in such a way that performance may be tracked. This is performed through identifying areas of concern and success, with the ultimate goal of improving organizational skills and learnings (Star et al., 2016). The PMS's purpose is to deliver performance-based data that can easily be transformed into actionable performance-based knowledge, allowing users to better understand, manage, and improve measurement (Harbour, 2011). Many ways have been discussed in the literature for better performance management. Kaplan and Norton (1993) suggested a balanced scorecard for performance measurement that took into account all perspectives, including customer and stakeholder, financial, internal process, and the organization's learning and progress. Dixon et al. (1990) developed the Performance Measurement Questionnaire (PMQ) to help managers identify their organization's improvement needs, determine the extent to which existing performance measures support improvements, and develop a performance measure improvement

agenda. There were four sections of the PMQ. The first section comprises generic data that is used to sort the respondents into groups. The second portion of the PMQ assesses the companies' competitive priorities and performance monitoring system. It is composed of items labeled as "improvement areas." The respondent is directed to circle a number on either side of the table. The third component of the PMQ is identical to the second, with the exception that it focuses on performance variables (performance measures). In the final section of the questionnaire, respondents are asked to give their opinion about performance measures other comments if any.

2.1.1. Performance measurement of service organizations

“A performance measure record sheet is used to record the definition of the performance measure” (Bourne et al., 1998). Following the collection of data for each metric, four tasks must be completed: data generation, data collecting, data analysis, and information sharing." The majority of performance measures are quantitative, which may be more appropriate in the manufacturing industry, however many qualitative performance indicators are employed in the service industry. Most organizations realize the value of both financial and non-financial success indicators but fail to exhibit them in a balanced manner (Kaplan and Norton, 1992). Some firms and scholars have concentrated on financial performance indicators, while others have also covered operational measures. Non-financial indicators are frequently superior for the day-to-day control of service activities, while financial performance assessments are critical for strategic decisions and external reporting (Maskell, 1991).

The commitment of top management is seen as a critical success factor in improving the organization's performance. The organization's main direction in terms of operations of diverse activities is based on top management policy, which includes the organization's vision and mission.

One of the indicators of an organization's performance is service quality. Free factors include responsiveness, tangibility, assurance, empathy, and reliability, while needy factors include consumer loyalty and customer happiness (Masrurul, 2019). However, in this study, the service provider's reaction to customer complaints about services is given greater weight than the other service criteria.

Customer happiness and loyalty are crucial metrics to use when evaluating service quality. Financial success, customer loyalty, and customer satisfaction, on the other hand, are not always inextricably linked (Williams and Naumann, 2011). Customer behavior can be influenced by a variety of causes and circumstances, including product, market segment, and pricing.

Performance evaluation is viewed as a vital component by management (Pongatichat and Johnston, 2008). This critical process enables an organization to assess how it is progressing with its planned and targeted objectives, as well as to identify areas of weakness and strength and to facilitate future actions aimed at enhancing organizational performance (Purbey et al., 2007). From this perspective, benchmarking is crucial for an organization's performance management process (Dawkins et al., 2007; Debnath and Shankar, 2008; Kwon et al., 2008; Goncharuck, 2008). If a company fails to make benchmarking a part of its performance improvement strategy, actions and policies are likely to fall short of expectations, leading to increased employee discontent and turnover (Longenecker and Fink, 2001). In the absence of well-established performance measurement systems that take into account the multi-faceted character of organizational performance, it can be difficult for a company to reap the full benefits of systematic benchmarking efforts aimed at improving various aspects of the company's performance.

Performance assessment methods have been created in the past to sustain and monitor organizational control to ensure its sustainability. In general, such strategies were employed to

ensure that an organization follows the performance-based activities to achieve its defined goals and objectives (Purbey et. al., 2007). The alignment and emphasis on performance evaluation went through two stages in general (Ghalayini and Noble, 1996). The first stage lasted a century, from the 1880s to the 1980s. The first level was distinguished by its emphasis on cost accounting and the relevance of financial metrics like earnings, returns on investment (ROI), and productivity. The second stage began in the 1980s. Changes in global marketplaces, such as the acceptance and deployment of new industrial technology and management philosophies, were the catalysts (Daz et al., 2005).

The emphasis on non-financial projects became more prominent in the second stage (Johnson and Kaplan, 1987; Santori and Anderson, 1987; Cross and Lynch, 1988-1989; Kaplan and Norton, 1992; Neely et al., 1995). The complete shift in organizational orientation from closed to open systems occurred at the same time as the shift from productivity to more long-term organizational success procedures. Executives are increasingly realizing that an open framework organizational concept is required to combine the organization's diverse functions. As a result, the management is concentrating more on customer satisfaction, supplier relationships, and general organizational effectiveness. Various publications for measuring service efficiency encompass educational institutions, the healthcare industry, universities, public agencies, real estate enterprises, police, and the banking sector, among others. (Wilson et. al., 2003; Modell, 2003; Ho and Chan, 2002; Brignall and Modell, 2001; Van Peursem et. al., 1995). Performance evaluation is the foundation for assessing an organization's progress toward its objectives, identifying key areas of strength and weakness, and analyzing potential strategies to improve organizational performance. As a result, companies that do not incorporate frequent performance assessment and

benchmarking into their management procedures and methodologies may see the performance lower than the projected (Longenecker and Fink, 2001).

2.1.2. Sustainability in Service organizations

Social sustainability represents employees, customers, and the organization's image that lead to enhanced organizational performance. Social sustainability is treated as a strategic resource within businesses to gain a competitive edge. This study incorporates the all the three different types of sustainability such as social, environment, and economic sustainability by looking at the welfare of employees, customers, and organizations. The sustainability of an organization is primarily determined by its strategy. As a result, companies that meet customer expectations satisfy both individual and societal needs (Gelhard and Von, 2016). Evaluation of performance has both positive and negative outcomes. To begin with, performance evaluation has positive effects/impacts such as greater productivity, increased transparency, and higher accountability. On the other hand, it could result in increased internal bureaucracy, internal politics, weaker motivation, and a lack of innovative focus (De Bruijn, 2002).

2.2. Service Organizations

Service sectors are becoming increasingly important in overall economic growth, particularly in developed countries (Bateson, 1991), while other developing countries continue to contribute to the country's prosperity (Pham, 2011). Because of its continuing expansion and development, the telecom sector has recently been in the news, and it has become a focus for researchers, academics, and legislators (Touray et al., 2013). Furthermore, while service quality is becoming more important, the focus on healthcare service quality is unparalleled (Elleuch, 2008). A strong and functioning economy requires a secure financial system. As a result, the banking

sector, which is the most important component of the financial services industry, is heavily dependent on the performance of any economy (Kumar et al., 2017).

The telecommunications sector connects an information-intensive society to the country's socio-economic development (Touray et al., 2013; Talib et al., 2017).

Several reform attempts in India, particularly in the telecom sector, are challenging to implement at both the technical and management levels. In addition, implementing these improvements is a challenging process that involves substantial research. The Indian telecom sector is transforming, and it is attempting to recapture its previous glory by establishing stringent laws to boost the sector's performance and revenue (The Hindu, 2014). All of these procedures, however, are still in the early phases, and roadblocks must be removed (Talib et al., 2017).

Customers demand a high level of satisfaction from their present service provider, which leads to customer loyalty and a strong bond with the current subscriber (Kim et al., 2004; Talib et al., 2017). Various studies comparing the performance of telecom sectors have been undertaken. To strengthen competitive positioning, Dominic et al. (2010) examined and produced a greater understanding of the links between service quality, customer relationship management, customer satisfaction, and customer loyalty.

Garg and Gupta (2007) looked into options for narrowing the gap between current performance levels and the predicted potential of the Indian telecom sector. Based on a literature review, insights gained through exploratory interviews, and a survey of industry respondents, Seth et al. (2006) created an instrument for measuring quality within the firm. Seth et al. (2008) looked at consumer satisfaction with telecom carriers' QoS, scoring different qualitative/subjective

attributes such as reliability, responsiveness, assurance, empathy, tangibles, convenience, and customer perceived network quality (Kumar and Kumar, 2013).

In the same way that other manufactured things may be seen, felt, numbered, touched, or measured, service in healthcare is an intangible benefit. Because healthcare is an intangible service, the consumer, the service process, and the service provider interact to establish service quality. Giving the same service to diverse customers, producers, hours, and places might be difficult at times. Several types of professions (such as nurses, doctors, and physicians) may provide services to patients with varying demands, resulting in heterogeneity. Healthcare services are produced and consumed simultaneously, and they cannot be saved for later use. Two other important characteristics are the mechanism of service delivery and the interactions between service providers. Because the patient is unable to assess the quality before consumption and purchase, it makes it difficult to maintain service quality (Vaish et al., 2016).

Patients' expectations for healthcare services are rising as the service industry expands in developing and emerging countries, particularly in hospital settings, where patients require high-quality service to be pleased and loyal. As a result, most service organizations examine processes that contribute to quality management to create and retain competitive positions. Quality management practices and quality audits are being adopted and implemented in private sector hospitals' business processes, but public sector hospitals are still trailing in terms of quality practices and audit management, necessitating the establishment of a well-designed strategy. These practices are directly linked to the enhancement of hospital healthcare service quality, which helps to build a robust healthcare system (Shabbir et al., 2016).

For service providers seeking a competitive advantage, service quality is the most important strategic dynamic to build and monitor (Lee and Yom, 2007). It has become vital to

serve patients with high-quality healthcare services as living standards and customer expectations have risen (Padma et al., 2010). In this regard, academics, hospital administrators, government leaders, and medical specialists are finding it difficult to establish criteria other than patient happiness (Al-Borie and Damanhouri, 2013; Shabbir et al., 2016).

As the principal sources of financial intermediation and payment systems, banks play a key role in a country's economic development and progress. Aside from their economic importance, the creation of a more competitive market underlines the importance of continuously improving banks' operations and monitoring their financial state through analyzing their performance. Performance assessments can be used by bank management to discover areas of operational inefficiencies, resource allocation gaps, the implications of ongoing regulatory changes on bank operations, and their ability to realign their businesses with the most profitable business trends, among other things (Paradi and Zhu, 2013).

Service quality has been a hot topic in academia, especially in the banking business. "The subjective comparison that customers make between the quality of the service that they want to receive and the quality of the service that they receive" (Gefen, 2000). According to Sudesh (2007), low service quality at public sector banks is mostly due to intangibility issues, as well as a lack of responsiveness and empathy. Banks in the private sector, on the other hand, were discovered to be more polished in this area. Foreign banks were relatively near to their client's expectations in terms of many aspects of service quality. Furthermore, the study discovered that service quality varied depending on demographic factors. It means that bank officials should be aware of potential areas of failure and respond to customer complaints (Sudesh, 2007). To encourage client loyalty, willingness to pay, commitment, and trust, banks should pay particular attention to service quality (Hazra and Srivastava, 2009). As a result, emphasizing the need of understanding

multidimensional notions of service quality and their implications in a competitive environment is crucial. Customers can maintain a relationship with a company even if they are dissatisfied, therefore a satisfied customer is not obligated to remain loyal (Matos, et al., 2013; Paul et al. 2016).

2.3. Factors Influencing Service Organization Performance

The key to performance measurement success is to ensure that all components of the measurement systems are in synchronization. The adoption of performance measurement systems is influenced by a variety of factors, including strategy and goals, performance variables, performance assessment and reward systems, and customer and supplier system integration (Chang, 2005). Every business must establish and build a performance criterion that will serve as the basis for effective management planning and control.

Based on a review of various studies, it is clear that none of them are fully effective. The majority of them highlight common factors like leadership management, training, employee involvement, process management, planning, and quality measurements for continuous improvement. Identifying critical regions for specific components can aid in the construction of a model that will help managers obtain a better understanding of quality and, eventually, aid in the establishment of the firm's performance measurement. The developed methodology can be used to manage a company's quality standards regularly (Claver et al., 2003).

The choice on service quality is very subjective, and it must take into account the well-being of consumers, employees, and society as a whole. Many factors influence this, including top management vision and leadership (Arshida and Agil (2013), corporate social responsibility (Hopkins, 2012), respect for the rules of law (Zurn et al., 2012), and transparency in dealings (Zurn et al., 2012; Rawlins, 2009). Top management commitment is viewed as a significant success factor in boosting the performance

of the organization. The organization's main direction in terms of operations of diverse activities is based on top management policy, which includes the organization's vision and mission. Customer satisfaction and loyalty are considered other necessary variables, while responsiveness, tangibility, assurance, empathy, and reliability are considered service quality (Masrurul, 2019). When measuring service quality, customer satisfaction and loyalty are crucial variables to consider.

Financial success, customer loyalty, and customer satisfaction, on the other hand, are not usually linked (Williams and Naumann, 2011). Some factors, such as product, market sector, and price, can influence customer behavior. Table 2.2 summarizes some of the most important references for the various factors included in the performance analysis of the organizations.

Based on a review of different studies, the majority of them highlight common factors like leadership management, training, employee involvement, process management, planning, and quality measurements for continuous improvement. Very few studies incorporate the sustainability-related issues, use of e-commerce, and other information technology-related tools and (Claver et al., 2003).

To establish disparities between industries, bigger sample sizes for each industrial or service sector should be gathered for better findings. For a better outcome, workers and managers at various levels of the firm should be surveyed with various aspects, and customer satisfaction should be taken into account.

Systematic techniques to planning and arranging delivery procedures, as well as network partners, are all part of industrial service delivery. To assess the effectiveness of a service company, significant key performance indicators are required. The ability of a service organization to successfully assign resources to service activities, such as service professionals, tools, and spare

parts, as well as develop and deliver service procedures as intended, characterizes its performance (Meier et al., 2013).

The key elements affecting service organizations include service quality, operational management, information systems, finance, human resource, marketing, and sustainability. They have a significant impact on service industries. Lead time reduction, quality improvement, productivity enhancement, facility location & layout, product/service organization, and cost minimization are all factors of operations. The type of industry determines the determinants.

Table 2.1: Factors influencing the performance of service organization

S. No.	Factors	Author	Remarks
1	Responsiveness	Masrurul (2019), Masarrat and Jha (2014), Jones et al. (2002).	The responsiveness of service providers is measured by how quickly they respond to client complaints about their services.
2	Customer retention	Alkitbi (2020), Kotler and Keller (2016), Williams and Nauman (2011), Hossain and Suchy (2013), Kumar and Vandana (2011), Kuo et al. (2009).	Customer retention is a reflection of service quality and relationship management. It's a sign that a company is providing better services at a lesser cost.
3	Lead time reduction	Siddiqui (2018), Jaff and Ivanov (2016), Karki (2012), Zhengping et al. (2012), Kuhlang et al. (2011), Ketokivi and Heikkila (2003), Wang and Gerchak (2000)	The term "lead time reduction" refers to the process of reducing the time it takes to complete numerous tasks while also lowering the cost of producing a product or service.
4	Quality improvement	Hassanien et al. (2020), Moore et al. (2019), Webster et al. (2012), Prajogo and Sohal (2001), Lemak and Reed (2000), Au and Choi (1999)	The service organization's performance is heavily influenced by the quality of its services. It must be constantly enhanced and centered on the consumer.

5	Brand image/market reputation	Kotler and Keller (2016), Smit et al. (2007), Keller and Lehmann (2006),	Many elements influence a company's brand image or market reputation. It has to do with the service providers' general performance, as well as the pricing.
6	Flexibility	Herzog et al. (2014), Wachsen and Blind (2011), Altuzarra and Serrano (2010), Jonsson (2007), Wilthagen and Tros (2004), Goodwin (2002)	Flexibility refers to an organization's ability to adapt its system in response to client demands.
7	Cost Minimization	Kusaku (2020), Saini S. (2014), Beamon and Balcik (2008).	Cost optimization is also a critical component of performance evaluation. Cost-cutting requires management's creativity, technology, and effort.
8	Employee satisfaction and Retention	Kusaku(2020), Yamamoto (2011), Self and Dewald (2011),	Employee happiness has an impact on the quality of services provided to customers. It's a sign of a more positive employer-employee relationship.
9	Employee empowerment	Bateman and Snell (2007), Fay and Luhrmann (2004).	Total quality management includes employee empowerment. It is a measure of an organization's overall quality, comprising service, process, system, and individual/personnel quality.
10	Employee participation	Pradhan and Jena (2017), Karakas (2010), Mone and London (2009), Hellriegel et al. (1999),.	Employee satisfaction and retention are both important factors in problem-solving involvement.

11	Job security	Backes and Tour (2010), Murthy (1992), Roznowski and Hulin (1992), Rao and Pareek (1982),	Employee motivation and a sense of belonging to the organization are boosted by job security.
12	Use of IT	Chen and Hsiao (2012), Bauer et al. (2008).	Information technology is equally crucial for both service and manufacturing businesses. It aids e-commerce and shortens the time it takes for information to travel through supply chains.
13.	E-Commerce	U.S. Census Bureau News (2018), Jiang et al., (2016), Li et al., (2013), Hossain (2002).	E-commerce refers to business transactions that take place through the internet. It could involve e-marketing, B2B, and B2C, among other things.
14	Top management commitment	Arshida and Agil (2013), Zakuan et al., (2012), Omware (2012), Baidoun (2003).	Top management commitment refers to the management's vision and efforts to attain the goal. It offers medium and low-level management with direction and leadership for future movement and operations.
15	Corporate social responsibility (CSR)	Hopkins (2012), Dess et al. (2010), Hediger (2010), Johnson et al. (2008), Elkington (1997), Carroll (1991).	The social connectivity of a corporation is shown through corporate social responsibility. How does the organization handle social welfare issues for the poor, such as food, education, and clean water, for

			example? What management thinks about its employees' well-being and healthcare?
16	Transparency	Rawlins (2009), Wayne et al. (2007), Tapscott and Ticoll (2003), Stirton and Lodge (2001), Cotterrell (2000).	For the organization's sustainability, transparency in customer dealings and corporate ethics are critical.
17	Respect for rules of law	Zurn et al. (2012), Ginsburg (2011).	There are several environmental, ethical, and social responsibility standards and regulations in place. Organizational performance is influenced by adherence to the law.
18	Environmental Sustainability	Swarnakar et al. (2019), Hosseinzade et al. (2018), Perez and Escamilla (2017).	The health of people and other living things on the planet is vital to environmental sustainability.
19	Social Sustainability	Lee et al. (2021), Larimian and Sadeghi (2021), Pfeffer (2010).	The impact of services on society is the subject of social sustainability. It also contributes to the well-being of society's citizens.
20	Economy Sustainability	Boar et al. (2020), Repo and Matschoss (2020).	It is concerned with the customer's financial ability to pay for the service.

Parasuraman et al. 1985 have established the SERVQUAL scale with ten dimensions for the first time in 1985. They shortened the scale to five aspects (tangibility, reliability, responsiveness, assurance, and empathy) in 1988. It has been widely used to assess service quality in a variety of settings (Zhou et al., 2018). Service quality is a nebulous concept that is difficult to define and quantify (Parasuraman et al. 1985,1988; Carman, 1990).

The service is constant enough to fulfill the customer's needs and expectations, and the service given meets or surpasses those expectations. Here are a few examples of common service quality variables: Process Quality: This refers to the consistency of processes and production techniques, as well as the quality of customer services. Product Quality: They are reviewed after they have supplied service. The service that the company gives to its clients is the product. Physical Quality: The goods or services that the product backs up are referred to as physical quality (Grace and Ocass, 2003). Interactional Quality: This refers to the interactions between customers and service providers. Organizational Quality: This refers to the overall mental picture and perception of the company. In general, organizational quality is an intangible characteristic (Evans and Lindsay, 2009).

Responsiveness, empathy, assurance, and tangibility are utilized to evaluate service quality in this study. Companies must re-engineer their cultures, operations, and processes to support customer-centric and quality-driven competitive business strategies as customer sophistication and business practices become more global. The current study has focused on new operational planning implementation domains like hospitals and the food industry (Helber et al., 2018; Wanniarachchi et al., 2016). In this article, operational management is measured in terms of lead time reduction, quality improvement, productivity improvement, facility location & layout, product/service organization, and cost minimization.

A good marketing strategy will show a company where it wants to go in the long run, hence a continuous process can be deemed marketing. The impact is moderated, according to the

findings, by the success of marketing strategy implementation. Goi (2009) described marketing strategy as a set of marketing tools used by organizations to achieve their marketing objectives in their target market (Osuagwu, 2006; Gronroos, 1999). According to (Owomoyela, et al, 2013), the goal of developing a company's marketing strategy is to establish, build, maintain, and sustain its competitive advantage. This research looks at market share, market reputation/brand image, flexibility, agility, market presentation, and customer loyalty/retention.

The percentage of total sales earned by a company in a certain industry or market over a period of time is referred to as its market share. Market share is calculated by dividing a company's sales over time by the total sales of the industry over the same period. It can also be stated as a proportion of a market's total sales volume that a brand, product, or company has captured. Market share is a key metric of market competitiveness since it reveals how well a company performs in contrast to its rivals (Farris et al., 2010). To be competitive in today's market, it must strategize to better satisfy customers' needs through marketing methods, while maintaining brand image and allowing flexibility. As a result, research is being carried out to see how marketing strategies (product, promotion, pricing, and location) affect organizational effectiveness (profit, sales volume, and market share, and customer loyalty).

In this article, marketing is measured using market share, market reputation/brand image, adaptability, agility, market presentation, and customer loyalty/retention.

In today's computer-aided modern environment, ICT plays a critical role in both developed and developing countries. They're crucial in service businesses, where items and services are exclusively offered via the internet, resulting in increased efficiency. In comparison to manufacturing, service industries make extensive use of ICT. Companies become more

competitive as a result of their usage of ICT, which allows them to add services to their product offering (Yeo and Grant, 2018).

ICT has contributed significantly to social and economic improvements, including more job opportunities and efficiency, as well as greater access to a higher standard of living (DesRoches et al., 2013). ICT encompasses information and knowledge management techniques, as well as information handling instruments that are used to create, store, process, distribute, and share data. The sub-factors of the information system factor are the use of IT software, digitization of processes, integration of operations, interdepartmental coordination, usage of E-commerce, and the removal of information gaps. Digitization has an impact on service organizations' marketing tactics, operational services, and financial management. E-commerce and technical breakthroughs are changing the way businesses are conducted.

Interdepartmental collaboration is very crucial in service organizations. Network quality is regarded to be the catalyst for competitive advantages in the service business because it is concerned with acquiring and retaining consumers. Researchers have established a link between network service quality and consumer satisfaction. Network quality and price fairness, according to Khan and Afsheen (2012), have a significant impact on mobile phone provider choice. As a result, it's been proven that bad network quality has a major negative influence on customer satisfaction, which in turn has an impact on customer loyalty.

In this article, the usage of IT software, digitization of processes, activity integration, interdepartmental coordination, e-commerce, and the elimination of information gaps are all utilized to evaluate an information system.

Finance is the lifeblood of modern businesses. Both fixed and operating capital need to be carefully managed. Overuse and underuse of capital should be avoided. The company's management should ensure that the money it invests delivers acceptable returns. If the company's finances are properly managed, productivity will increase. Accounting models are used to assess performance, notably accounting earnings or profits per share models. In this study, finance is measured using annual turnover, liability, operating cash flow, working capital, current ratio, debt-equity ratio, and return on equity.

Human resource management practices are thought to be a way of boosting employees' job happiness (Mohammed et al., 2019). HRM techniques are more likely to generate work circumstances and an environment in which employees become deeply devoted to the organization and strive to achieve its objectives (Cherif, 2020). The most significant challenge that businesses face is employee participation. Every company has both an internal and external environment in which it functions. Structure defines the formal relationships of individuals in the organization and shapes people's attitudes both internally and externally. Technology provides resources; structure defines the formal relationships of individuals in the organization and shapes people's attitudes both internally and externally.

Employee retention and contentment, as well as employee empowerment incentives, employee participation, training and development, job security, and innovation and creativity, are all examples of human resources in this article.

Today's business sector is confronted with a key issue: long-term viability. Corporate sustainability, according to the study, comprises optimizing long-term shareholder value by seizing opportunities and managing risks posed by social, environmental, and economic factors. The sub-factors include environmental sustainability, social sustainability, and economic sustainability.

For the long-term sustainability of service organizations, several scholars have recognized numerous types and models of performance assessment systems in manufacturing operational environments (Cross and Lynch, 1988- 1989; Kaplan et al., 1992; Neely et al., 1995; Neely, et al. 2001; Pun and White, 2005; Shepherd and Gunter, 2010). Even though performance metrics and measurement have been given less attention in service operating contexts, difficulties related to intangible aspects of various services have been discovered (Brignall and Ballantine, 1996; Amott, 2007). Its purpose is to aid performance measurements that emphasize financial aspects of success in service companies due to historical challenges. In addition, service firms began to appreciate the importance and value of non-financial service quality standards for long-term existence (Duggirala et al., 2008; Chau, 2009).

There hasn't been much research on performance measurement in India, but as the economy grows more competitive, it's becoming more vital for any firm to use performance measurement to assess the efficacy of the strategy and processes followed for business growth. Because India's service industry has grown so rapidly in the last decade, and because there is so little data available, research must be conducted that considers numerous performance factors, and a performance instrument must be developed. Table 2.1 shows some important factors that influence the performance of service organizations.

2.4. Methodologies used for performance evaluation

Three primary strategies for measuring organizational performance have been identified in the literature. The first strategy is the linking between the matrices and performance (Hawawini et al., 2003; Hillman & Keim, 2001; Roberts & Dowling, 2002; Spanos et al., 2004). In the second strategy, the researcher analyses many alternative measures with different dependent and independent variables (Baum & Wally, 2003; Contractor et al., 2003). The third strategy entails

the researcher combining dependent variables and assuming convergent validity based on the correlation between the measures (e.g., Cho & Pucik, 2005; Goerzen & Beamish, 2003). This is applicable when the researcher is looking for trait-based psychometric validity in subjective performance measures (Varadarajan & Ramanujam, 1990). The validity of these methods is determined by whether the particular measurements used to meet the given theoretical, statistical, and psychometric assumptions.

The performance of service companies is measured using a variety of approaches. Cherif (2020) used DEA to assess the banking sector's performance. Shieh et al. (2020) used a four-stage DEA to assess the efficiency of life insurance businesses (Data Envelopment Analysis).

In the recent past, there has been a lot of research on how to quantify the performance of telephone service providers. As a result of significant technology breakthroughs, customers' requirements and preferences are always changing. As a result, many researchers' and practitioners' reports have served as the basis for performance rating and measuring parameters. Yadav (2014) employed total interpretive structural modeling (TISM) of strategic factors from both the enterprise and subscriber perspectives to measure the performance of Indian TSPs.

Masson et al. (2016) benchmarked and measured the operational efficiency and service delivery efficacy of Indian TSPs. Debnath and Shankar (2008) and Nigam et al. (2012) conducted studies to determine the relative efficiency of TSPs in India and to identify inefficient service providers using data envelopment analysis (DEA). They emphasized some of the input and output aspects that must be modified for service providers with poor relative efficiency to improve. They focused their investigation on the service quality criteria for input-output variables. Haridasan and Venkatesh (2011) investigated Mobile Service Provider performance in Tamil Nadu, one of India's

southern states. They employed DEA to find the service provider's efficient bounds (DMUs) and a set of input and output parameters.

Zhu (2003) assessed the relative efficiency of Korean TSPs outside of India using DEA with strong ordinal input/output. Yang and Chang (2009) used the DEA method to analyze the effectiveness of Taiwanese TSPs before and after privatization. Resende (2008) used DEA to calculate the telecom industry's efficiency in the United States. They compared efficiency measurement to stochastic frontier analysis and discovered that the two methods were moderately consistent. They assisted in the creation of new telecom industry legislation.

Douligeris and Pereira (1994) used AHP to evaluate alternative telecommunications technology and to assess the quality of various telecommunication providers. Using the Analytical Network Process, Pramod and Banwet (2010) investigated the performance of TSP quality in the Indian environment (ANP). Kumar et al. (2015) investigated the relative efficiency of TSPs using an integrated model of Fuzzy AHP and data envelope analysis. They considered the factors that influence consumer perceptions and choices. Kumar and Kumar (2013) used a combined AHP and methodology for an order of preference by similarity to ideal solution (AHP-TOPSIS) tool to assess the performance of TSPs working in the Delhi Metropolis.

Many academics in the telecom industry have previously adopted the DEA as an effective study technique. However, only a few studies have been found that use the outranking method to rank telecom operators' performance based on operational quality parameters such as network availability (BTS accumulated downtime), connection accessibility (call setup success rate, channel congestion, and traffic channel (TCH) congestion), and connection retainability (call drop rate and connection with good voice quality). Kumar et al. (2017) used fuzzy ELECTRE and comparable criteria to rank 3G mobile service providers in the Delhi working region, finding that

Reliance Communications and Airtel are top and second, respectively. Other criteria, such as fault incidence, fault repair, mean time to repair, settlement of billing/charging complaints, and so on, have been used in a few studies (Kumar and Kumar, 2013; Kumar et al., 2015), however, due to the unique context, they were not found to be suitable for this study. This study is focused on cellular mobile phone services. These additional criteria may be applied to wireline telephone service providers.

Many studies on how to evaluate telephone service providers' performance have already been done. Because of its rapid expansion, many scholars and practitioners have concentrated their efforts on the telecom business. Managers and experts can acquire insights into the operation of telecom operators, uncover problems, and improve performance with the use of performance measurement (Zhang, 2018). Table 2.2 shows some methodologies used for performance measurement in the service organization.

Table 2.2: Methodologies used for performance measurement

References	Methodology	Remarks
Masson et al. (2016)	Data Envelopment Analysis (DEA)	Indian Telecom Service Providers
Nigam et al (2012)	Data Envelopment Analysis (DEA)	Indian Telecom Service Providers
Debnath and Shankar (2008)	Data Envelopment Analysis (DEA)	Indian Telecom Service Providers
Cherif (2020)	Data Envelopment Analysis (DEA)	Indian Banking Sector
Kumar et al. (2016)	Data Envelopment Analysis (DEA)	Indian Banking Sector
Karsak (2017)	Data Envelopment Analysis (DEA)	Health care Sector
Halkjaer and Lueg (2017)	Data Envelopment Analysis (DEA)	Health care Sector
Shieh et al. (2020)	Data Envelopment Analysis (DEA)	Life insurance company
Shukla and Roopa (2018)	Data Envelopment Analysis (DEA)	Telecom Service Providers (Karnataka)

Zhang et al. (2018)	Structural Equation Modelling (SEM)	Chinese Telecom Operators
Joshi (2014)	Structural Equation Modelling (SEM)	Telecom Service Providers
Nizam et al. (2019)	Structural Equation Modelling (SEM)	Banking Sector
Kumar et al. (2017)	Fuzzy ELECTRE	Telecom Service Providers (Delhi)
Kumar et al. (2015)	Fuzzy AHP and DEA	Indian Telecom Service Providers
Subramanian and Ramanathan (2012)	Analytical Hierarchy Process (AHP)	Mobile Service Providers (Chennai, Tamil Nadu)
Dhir et al. (2021)	Analytical Hierarchy Process (AHP)	African Telecom Service Providers
Zhao et al. (2020)	Total Interpretive structural modeling (TISM)	Agrifood Supply Chain
Yadav (2014)	Total Interpretive structural modeling (TISM)	Indian Telecom Service Providers
Talib (2017)	Total Interpretive structural modeling (TISM)	Indian Telecom Service Providers

2.4.1 The Application of Total Interpretive Structural Modeling in Performance Measurements

To establish a hierarchical relationship structure between the variables in question, the TISM method is utilized. It takes into account the effects of the embedded elements and creates a simplified directed graph for a complex system. Green Supply Chain Management (Dubey et al., 2015), Telecom Service Providers (Yadav and Sushil, 2014), Agile Manufacturing System (Sindhwani and Malhotra, 2016), Flexible Manufacturing System (Kumar et al., 2008), and other sectors have employed qualitative modeling.

ISM fails to interpret the interactive relationships for the identified factors/variables represented by directed links, potentially distorting the decision-making process, whereas TISM interprets both nodes and links in the digraph, and incorporates all three key questions of theory construction, namely what, how, and why. Furthermore, all transitive interactions are eliminated in ISM, whereas some major transitive relationships may exist in TISM, resulting in a more thorough explanatory framework.

Total interpretive structural modeling (TISM) is a technique for visualizing the complex and unpredictable interactions that exist between connected variables in a system (Sushil and Chroust, 2015). The TISM is a supplement to the ISM that allows for greater in-depth investigation and analysis (Sushil, 2012). B. TISM's most important applications.

Total interpretive structural modeling (TISM) is a technique for visualizing the complex and unpredictable interactions that exist between connected variables in a system

(Sushil and Chroust, 2015). The TISM is a supplement to the ISM that allows for greater in-depth investigation and analysis (Sushil, 2012). Table 2.3 shows some of the most often mentioned TISM articles.

Table 2.3: Some of the most prominent TISM applications

Authors	Application
Mandal and Deshmukh (1994)	Vendor Selection
Jharkharia and Shankar (2005)	IT ennoblement of the supply chain
Ravi and Shankar (2005)	Reverse logistics
Kumar et al. (2008)	Flexibility in the global supply chain
Nasim (2011)	Change forces in E-Governance
Satapathy et al. (2012)	E-electricity utility service
Sandbhor, and Botre (2014)	Construction Labor
Solke and Singh (2018)	Lean performance

2.4.2 Analytical Hierarchy Process (AHP)

The AHP approach is well-known for comparing criteria, sub-criteria, and options in pairs. Saaty (1980) presented AHP as a pairwise comparison technique based on a 9-point rating system. Many criteria and sub-criteria may be reviewed at various levels of the hierarchy while ranking the alternatives. However, only one level of the hierarchy is considered in this work when comparing the criteria pair-wise.

2.4.3 PROMETHEE

The PROMETHEE is a first-placed multi-criteria decision-making procedure. It was developed and used for the first time by Brans and Vincke (1985). It's appropriate for decision-making situations in which a small number of choices or possibilities must be evaluated against a set of criteria (Albadvi et al., 2007). Throughout the process, an assessment matrix is constructed, in which the options are weighed against the various criteria. In this assessment, the weights of the criterion and the decision makers' preference function are determined (Mousavi et al., 2013; Macharis et al., 2004). Two PROMETHEE approaches for examining decision-making issues are PROMETHEE-I for partial ranking and PROMETHEE-II for total ranking.

Part of the ranking PROMETHEE-I assesses a list of possibilities. This rating, however, is not always complete. As a result, some options may be left out of the comparison. As a result, they are ineligible for inclusion in a complete ranking. This is most common when the first alternative has high ratings on one criterion while the second alternative receives low ratings on other criteria, and vice versa. As a result, the decision-maker must engage in a second evaluation process, PROMETHEE-II, in the case of PROMETHEE-I.

PROMETHEE-II uses the net flow (the result of positive and negative preference flows) to score the options from excellent to poor. The relative position of the options is graphically represented using the Geometrical Analysis for Interactive Aid (GAIA) plane (Macharis et al., 2004). The weights of the criterion can be determined using other multi-criteria decision-making systems. Because the PROMETHEE lacks a structure for allocating weights to the criterion.

The higher the net outranking flow value of a decision, the better the decision. PROMETHEE has been used as an MCDM tool for a variety of applications recently, including equipment selection (Dadeviren, 2008), material handling equipment selection (Tuzkaya et al., 2010), ranking alternative energy exploitation projects (Goumas and Lygerou, 2000), stock trading (Albadvi et al., 2007), and so on.

2.4.4 Partial Least Square-Structural Equation Modeling Was Applied To Hypothesis Testing

Covariance-based structural equation modeling (CB-SEM) was the go-to method for studying complex interrelationships between observed and unobserved components for a long time. To be honest, until around 2010, there were more articles in sociological journals that employed CBSEM instead of partial least squares structural equation modeling. (PLS-SEM). The number of distributed publications utilizing PLS-SEM has recently increased in comparison to CB-SEM (Hair et al., 2017b). PLS-SEM is now widely used in sociology disciplines such as authoritative management (Sosik et al., 2009), global management (Richter et al., 2015), human asset management (Ringle et al., 2019), management information systems (Ringle et al., 2012), operations management (Peng and Lai, 2012), marketing management (Hair et al., 2012b), management bookkeeping (Hair et al., 2012), (Kaufmann and Gaeckler, 2015). PLS-SEM is mentioned in a few books (e.g., Garson, 2016; Ramayah et al., 2016), but the volumes are different (e.g., Avkiran and Ringle, 2018; Ali et al., 2018), and special editions of academic diaries (e.g., Rasoolimanesh and Ali, 2018; Shiau et al., 2019).

The PLS-SEM method appeals to many analysts because it allows them to test complicated models with several builds, pointer factors, and structural ways without imposing distributional assumptions on the data. In any case, PLS-SEM is a causal-predictive approach to SEM that focuses on forecasting when evaluating measurable models with constructs that are designed to give causal clarifications (Wold, 1982; Sarstedt et al, 2017a). The method then overcomes the clear dichotomy between clarification – which is typically emphasized in scholarly inquiry – and expectation, which is the driving force behind imposing administrative consequences (Hair et al, 2019). For example, PLS-Graph (Chin, 2003) and SmartPLS (Ringle et al., 2015; Ringle et al., 2005) are simple to use programming bundles that demand minimal specific knowledge of the method, although more difficult bundles for factual figure programming conditions, such as R, may also execute PLS-SEM (for example sem PLS; Monecke and Leisch, 2012). More detailed reasons and discussions on whether to use and when not to employ PLS-SEM may be found in Richter et al. (2016), Rigdon (2016), and Sarstedt et al. (2017a).

2.5. Hypotheses formulation

A total of twelve hypotheses have been formulated after a review of the literature and consultations with industry and academic professionals. The hypotheses are based on some of the most important factors that influence service organization success, including sustainability, service quality, operational performance, information systems, marketing, financial situation, and investments, among others.

2.5.1 Hypotheses based on sectoral disparities:

Climate change is projected to have a detrimental influence on economic production in the long run due to sea-level rise, health issues, agricultural productivity decline, and threats to ecosystems and biodiversity (Bamisile et al, 2020). The detrimental effects of hazardous radiation from mobile towers and mobile phones on human health have been a source of public concern and with the advent of 5G technology and ever-increasing teledensity, energy demand is expected to skyrocket, causing this industry's energy consumption habits to shift even more (Vijay and Choudhary, 2017). Green Telecom is being adopted by the telecom sector. Green telecom networks are defined as the reduction of energy consumption through the use of energy-efficient technology, alternative energy sources, and environmentally friendly consumables (TRAI, 2020).

Similarly, many leaders are placing a higher value on decreasing pollution and leaving a smaller environmental footprint as community health becomes a primary objective for hospitals and health systems (Dombrowski 2013). Healthcare is a major source of toxins in the environment that harm people's health. To develop criteria for corporate social responsibility, healthcare firms should foster economic, social, and environmental sustainability (Comunidal de Madrid, 2005). Finally, sustainability can lower the per capita cost of healthcare by lowering healthcare expenses; for example, hospitals' ability to free up resources for patient care is improved when they spend less money on utilities (Reeves, 2012). Authors envisaged a link between banking and carbon emissions, and hence feel that the banking and financial industry should bear a greater share of responsibility. Although banks' core function as drivers of economic progress and prosperity is undeniable, civil society, particularly in the developed world, is growing

increasingly worried about how they achieve this goal. Many people have called for "moral capitalism" that is sensitive to social and environmental issues (Jo et al., 2014). Banks must be able to value map material social and environmental indicators into business success with adequate data availability and quality, even if they comprehend the relationship between sustainable performance and their commercial performance (Khan et al., 2015; Sala et al., 2015; Serafeim et al., 2016). As a result, investors (including present and future shareholders) will be able to incorporate their sustainability assessment into decision-making and business operations.

According to the findings of this literature study, there is a difference in perceptions of environmental sustainability. The hypothesis leads to the discovery of a certain factor's impact on the organization's performance.

Hypotheses 1: *There is a difference in perception between telecom, banking, and healthcare sectors concerning the practices of environmental sustainability.*

The use of assets and resources to produce quality service is referred to as operational efficiency. The greater the service quality and the lower the asset cost, the more efficient the operation. The ability of a company to effectively communicate, reach, and deliver services to its customers is referred to as service delivery performance (Masoon et al., 2016). Telecommunications solutions are being used by telecom firms to assist businesses in driving digital transformation through purpose-built workflows. Based on their partnership with prominent telecommunications providers, service organizations have produced innovative telecoms products. Telecommunications Service Management and Telecommunications Network Performance Management products will help service providers provide better experiences to customers, contact center agents, and network

operations teams, allowing them to get the most out of their network technology investments while lowering costs, thus increasing operational performance. Likewise, Cherif (2020) found that human resource management and employee job satisfaction in the banking sector have a high influence in predicting organizational commitment. Financial institutions require to cut operating and compliance costs and promote client loyalty by connecting workflows end-to-end to improve operational efficiency. Operational performance varies from one sector to another and following hypothesis is formulated.

Hypotheses 2: *There is a difference in the perception between the telecom, banking, and healthcare sectors concerning operational performance.*

Human resource management is crucial in providing high-quality services in banking, telecommunications, and health care. To design new policies in all three areas, a refocus on human resource management and additional research are required. Effective human resource management methods are critical for better health care outcomes and access around the world (Kabene, 2006).

When it comes to health care, human resources refers to the various types of clinical and non-clinical personnel who are responsible for public and individual health intervention (World Health Organization.2000). The performance and advantages that the health system can give are primarily dependent on the knowledge, skills, and motivation of personnel responsible for delivering health care, which is perhaps the most essential of the health system inputs (Kirby & LeBreton, 2002). To ensure the system's effectiveness, it is also necessary to maintain an adequate mix of different types of health promoters and caregivers, in addition to the balance between human and physical resources (Anson,

2000). Human capital must be handled and managed significantly differently than physical capital due to their evident and significant disparities (Malat,2001). The relationship between human resources and health care is extremely complicated, and it warrants additional investigation.

The volume and cost of healthcare consumables (drugs, prostheses, and disposable equipment) are skyrocketing, potentially driving up healthcare expenses dramatically. Expenditures in this area can have an impact on the ability to hire and retain good practitioners in publicly-funded systems. HRM methods must be established in both government-funded and employer-paid systems to find the balance between labor supply and practitioners' ability to practice effectively and efficiently. A practitioner without proper tools is just as ineffective as a practitioner with adequate tools. There are many more professionals involved in the healthcare process than doctors and nurses. Pharmacists, nutritionists, social workers, and case managers are just a few examples of allied health care professionals. While doctors and nurses receive a lot of attention, there are a lot of difficulties that affect other health care providers as well, such as workplace issues, scopes of practice, and the impact of changing service delivery methods (Health Canada, 2003). Furthermore, as health care becomes increasingly technologically advanced, a growing number of highly trained and skilled technicians is required. (2003, Health Canada) As a result, we can see the diverse responsibilities that these five groups perform and how they collaborate to build the Indian healthcare system. In the Saudi Arabian banking sector, Cherif (2020) looked at the influence of human resource management and employee job satisfaction in predicting organizational commitment. The success of various public and

commercial institutions, such as banks, is mainly dependent on the performance of their human resources (Uma et al., 2017).

The expansion of the cellular telecommunications business necessitates a higher level of data security. Human resource (HR) departments play a role in data security since security breaches frequently include existing employees. HR managers must keep organizational justice in mind when they integrate information security considerations into initiatives including areas like training, selection, electronic performance monitoring, and performance appraisal design (Ross et al., 2009). According to the literature analysis, HR is not equally vital in the telecom, banking, and healthcare industries.

Hypothesis-3 *There is a difference in perception between telecom, banking, and healthcare sectors concerning human resource management.*

To examine the relationship between IT-based services and consumers' perceptions of service quality, Zhu et al. (2002) established the service quality model highlighting the information technology (IT)-based service possibilities. E-health, which refers to the use of information and communication technologies (ICT) for health care, is an example of e-service in the service industry (Chang et al., 2017; Eysenbach, 2001).

Other authors have developed the theory of economic growth, as stated by (ерикова, 2003), who call attention to the fact that certain aspects in the production process may produce increased income depending on the number of operations and efficiency level. Information gathering, information management, and the availability of external relationships are examples of such elements. We can presume that technological

advancements disrupt the typical relationship between development and corporate growth, resulting in so-called growth spurts that can be predicted by general-purpose technology (the Internet), which could be employed in a variety of industries. Information systems based on ICT, according to Lipaj & Davidaviciene (2013), aid in the improvement of corporate goals, targets, and plans. General-purpose technology alters the current business model and foreshadows significant sector development as well as long-term added value growth. For telecom and finance, as well as the healthcare industry, technology has opened up new products and services, new markets, and efficient delivery routes. IT also gives the banking industry the structure it needs to handle the difficulties of today's competitive climate. With the introduction of modern technologies such as Artificial Intelligence (AI), Machine Learning (ML), BlockChain, and Robotics, India's banking and healthcare industries are poised for a revolutionary space. Information technology is not equally crucial for the telecom, banking, and healthcare sectors, according to the literature assessment.

Hypothesis-4 *There is a difference in perception between telecom, banking, and healthcare sectors concerning information technology.*

2.5.2 Interaction amongst the factors influencing the performance of service organization

The Telecom Regulatory Authority of India (TRAI) has given the quality of service measurements for all telecom service providers in India across all service circles, which has acted as a key source for the majority of their subsequent studies. These indicators included call success rates, voice quality, call drop rate, percentage of calls answered by

the operator within 60 seconds, and other factors that assisted in evaluating the telecom service providers' service quality (Masson et al., 2016). Operational performance has a favorable impact on the organization's service quality (Kumar et al. 2017; Masoon et al., 2016). Numerous articles have been written to look into the connections between quality, customer satisfaction, and business performance (Balasubramanian et al., 2003; Heim and Sinha, 2001; Nagar and Ranjan, 2005; Yee et al., 2010). In manufacturing, operational performance is typically evaluated in faults per million or reaction time for services. These are not the same as the commonly used operational performance measures in healthcare. They frequently do not evaluate economic performance, but rather resources and competencies dedicated to improving human life quality (Berry and Bendaprir, 2007; Halkjaer and Lueg, 2017). As service quality increases, customer satisfaction grows. Customer retention, commitment, the formation of a mutually rewarding bond between the user and the service provider, increased customer tolerance for service and product failures, positive word-of-mouth advertising about the organization, increased future customer spending, and it may result in more selling, attracting new customers, lower costs, and greater profitability are some of the behavioral characteristics that can be observed (Hasouneh et al., 2012). The overall performance of provider delivery operations influences consumer delight. This research goes a step further by claiming that operational performance is a real-time predictor of customer loyalty. According to this analysis, poor carrier transportation operations performance has a negative impact on consumer loyalty (Stank et al. 1999).

The following hypothesis can be made based on the above literature review:

Hypothesis-5 *The operational performance positively influences the service quality of the organization.*

The Information System (I.S) of a quality improvement initiative is a crucial component where the cost of services can be decreased by building information systems. When a company's information systems are critical to its performance, technical help has an impact on service quality. Technical help timeliness, expertise, and reliability were employed as indicators of technical assistance in previous studies (Jiang et.al., 2000; Kettinger and Lee, 1999; Pitt, Watson and Kavan, 1995; Pitt et.al., 1997; Van Dyke et al., 1997; Van Dyke et al., 1999; Watson et al, 1998). In the healthcare profession, I.S. is used to keep track of patients and improve the quality of care they receive (Bharati, 2003) leading to cost-saving. As a result, strong technical assistance helps to improve service quality. Information technology is used to improve market share and profit as businesses can now increase their global market share by deploying more efficient systems and reaching new markets and clientele. The internet and new tools allow access to broader markets with less risk because there are no additional fees for additional clients. Managers of organizations feel that improving or maintaining service levels is crucial for in-service firms and the quality of the system has an indirect impact on the quality of the service (Vannirajan, 2009). As a result, managers must pay close attention not only to the system's quality but also to the performance of their employees' information systems to deliver acceptable service quality.

The following hypothesis can be made based on the above literature review:

Hypothesis-6 *Information system positively influences the service quality of an organization.*

In today's service industry, competition is heating up, so it's more crucial than ever for businesses to grasp service quality as a driver of marketing competitiveness. As a result, service quality should be seen as a different strategy for competing in the service market. Although competitive service plans may differ, they should all be founded on service quality, taking into account differences in servicing consumers' demands, purchasing habits, and consumption patterns. To satisfy the clients they can best serve, service organizations must concentrate their efforts on establishing and increasing service quality. This implies that service firms should perform internal, market, and competition research. The findings of the proposed analysis reveal that service quality is a constant component in marketing competitiveness. To become market leaders, businesses must pay close attention to service quality and marketing initiatives at all times. Because rivalry in every company line is becoming more intense, management must be more cautious in defining their competitive strategies to win the competition. The company's management must be able to plan and implement a marketing strategy that will allow it to grow, maintain, and improve its customer base while maintaining a lucrative relationship for a long period. The final test of whether a marketing strategy will succeed is consumer response (Solomon, 2007). The marketing mix can be customized to fit the company's target market and goals. The following hypothesis can be formulated based on the above literature:

Hypothesis-7 *Marketing feedback positively influences the service quality of an organization.*

Customer satisfaction and loyalty are dependent on the services given by the service organization's human resource management. According to Hays and Hills (2006), service businesses with highly driven personnel improve service quality, customer happiness, and

loyalty. Employees who are satisfied with their jobs exhibit their commitment to their employers by working hard and dedicating themselves to providing high-quality services to clients. Yee et al. (2010) observed that employee loyalty is significantly related to service quality, which in turn impacts customer satisfaction and customer loyalty, ultimately leading to firm profitability in high contact service industries.

Murat et al. (2014) discovered that HRM strategies such as recruiting and selection, training, and development had a favorable impact on an organization's service quality. Employee beliefs about distributive, procedural, interpersonal, and information justice are influenced by human resource strategies designed to improve data security; these beliefs must be explicitly considered as such strategies are implemented; thus, HR's role influences an organization's service quality (Ross et al. 2009). Employee quality and competency are extremely important to banking firms (Saleem and Khurshid, 2014). Human talents and skills are managed by banks to meet the organization's objectives (Ana et al., 2019). The following hypothesis can be formulated based on the above literature:

Hypothesis 8: *Human Resource planning positively influences the performance of an organization.*

A service organization's financial profitability is tied to the quality of its services. Service organizations can use their financial success to invest in ways that improve their environmental and social performance. Managers must be convinced that maximizing societal welfare and maximizing profits are not mutually exclusive goals. Commitment to various social welfare programs and initiatives, on the other hand, might be used as a strategic marketing plan to strengthen the company's brand and secure stakeholders' loyalty, which is both beneficial and profitable in the long run (Nelling and Webb, 2009).

Customer loyalty is the result of higher satisfaction with service, which leads to increased financial performance (Nath and Pal, 2003), leading to profit maximization. Good financial reports usually include the company's responsibilities to share the profits with stakeholders, including employees, customers, the community, and the environment (Gao, 2009). As an effort on corporate social responsibility, firms with strong shareholder rights have a lower cost of equity capital than their competitors having fewer shareholders. The following hypothesis can be made based on the above literature review:

Hypothesis-9: *Financial support positively influences the service quality of an organization.*

Numerous scientific studies have shown that high service quality improves a company's performance (Portela and Thanassoulis, 2005), increase profit margin (Kish, 2000; Duncan and Elliot, 2002) and market share (Fister, 2001), improves brand image (Caruana, 2002; Ehigie, 2006), and promotes customer loyalty (Kish, 2000; Duncan and Elliot, 2002; Qadri and Khan, 2014; Yap et al., 2010). In general, service quality refers to a customer's assessment of service expectations in relation to a company's performance. During service marketing, marketing teams offer a variety of discounts to entice customers to make an effort to boost their company's brand image. Customers' input on their services is also taken into account for future enhancements. A company with a high level of service quality is more likely to be able to meet customers' expectations while being economically competitive in its industry. This can be stated that service quality is determined by a comparison of expectation and perception of customers. "Perceptions of great service quality and high customer satisfaction lead to higher levels of purchase intentions and recurrent buying" (Schiffman and Kanuk, 2007). Non-essential services can be reduced or

even eliminated once a firm understands its customers' demands, wants, and expectations. Increasing the efficiency and effectiveness of offering the right services at the right time will aid the organization's profitability.

Based on the above literature, the following hypothesis can be formulated:

Hypothesis 10: *Service quality has a positive impact on an organization's performance.*

The ability to provide consistent, high-quality services on a long-term basis is referred to as sustainable service quality. Maintaining and building customer loyalty through high levels of service quality and satisfying customer requests is a critical priority for accomplishing sustainable business operations in today's highly competitive business market (Lee, 2013). According to Reich et al. (2006), keeping existing consumers is easier than attracting new ones. Sustainable service quality, according to Stamenkov and Dika (2015), can provide uninterrupted services with extraordinary sustainable quality for an extended period. Various elements of service quality must be evaluated for an organization's sustainability (Saei et al., 2010; Nizam et al., 2019). Rapert and Wren (1998) discovered that service quality had a good impact on short-term increases in both operating cost and net revenue growth.

The following hypothesis can be formulated based on the above literature:

Hypothesis 11: *Performance of a service organization positively influences its overall sustainability.*

Customers' opinions of service quality are based on a comparison of their expectations before service with the actual service experience. If perceptions exceed

expectations, the service will be considered great; if perceptions just meet expectations, it will be considered acceptable or adequate; and if perceptions do not meet expectations, the service will be classified as awful, poor, or deficient (Naik et al., 2010). As a result, service quality is "an important component of consumer perceptions" (Zeithaml et al., 2009). As Abd-El-Salam et al. (2013) pointed out, company initiatives are critical since service quality is generated, provided, and delivered by the firm as a service provider. Many elements influence a consumer's decision to buy, one of which is a promotional activity in the form of a deal, as consumers are price sensitive (Shamout, 2016). Maintaining and building customer loyalty through high levels of service quality and satisfying customer requests is a critical priority for accomplishing sustainable business operations in today's highly competitive business market (Lee, 2013).

The following hypothesis can be made based on the above literature review:

Hypothesis 12: Service quality positively influences the sustainability of an organization.

These hypotheses are supported by the researchers' viewpoints. The ability to provide consistent, high-quality services on a long-term basis is referred to as sustainable service quality. Marketing feedback has a direct impact on an organization's service quality. Customer satisfaction and loyalty are dependent on the services provided by the service organizations. All of the factors that contribute to a service organization's success and long-term viability are interconnected.

2.6. The Identified Research Gap

Gap 1: Many performance measurement factors have been identified which vary from one firm to another. Most of the factors are focused on the specific service/product produced by the organization. Very few references have been found that consider the overall performance of a service organization.

Gap 2: Very few articles are available on sectoral disparities in organizational performance.

Gap 3: Very few research articles have been found in the literature that is focused on triple bottom line aspects of sustainability in service organizations.

Gap 4: The majority of studies on telecom service performance are focused on a single region or circle. Wide research is required to find the performance of the telecom service providers on the country level.

2.7. Conclusion

This chapter leads to the in-depth literature review on service organization performance. The various methodologies such as PLS-SEM, AHP, PROMETHEE, and TISM have been reviewed and their applications are explored in the different areas of the management. Twelve hypotheses have been formulated based on the in-depth literature review and some major research gaps have also been identified.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The research gap is identified to reduce produce the necessary evidence to answer the research question. The aim, objectives of the research work, and research methodology are stated in this chapter. Research hypotheses, methodology, strategies, techniques, and instruments for data collection have been developed. This chapter aims to provide an overview of the conceptual theories that underpin this research, as well as the research methods and empirical approaches used. The entire research study procedure is depicted using the research onion framework in Figure 3.1.

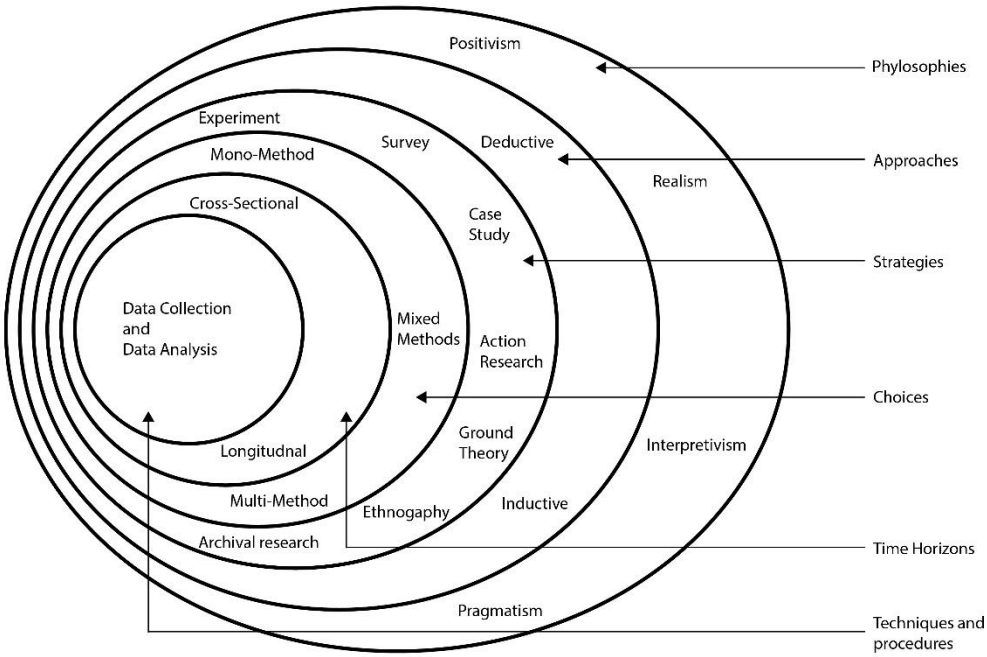


Figure 3.1: Research Process Onion (Saunders et al., 2003)

The testing ideology is represented by the first layer of the process onion. Positivism, realism, interpretivism, and pragmatism are some of the different research philosophies. The research methodologies are defined in the second layer of analysis: are deductive and inductive reasoning.

Research techniques are the third layer of the onion, which reflects the analytical approach. Experiments, surveys, case studies, action analysis, grounded theory, ethnography, and archival research are some of the methodologies used. Process selection is the study's fourth layer. Mono-method, mixed-method, and multi-method are examples of these methods. The fifth layer of the study phase onion represents time horizons, such as cross-sectional or longitudinal. The sixth sheet, which is the study onion's core, shows the data collecting and analysis.

3.2 RESEARCH PHILOSOPHY

The study of knowledge's evolution and existence is referred to as "research philosophy." It's a means of considering how data is collected about a research phenomenon and analyzed, the results are interpreted and used in the societal context. There are several research philosophies such as Positivism, interpretivism, realism, pragmatism, objectivism, subjectivism, functionalism, and many more. Galliers (1991) proposed four major research philosophies: positivist (also known as scientific) and interpretivism (also known as anti-positivist), pragmatism (a theory developed from practice), and realism (scientific approach to the development of knowledge). According to positivism truth is always stable, and it can be represented and studied objectively.

Levin (1988) claims that According to interpretivism, the truth can only be fully realized through subjective perception and interference. The interpretivism theory places a premium on studying events in their natural environment. Realism, like positivism, is an epistemic branch that posits a scientific method to knowledge formation. This idea fosters data collection and analysis. Pragmatism is a philosophy that tries to account for lived experience in human behavior and activity (Simpson, 2010). It is a philosophical tradition that connects practice and theory. The technique for extracting theory from reality is referred to as this. Charles Sanders Pierce, the founder of pragmatism, popularized an early pragmatist concept of a separate philosophy of meaning. Meaning, according to Pierce, is a function of its functional end or its effects.

This research favors the pragmatic philosophy. According to pragmatists, there is no difference between theory and practice, simply informed and ignorant practice. Pragmatists think that the system and the individual are inextricably linked. Pragmatists prefer to research several days depending on the purpose and conditions of the study (Saunders et al. 2011). According to Tashakkori et al. (1998), pragmatism appeals intuitively because it keeps the researcher from engaging in what they regard as pointless debates about truth and fact. They believe that one should conduct a study in a variety of ways that he deems necessary, and then use what he learns in ways that will improve his value system. This study looked at new performance assessment approaches for service organizations using questionnaires and case studies. The validity of the hypotheses developed after the literature review was assessed using data analysis.

3.3 RESEARCH APPROACH

Two key testing approaches are inductive reasoning and deductive reasoning. In induction, data is collected and evaluated, and a hypothesis is created as a result of the study. A deductive theory and hypothesis (or hypotheses) are created, then a testing approach is used to test the hypothesis. Eisenhardt advocated for a research technique that centered on developing a hypothesis from a case study. In this method, research questions are created, case companies are chosen, data is collected from these case companies, hypotheses are framed based on data analysis, and finally, the results are compared to comparable or conflicting literature. Sousa (2003) employed theory-building case-study analysis to link quality control to industrial strategy. Ponsignon et al. (2011) created a service delivery system using the same research technique. While it is acknowledged that such labeling is potentially deceptive and provides no specific practical benefit, deduction owes more to positivism and induction owes more to interpretivism from the study methods and various research ideologies, it is useful to note that deduction owes more to positivism and induction owes more to interpretivism (Saunders et al., 2011). Combining inference and induction within the same piece of study, according to Saunders et al. (2011), is not only possible but also advantageous in their experience. In this study, data from the industry was gathered utilizing a deductive manner. Some hypotheses were developed as a result of the literature review. To test the idea, a questionnaire is created and data from the industry is collected (telecom sector, banking sector, and healthcare organization).

3.4 RESEARCH STRATEGY

Figure 3.1 depicts seven fundamental research techniques: experiment, survey,

case study, action analysis, grounded theory, and ethnography. The research strategy is influenced by the study questions and aims, as well as established expertise, time and other resources, and intellectual underpinnings. These approaches, on the other hand, should not be considered mutually exclusive. It is feasible to apply the survey technique as part of a case study.

Experiments are often employed in natural science research, but they are also commonly utilized in social science research. The objective of an experiment is to see if the independent and dependent variables have any causal relationships. The survey method is used to collect quantitative and qualitative (categorical) data that may be analyzed statistically with descriptive and inferential statistics. A case study is often used in both explanatory and exploratory studies. Various data gathering methods may be utilized, and they will almost certainly be combined. This form of research includes things like interview observation, questionnaires, and documentary analysis.

The simultaneous endeavor of studying the structure and working with the system's players to change it further is considered as a desirable path in action analysis. To attain this twofold goal, it highlights the necessity of co-learning as a fundamental part of the research process, which necessitates active collaboration between the researcher and the client.

In grounded theory, data processing begins without the creation of a theoretical structure. The theory is based on information gleaned from a series of observations. These data are used to make predictions, which are subsequently tested in additional observations that either confirm or deny the predictions. Because of the frequent reference to the production of data and the test theory, Collins and Hussey (2003) describe the

grounded theory as an inductive/deductive method.

Because the researcher must immerse himself as deeply as possible in the social milieu being researched, ethnography analysis is time-consuming and takes place over a long period. The research will continue to generate new perspectives on what has been discovered. Records and papers are the most common sources of data for the archival study.

Surveys and case studies were employed as research methodologies in this study. Surveys allow us to collect data about actions, circumstances, or attitudes at a specified point in time via questionnaires or interviews. Using quantitative and qualitative analysis tools, the data is then used to conclude the current relationships. One of the primary drawbacks of the survey approach is how difficult it is to get insights into the causes of processes involved in the phenomenon under investigation. Aside from that, there are several sources of bias, such as respondents' self-selection, the period during which the survey is conducted, and the researcher himself through the survey's design.

Case studies are attempts to explain real-world interactions, most typically within a single organization. A case study is especially useful for research that works with practice-based problems when the actors' experience is relevant and the context of action is too important. A case study technique, according to (Bonoma and Wong, 1985) and Cepeda and Martin (2005), is highly suited to gathering practitioner knowledge and documenting practice experience. Case studies, on the other hand, have limitations in that they are usually limited to a single entity, and it is difficult to generalize conclusions because it is rare to find similar examples with comparable data that can be statistically

examined. Furthermore, different researchers interpret comparable or identical data differently, resulting in study bias.

3.5 CHOICES OF DATA COLLECTION TECHNIQUES

Mono-method, mixed methods, and multiple methods are the three types of data gathering methodologies available. Researchers who employ mono-methods use either quantitative or qualitative techniques. Mixed research techniques integrate qualitative and quantitative data gathering techniques and analyze the procedures either simultaneously or sequentially, rather than combining the two. A mixed model study combines quantitative and qualitative data gathering methodologies and research processes, as well as quantitative and qualitative approaches at various stages of the research, such as research question creation. This means that one can take quantitative data and qualitative it, or qualitative data and quantize it by converting it to numerical codes, allowing it to be statistically examined. Multiple approaches are when more than one data collection tool is utilized in conjunction with related research procedures, but only in the context of a quantitative world view or quantitative data (Tashakkori and Teddlie, 2003). This study used mixed model research approaches. The data is collected in a qualitative format before being converted into a numerical code for statistical analysis. The quantitative approach is used in the development of a statistical model and the qualitative approach is used to interpret the relationship among the factors in TISM.

3.6 TIME HORIZONS

The two types of temporal horizons employed in science are cross-sectional and longitudinal studies. In cross-sectional research, surveys are frequently utilized (Easterby-

Smith et al., 2008; Robson, 2003; and Saunders et al., 2011). They could be seeking to characterize a phenomenon or explain how causes in different organizations are linked. Qualitative approaches, on the other hand, are possible. Many case studies concentrate on quick interviews. In longitudinal studies, the researcher must track an incidence or occurrence over time.

According to Adams and Schvaneveldt (1991), a researcher can modify the variables under consideration by examining individuals or situations over time, as long as the analysis procedure does not affect them. In this study, cross-sectional investigations were used to collect data from the industry.

3.7 DATA COLLECTION

The information for this study was gathered from both primary and secondary sources. Semi-structured interviews and questionnaire surveys were used to collect primary data. Questionnaires and semi-structured interviews were used to acquire primary data and information from each company's concerned managers, while secondary data was gathered from public sources and websites. These case studies were created from market news, annual reports, business weekly, corporate magazines, and materials available on the website and the internet.

3.7.1 *Sampling Design*

A sample is a part of the population that has been selected for observation and research to produce a relevant result. Employees from numerous support agencies made up the present sample's workforce. The sample was chosen from the service firms these

service firms were concerned with telecom, banking, and healthcare organizations located in different parts of India.

3.7.2 *Questionnaire development*

The factors that determine the success of service companies were investigated through a questionnaire-based survey. Information from prior studies and the literature was used to build the questionnaire. During the questionnaire's development, practicing managers and academics in the field of service organization performance measurement were also contacted.

Questionnaire surveys have been used to bring together the opinions of service agency management, staff, clients, and other practitioners; nevertheless, response rates have been poor due to respondents' unwillingness to dedicate time to filling out the questionnaire. The questionnaire was meant to be closed-ended so that it would take less time and effort to complete. Five-point Likert scales were used to frame the questions. Some questions, on the other hand, have a yes/no response option. Individual responses were recorded on a five-point rating to execute the statistical analysis.

A questionnaire was distributed to 320 respondents from diverse service organizations. Two groups of questionnaires have been created. Sec [A] contains demographic information about people who work for service organizations and are concerned about their smooth operation. The personnel is chosen using a method known as judgmental sampling. The statements in Section [B] of the questionnaire assess awareness, attitude, and factors impacting the efficiency of the service organization. The cross-sectional survey was conducted using Google forms. An online questionnaire was

delivered to the respondents using social media channels such as WhatsApp and email. Participants must declare their willingness to engage voluntarily before entering the survey by replying yes or no. The participants were then instructed to complete the questionnaire. Closed-ended and open-ended questions were used to elicit their responses.

3.7.3 *Data and data collection*

The questionnaires will be designed in such a way that the responses may be examined statistically. You may collect data from a large number of people using questionnaires and surveys. Total 670 questionnaires were communicated. 350 replies were collected. 320 replies were chosen for final analysis and hypothesis testing. The questionnaire that did not match the criteria was left out of the final data analysis.

3.7.4 *Statistical method used*

The frequency distribution of the respondents is determined and stored in the data. The numerous factors that drive service organizations were determined using a literature review and expert input from the industry. Cronbach's alpha coefficient is used to determine how accurate and reliable these variables are internal. Confirmatory factor analysis is used to evaluate the construct validity of the measurement scale (CFA). The hypothesis is investigated using the structural equation modelling technique and the One-way ANOVA and SMART PLS programs. The hypothesis is put to the test with a 95% confidence level and a significance level of 5%.

3.8 DATA COLLECTION: RELIABILITY AND VALIDITY

The issues of trustworthiness and validity are frequently discussed, but the integrity of a study report is at its core. The approach described by Yin (1994) is used to

establish the study's credibility, which comprises employing standard criteria concepts and establishing research strategies to eliminate, or at the very least restrict any criticism.

The questionnaire was further tested for content and construct validity. Content validity refers to the adequacy with which a given domain of containing is sampled (Nunally, 1978). Content validity cannot be measured mathematically; it is a subjective and qualitative process. The selection of measurement items, which was based on an exhaustive analysis of the literature as well as appraisal by academics and practicing managers during pre-testing, demonstrates the content validity of the instruments established in this study.

According to Forza's criteria, the material validity was also evaluated during the pilot survey (2002). Based on input from respondents, a few questions were eliminated from the questionnaire after the pilot survey.

Construct validity was investigated using exploratory factor analysis. Factor analysis was used to evaluate the uni-dimensionality of the multi-item perceptual measurements. According to Kim and Muller, only goods having a factor loading greater than 0.40 were included in the questionnaire (1978).

Several sources of evidence were sought in each case study to achieve a synergistic view of data (Yin, 1994 and Stake, 1995). Primary sources were questionnaires and interviews, with documents serving as secondary sources. To trace the stream of data back to its source, a chain of evidence was devised. The primary informants then double-checked each case study article's drafting versions. After the exploration process, research summarising the findings of all case studies was published.

Internal validity can be characterized as a concern in causal and explanatory

studies of the relationship between distinct occurrences that can be proved by a sound argument even if all of the evidence is missing (Remenyi et al., 1998). Perceptual errors (perceptions of past events may not be correct), Halo effects (the informant is preconditioned to answer), memory recall biases (including forgetfulness and distortion), and reflexivity are all given special consideration (informants give answers the researcher would like to hear).

External validity can be described as the desire to know whether the findings can be applied to a larger context outside of the local research setting. When it comes to external validity, it might be difficult to foresee what would happen if the results in one context are applied to another. To address this issue, many case studies were examined to establish a context for fabrication (Yin, 1994). This was especially significant during the study's Testing phase, which was focused on the validation of the proposed approach. The goal should be to predict either comparable findings (literal replication) or contradictory results (theoretical replication) under expressly stated criteria (Yin, 1994).

Cronbach's alpha coefficient was determined for each question to verify the reliability and internal consistency of the response, where relevant. For such exploratory work, a value of more than 0.5 is deemed appropriate (Nunally, 1978). A database containing diverse artifacts was developed for each case study. A protocol including questionnaires was first devised for each series of case studies, allowing an independent individual to conduct an audit on the study process. This case study methodology, including questionnaires, was reviewed both during the research and testing phases before the case study was conducted. The returned questionnaires, interview references, accessed data, and the case study report were subsequently preserved as part of each case study's outcomes.

3.9 RESEARCH METHODS USED FOR THE THESIS WORK

An in-depth literature analysis was undertaken to investigate the elements that influence the performance of service organizations. Hypotheses were formulated based on the literature review and the advice of several experts. A questionnaire was formed to investigate these hypotheses, and data pertaining to the hypotheses were collected. The questionnaire employed a five-point Likert scale. However, a pilot survey was used to answer some of the questions. Following that, changes to the questionnaire were made to make it more appealing to the respondents. The survey was then sent to the three key industries: telecommunications, banking, and healthcare. The information for this study was gathered from both primary and secondary sources. Through questionnaires and semi-structured interviews, primary data and information were collected from each company's concerned personnel, while secondary data was gathered from TRAI, all of which were used to create these case studies.

Hypotheses were evaluated and validated using mathematical models based on the responses collected from the survey. The statistical procedure used to calculate the respondents' frequency distribution is anticipated and stated in the results. The literature review and industry experts' perspectives have been used to identify various factors that influence service organizations. Cronbach's alpha is used to assess these parameters' internal consistency and reliability. The hypotheses are tested using the SMART PLS software and the structural equation modelling approach. This study looks into the effects of different factors on the long-term viability of service companies, and it employs PLS-SEM to develop and test the hypotheses. The hypothesis is tested using a 95% confidence level and a 5% level of significance.

The one-way ANOVA test is used to see if there are any differences in their perceptions of certain elements. The first four hypotheses are based on sectoral disparities. This study also looked into other components of the survey, such as questionnaire development, administration, validity, and descriptive statistics.

A hierarchy-based framework based on the total interpretive structural modelling (TISM) approach is offered to analyze the connection among numerous aspects influencing an organization's performance. The relative dependency and driving strength of the factors influencing the service organization can be better understood using this approach. The literature review helped to identify the factors that influence the services. Following the identification of the components, TISM was used to interpret the direct and substantial transitive links between them.

The AHP and PROMETHEE integrated methodologies are utilized in this study to compare the operational performance of cell phone service providers in India. The goal of this study is to assess cellular mobile telecom service providers' operational performance in India. This report is based on data provided by the Telecom Regulatory Authority of India from July to September 2020.

3.10 Conclusion

This section goes over the many components of the research paper's research design. The collection of accurate information to answer the study's questions is one of the most important components of this research. To create the tool, the following procedures are taken: Review of the literature, questionnaires administration, expert opinions, and suggestions Chapter 4 discusses the analysis, hypothesis, formulation, questionnaire administration, and descriptive statistics.

CHAPTER 4

QUESTIONNAIRE ADMINISTRATION AND DESCRIPTIVE STATISTICS

4.1 IINTRODUCTION

In this chapter, the questionnaire is developed based on the hypotheses formulated in Chapter 2. The questionnaire was administrated and circulated in the concerned industries to gather the required information. The industries investigated for this study were divided into three categories: healthcare, banking, and telecommunications. The survey's goals are to determine the factors that have a major impact on the organization's performance and to validate all of the hypotheses formulated. The survey's questionnaire development, implementation, validity, and descriptive statistics are all covered in this chapter. Finally, the chapter wraps up with a review of the survey's findings.

4.2 HYPOTHESES FORMULATION

Twelve hypotheses have been developed based on the literature review and interaction with industry and academic experts (chapter 2). The organization's sustainability, quality, operational performance, information system, marketing, financial situation, and investments, among many others, have all been postulated to influence the performance of service businesses. The hypotheses were created based on a survey of the literature and expert recommendations. Some statistical tools such as One-way ANOVA and PLS-SEM are used to evaluate the hypotheses.

The hypotheses formulated are summarized below as:

Hypothesis 1: There is a difference in perception between the telecom, banking, and healthcare sectors concerning the practices of environmental sustainability.

Hypothesis 2: There is a difference in the perception between telecom, banking, and healthcare sectors concerning operational performance

Hypothesis 3: There is a difference in perception between telecom, banking, and healthcare sectors concerning human resource management.

Hypothesis 4: There is a difference in perception between telecom, banking, and healthcare sectors concerning information technology.

Hypothesis 5: The operational performance positively influences the service quality of the organization.

Hypothesis 6: Information system positively influences the service quality of an organization.

Hypothesis 7: Marketing feedback positively influences the service quality of an organization.

Hypothesis 8: Human Resource planning positively influences the performance of an organization.

Hypothesis 9: Financial support positively influences the service quality of an organization.

Hypothesis 10: Service quality has a positive impact on an organization's performance.

Hypothesis 11: Performance of a service organization positively influences its overall sustainability.

Hypothesis 12: Service quality positively influences the sustainability of an organization.

4.3 QUESTIONNAIRE DEVELOPMENT

A questionnaire-based survey was conducted to investigate the factors that influence the performance of service organizations. The questionnaire was developed with the available research and prior surveys. Practicing managers and academics in the field of service industries were also approached throughout the questionnaire's preparation.

Questionnaire surveys have been used to incorporate the perceptions of service sector practitioners and users. The response rates in questionnaire surveys have been low, owing to respondents' unwillingness to devote time to responding to the questionnaire. The questionnaire was meant to be closed-ended as well as open-ended. For a closed-ended questionnaire, a five-point Likert scale was used. However, some of the questions had a yes/no response choice.

A questionnaire was designed for this study and distributed to 320 respondents from various service organizations. The questionnaires are divided into two parts. The profile of the respondents is mentioned in part A of the questionnaire. The opinion of the respondents was recorded in part B of the questionnaire.

The questions in section [B] of the questionnaire measure the level of knowledge, attitude, and factors impacting the service organization's performance. Google forms were used to conduct the cross-sectional survey. The responders were sent an online questionnaire link via social media channels such as WhatsApp and email. Before entering the survey, participants must affirm their intent to engage willingly by answering yes or no. After that, the participants were told to fill out the questionnaire. Their responses were gathered using both closed-ended and open-ended questions.

4.3.1 Structure and content validation of a questionnaire

There were two types of validity tests performed on the questionnaire: content validity and construct validity. The adequacy with which a defined domain of containing is sampled is referred to as content validity (Nunally, 1978). The content validity of a piece of content cannot be determined mathematically; rather, it is a subjective and judgmental process. The content validity of the questions produced in this study can be seen in the selection of measurement items, which was based on an extensive assessment of the literature as well as appraisal by academicians and practicing managers during pre-testing. According to Forza (2002), the content validity was also checked during the pilot survey. Following the pilot survey, a few questions were removed from the questionnaire based on feedback from respondents. Exploratory factor analysis was used to test construct validity. The uni-dimensionality of the multi-item perceptual measures was tested using factor analysis. Only those items with a factor loading of higher than 0.40 were used in the questionnaire, as suggested by Kim and Muller (1978).

4.4 STATISTICAL ANALYSIS

Various statistical methods and procedures are used in this proposed research activity, depending on the study's requirements.

- **Descriptive statistics:** Mean value and standard deviation of all the responses presented in the form of a bar chart.
- **Other Statistical Technique:** PLS-SEM tool is used for the confirmatory analysis.

4.5 SURVEY RESPONSES AND RESPONDENTS PROFILE

Total 670 questionnaires were communicated to the different respondents through e-mail, by post, and personal contact. The information gathered from the respondents was compiled into the final form. During the six months of the survey, 350 replies were collected, with just 320 being chosen for final analysis and hypothesis testing. Rest 30 responses were incomplete. The questionnaire that did not meet the criteria was not included in the final data analysis.

Demographic Profile

The demographic profile of the sample study's respondents was taken into account. The data was gathered from 320 people, with 62 percent of male and 38 percent female responding.

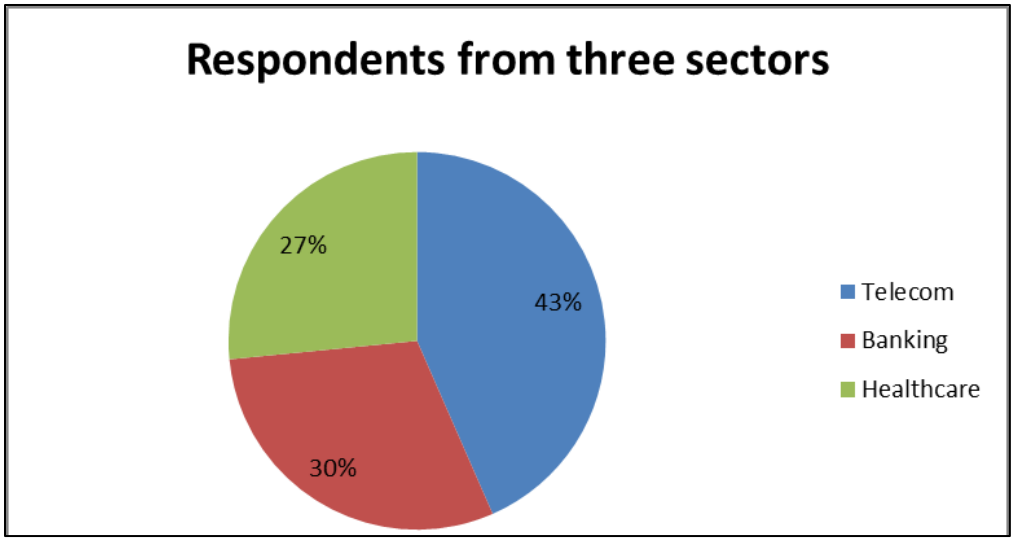


Figure 4.1: Service Organization of Respondents

The telecom sector accounts for 43% of respondents, while the banking sector accounts for 30% and the health sector accounts for 27%.

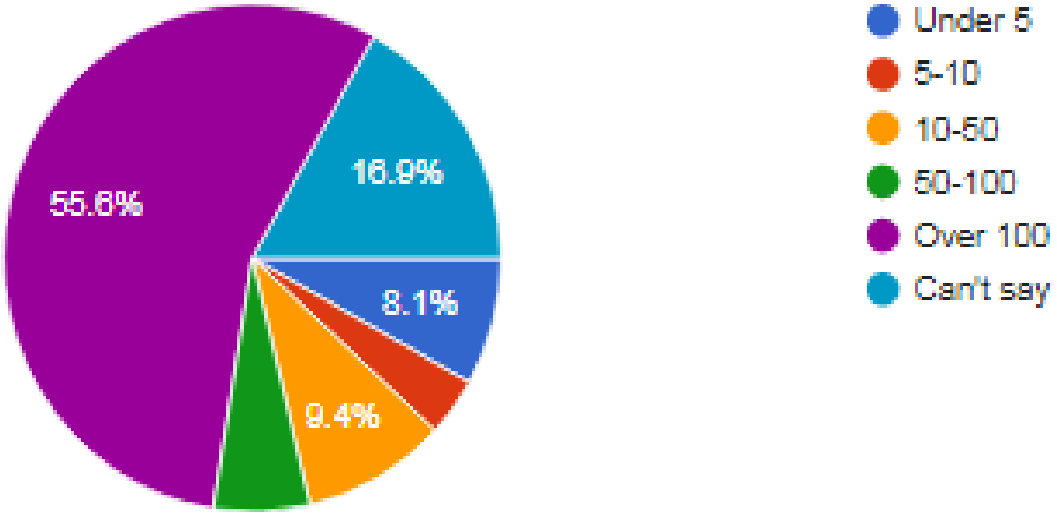


Figure 4.2: Company approximate annual turnover in crores

Around 55.6 percent of respondents indicated their company's annual turnover is less than 5 crores, 9.4 percent said their annual turnover is between 10 and 50 crores, and 16.9 percent said they don't know.

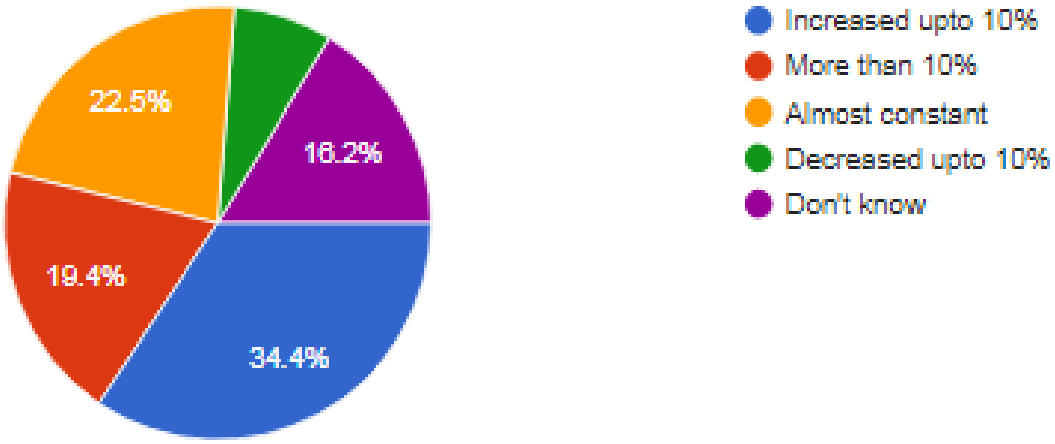


Figure 4.3: The trend of average annual profits during the last three years in percentage revenue

Around 34.4 percent of respondents stated earnings have climbed by up to 10% per year during the last three years, 19.4 percent said more than 10%, 22.5 percent said virtually steady, and 16.2 percent said they don't know.

4.5.1 Reliability of the Questionnaire Survey

Cronbach's coefficient (Alpha, α) was determined for each question to verify the response's reliability and internal consistency, where relevant. For such exploratory work, a value of higher than 0.7 is regarded as appropriate (Nunally, 1978). Table 4.1 shows that the value of Cronbach's alpha coefficient for all of the questions were greater than 0.7. It means that the responses to the questionnaire have a high level of consistency.

Table 4.1: Cronbach's alpha coefficient

Question No.	Cronbach's Alpha	N of Items
4.	0.906	5
5.	0.904	6
6.	0.905	6
7.	0.899	7

8.	0.923	6
9.	0.917	7
10.	0.913	10
11.	0.965	10
12.	0.923	4
13.	0.922	4

Cronbach's $\propto$ is defined as:

$$\propto = \frac{N}{N-1}\left[1 - \frac{\sum_{i=1}^{N} \sigma_{yi}^2}{\sigma_X^2}\right]$$

Where N is the number of components, σ_X^2 is the variance of the observed total test scores, and σ_{yi}^2 is the variance of component i for the current sample (Develles, 1991).

4.6 OBSERVATIONS FROM THE SURVEY

The survey questions were designed to investigate the importance of elements that influence the performance of service businesses such as banks, telecommunications, and hospitals. For the survey, there were 16 such questions.

4.6.1 Importance of Dimensions of Service Quality

The respondents were asked to assign weights to several service quality parameters based on the five dimensions of service quality. As shown in Figure 4.4, the most important parameters of service quality are responsiveness (Mean = 3.82, Std Dev. = 1.073) and

reliability (Mean = 3.81, Std Dev. = 1.126), followed by three other parameters empathy (Mean = 3.55, Std Dev. = 1.124), assurance (Mean = 3.68, Std Dev. = 1.077), and tangibility (Mean = 3.52, Std. Dev. = 1.136).

The majority of respondents chose responsiveness and reliability over the other aspects of service quality. The responsiveness of service providers is measured by how quickly they respond to customers' complaints about their services. The capacity of service providers to fulfill the promised service to the consumer is referred to as reliability.

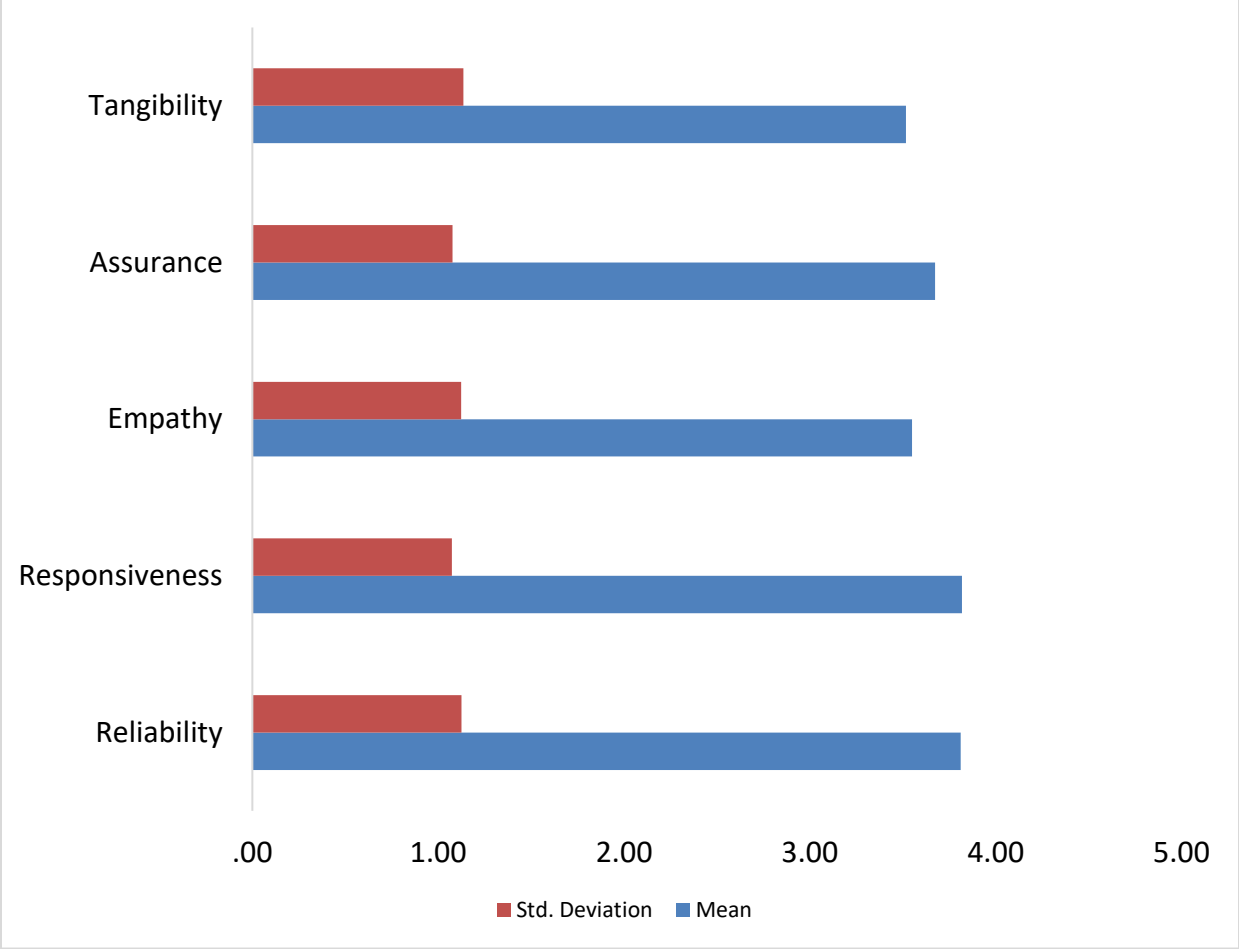


Figure 4.4: Importance of Dimensions of Service quality

4.6.2 Importance of Operational Performance

The literature has identified many factors that influence the performance of service organizations. In this study, some of the important factors were reviewed, and respondents were asked to rank their importance on a 5-point rating scale, as shown in Figure 4.5.

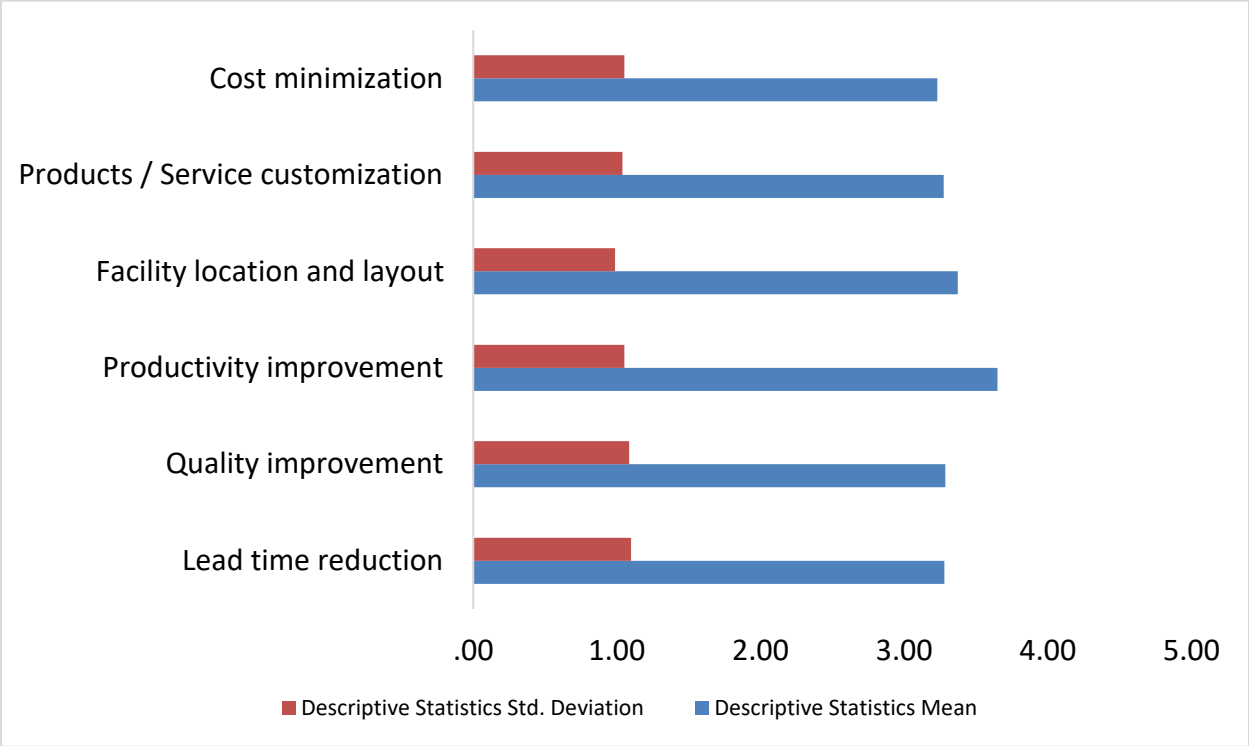


Figure 4.5: Importance of Operational Performance

It has been observed that the most important factor for operational performance is productivity improvement (Mean = 3.65, Std. Dev. =1.052) followed by five other important factors that are facility location and layout (Mean = 3.38, Std. Dev. = 0.987), quality improvement (Mean = 3.28, Std. Dev. = 1.098), products/ service customization (Mean = 3.28, Std. Dev. = 1.038), cost minimization (Mean = 3.23, Std. Dev. = 1.050) as shown in Figure 4.5.

Productivity improvement was given more weightage because the respondents want to produce more quality service with less inputs. Facility location and layout influence the proximity to the market, availability of the resources, availability of the infrastructure, etc. Thus, facility location and layout play an important role in the production and distribution of products/ services.

4.6.3 Factors influence the Marketing Performance

Factors influencing the marketing performance are market share, market reputation/ brand image, flexibility, agility, market penetration, and customer loyalty/ retention. Market share is a measure of the consumers' preference for a product over other similar products.

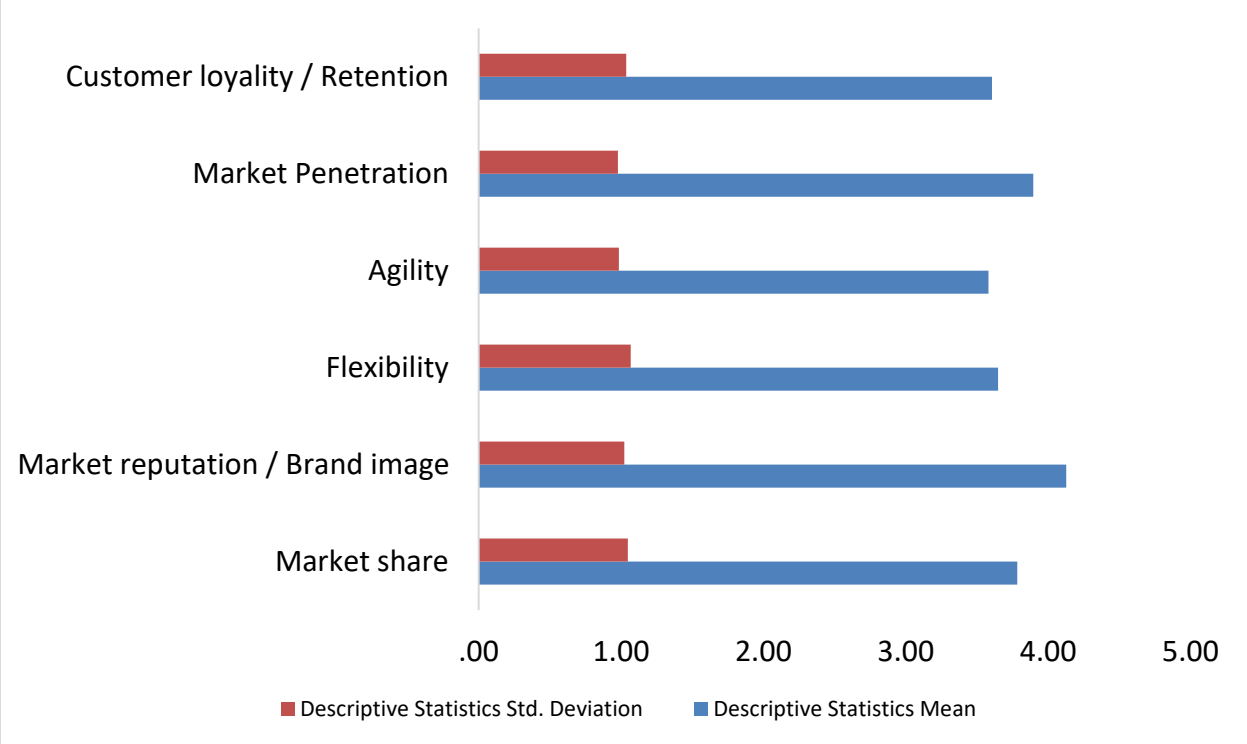


Figure 4.6: Factors influencing the Marketing Performance

It has been observed that the most important factor for marketing performance is market reputation/ brand image (Std. Dev. = 1.023, Mean = 4.13), followed by five other important factors that are market penetration (Std. Dev. = 0.979, Mean = 3.90), market share (Std. Dev. = 1.048, Mean = 3.78), flexibility (Std. Dev. = 1.069, Mean = 3.65), customer loyality/ retention (Std. Dev. = 1.036, Mean = 3.61), agility (Std. Dev. = 0.986, Mean = 3.58) as shown in Figure 4.6.

Market reputation/ brand image attracts more new customers and also helps in market expansion; therefore, it was given more weightage by the respondents than the others. In the modern business age, Brand reputation is served as a crucial aspect for providing a clear or deep perception of a situation into the brand for the customers. Market's perceptions of the brand, stakeholders, and the customers make the brand reputation. Maintaining a positive brand reputation increases customer loyalty, builds confidence in the market and helps position the service organization as a leader in its space.

Market penetration leads to entry into new markets and hence the market expansion. A higher market share usually means greater sales, lesser effort to sell more, and a strong barrier to entry for other competitors.

4.6.4 Factors Influencing the Performance of Human Resources Management

Factors influencing the performance of human resources management are employee satisfaction and retention, employee empowerment, incentives to an employee, employee participation, training and development, job security, and innovation and creativity.

It has been observed that the most important factor for human resources management is employee participation (Std. Dev. = 1.068, Mean = 3.80), followed by six other important factors that are incentives to employees (Mean = 3.77, Std. Dev. = 0.982), employee empowerment (Std. Dev. = 1.104, Mean = 3.73), employee satisfaction and retention (Std. Dev. = 1.260, Mean = 3.69), job security (Std. Dev. = 1.199, Mean = 3.63), innovation and creativity (Std. Dev. = 1.208, Mean = 3.58), training and development (Std. Dev. = 1.091, Mean = 3.52) as shown in Figure 4.7.

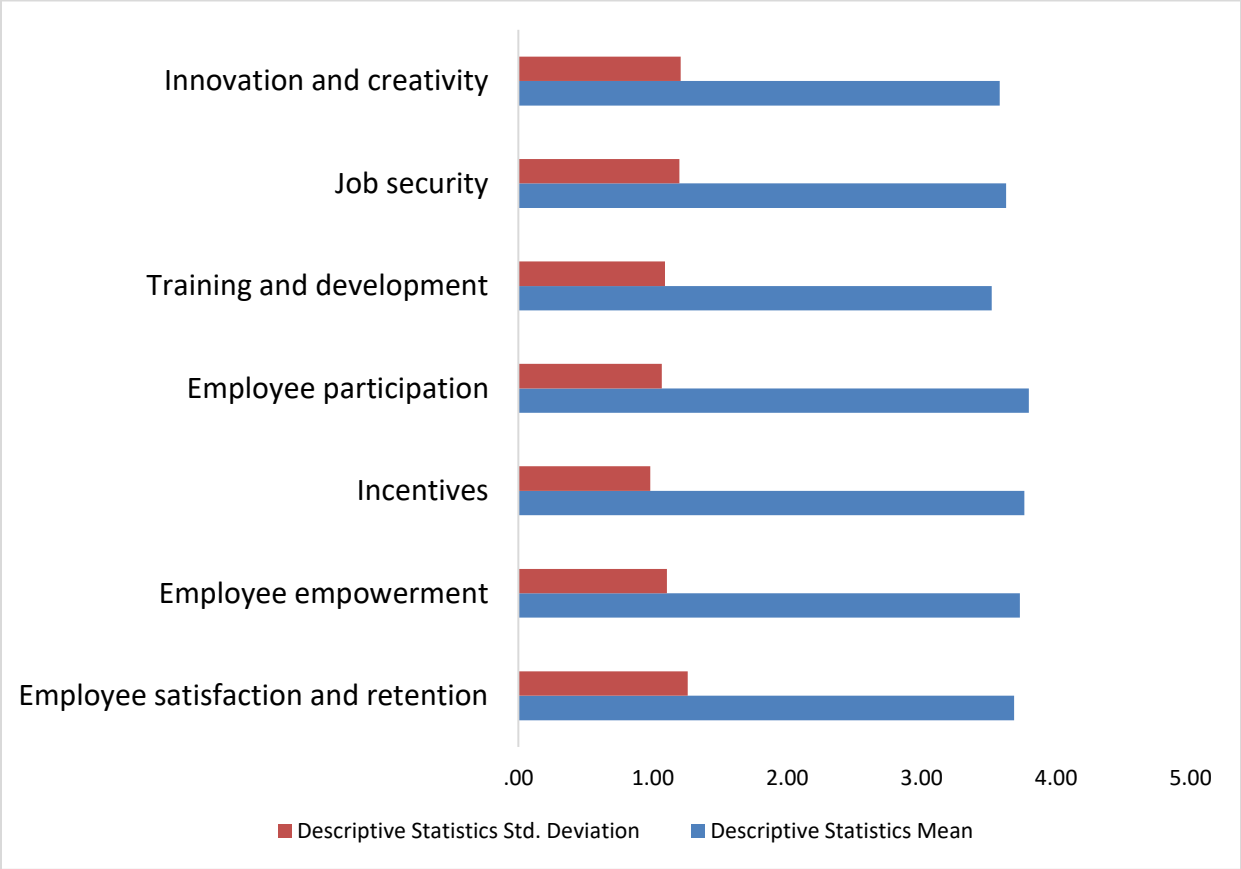


Figure 4.7: Factors influencing the performance of human resources management

Employee participation was given more weightage because employee participation in problem-solving depends on employee satisfaction and retention. Employee

empowerment is part of total quality management. It is an indicator of the total quality of the organization, including quality of services, processes, systems, and individuals/ personnel thus employee empowerment plays an important role.

4.6.5 Important Factors to Improve the Information Technology Services

Many factors influencing the performance of information technology have been observed in the literature. Some of the major factors have been considered use of IT software, digitization of the processes, integration of activities, interdepartmental coordination, use of e-commerce, and elimination of information gap in this research, and respondents were asked to rate the importance of these factors on a 5-point rating scale as shown in Figure 4.8.

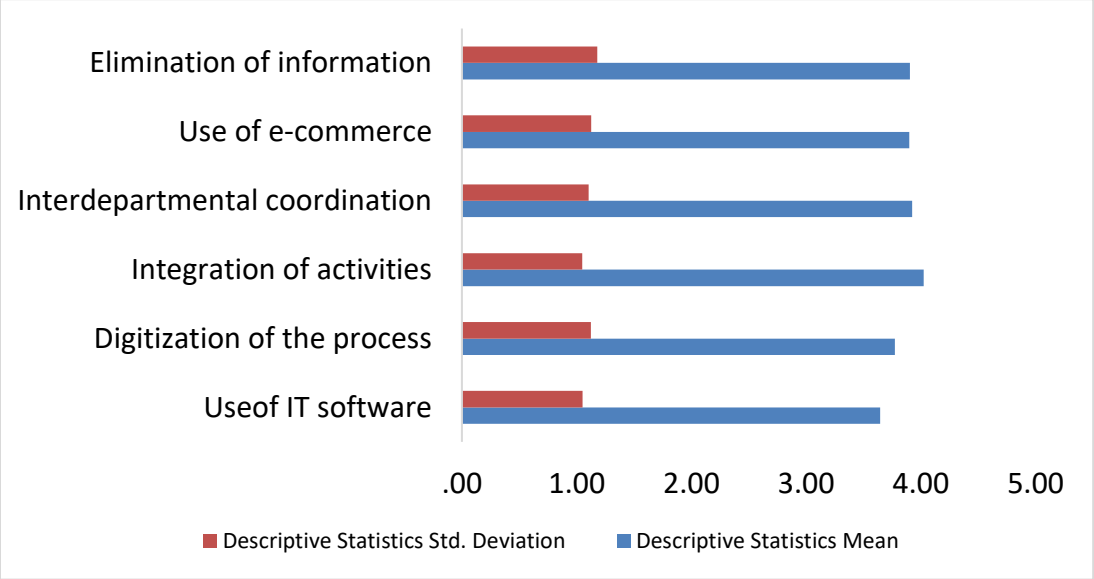


Figure 4.8: Important factors to improve the Information technology services

It has been observed that the most important factor for information technology

services is integration of activities (Mean = 4.03, Std. Dev. = 1.050), followed by five other important factors that are interdepartmental coordination (Mean = 3.93, Std. Dev. = 1.106), elimination of information gap (Mean = 3.91, Std. Dev. = 1.179), use of e-commerce (Mean = 3.90, Std. Dev. = 1.126), digitization of the process (Mean = 3.78, Std. Dev. = 1.125), use of IT software (Mean = 3.65, Std. Dev. = 1.052) as shown in Figure 4.8.

Information technology is equally important for both services as well as manufacturing organizations. It helps in e-commerce and reduces the lead time of information flow in the supply chains.

4.6.6 Important Factors to Measure the Financial Performance

Factors influencing the financial performance of an organization are annual turnover, liability, operating cash flow, working capital, current ratio, debt-equity ratio, and return on equity.

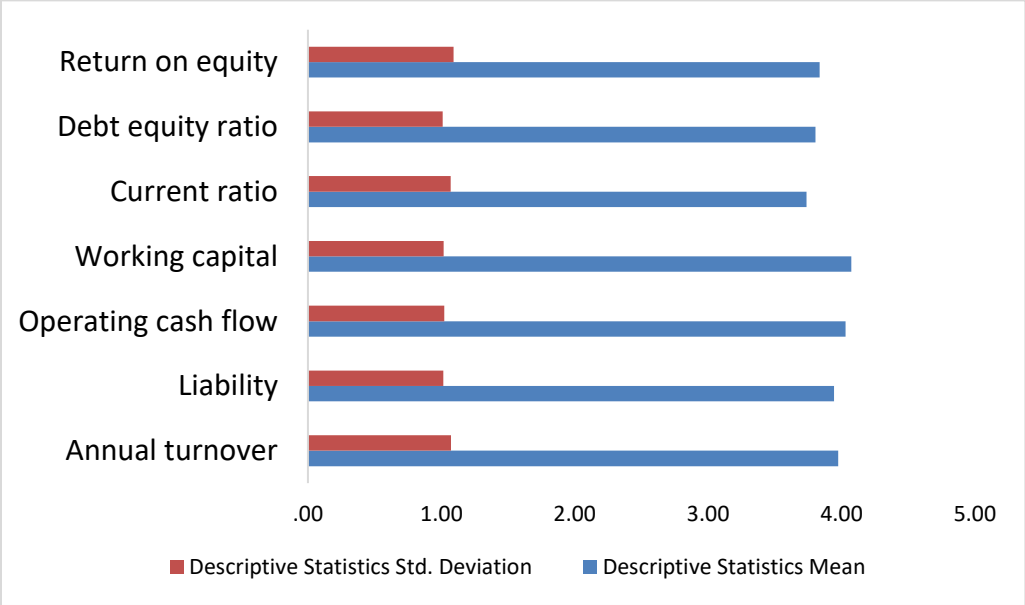


Figure 4.9: **Important factors to measure the financial performance**

It has been observed that the most important factor influencing the financial performance is working capital (Mean = 4.08, Std. Dev. = 1.017), followed by six other important factors that are operating cash flow (Mean = 4.03, Std. Dev. = 1.023), annual turnover (Mean = 3.98, Std. Dev. = 1.074), liability (Mean = 3.94, Std. Dev. = 1.016), return on equity (Mean = 3.84, Std. Dev. = 1.091), debt equity ratio (Mean = 3.81, Std. Dev. = 1.011), current ratio (Mean = 3.74, Std. Dev. = 1.0) as shown in Figure 4.9.

Among the various factors influencing financial performance, working capital and operating cash flow are more preferred by most of the respondents. Working capital is a current asset - current liabilities of an organization. This is the company's operational efficiency. Operating cash flow refers to money movement in business. These factors improve the financial performance of organizations.

4.6.7 Factors that make an organization environmentally sustainable

Factors that make an organization environmentally sustainable are top management commitment, environmental awareness of employees and customers, implementation of government rules and regulations, use of non-hazardous material, green packaging, implementation of environmental management systems, energy consumption and efficiency, water consumption and efficiency, resource circulating, amount of air discharge pollutant and amount of water pollutant released and the respondents were asked to rate the importance of these factors on a 5-point rating scale as shown in Figure 4.10.

It has been observed that the most important factors for environmental sustainability are energy consumption and efficiency (Mean = 3.88, Std. Dev. = 1.073),

and water consumption and efficiency (Mean = 3.88, Std. Dev. = 1.096) followed by eight other important factors that are green packaging (Mean = 3.85, Std. Dev. = 1.093), implementation of government rules and regulations (Mean = 3.84, Std. Dev. = 1.042), use of non hazardous material (Mean = 3.84, Std. Dev. = 1.152), top management commitment (Mean = 3.83, Std. Dev. = 1.121), implementation of environmental management systems (Mean = 3.81, Std. Dev. = 1.059), environmental awareness of employees and customers (Mean = 3.80, Std. Dev. = 1.0), resource circulating (Mean = 3.74, Std. Dev. = 1.111), and control of hazardous waste and radiation (Mean = 3.51, Std. Dev. = 1.068) as shown in Figure 4.10.

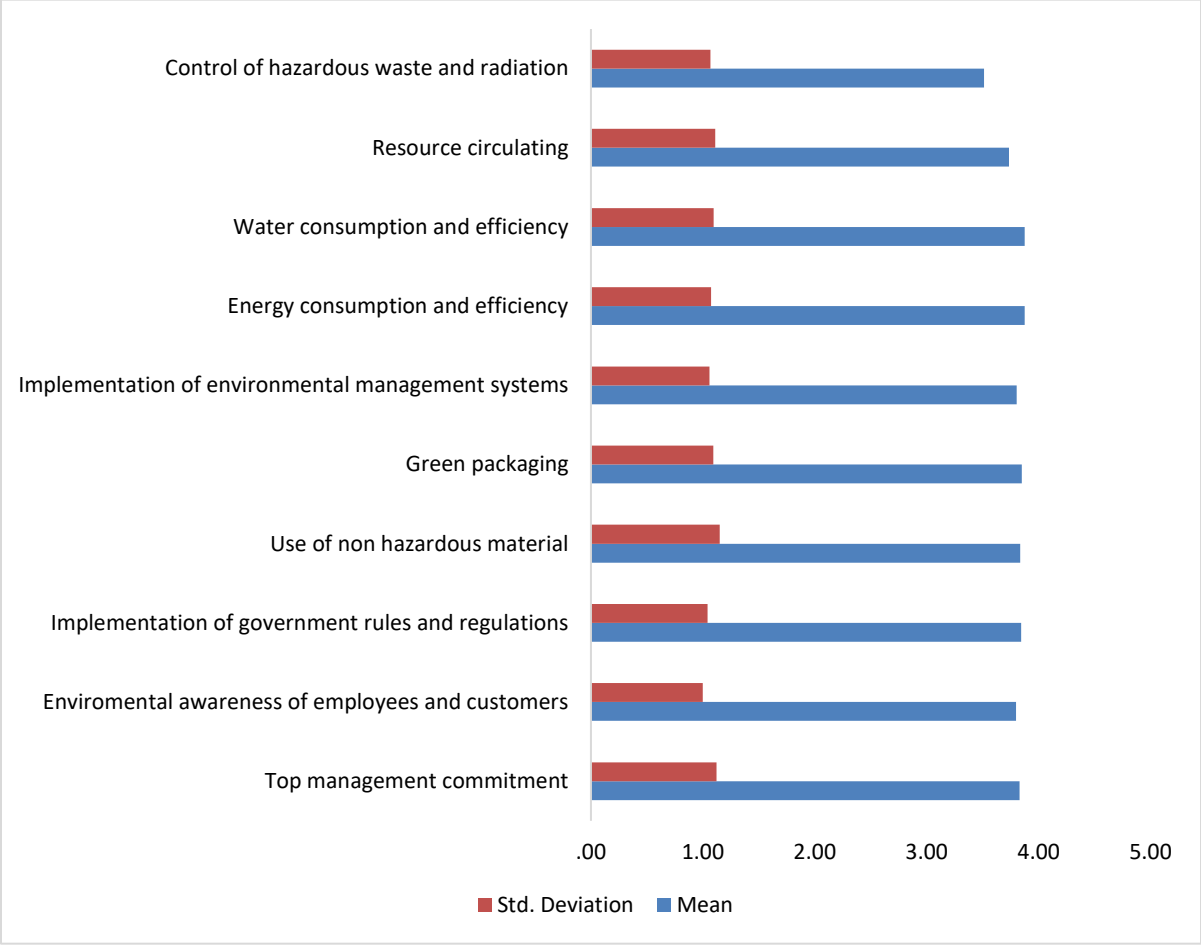


Figure 4.10: Factors that make an organization environmentally sustainable

Environmental sustainability is concerned with the health of the people and living beings on the earth. Staff needs to understand the changes required and their impact on the organization level. The training provided to the employees and customers may increase the environmental awareness and their role in the organization. Review environmental performance regularly to check whether the system is achieving the required results.

Procedures and policies are an absolutely necessary part of an organization. Altogether, procedures and policies provide a detailed plan for everyday operations. They both make certain compliance with rules and regulations, also give guidance for making the decisions, and streamlining the internal processes.

4.6.8 Factors that make an organization social sustainable

Factors that make an organization socially sustainable are corporate social responsibility, avoiding child labor, human rights, product responsibility, health and safety, transparency in the business activities, ethical behavior, stack holder interest, respect for rule of law, and follow international norms as shown in figure 4.11.

It has been observed that the most important factors for social sustainability are health and safety (Mean = 4.19, Std. Dev. = 1.154) and ethical behaviour (Mean = 4.19, Std. Dev. = 1.087), followed by eight other important factors that are respect for rule of law (Mean = 4.16, Std. Dev. = 1.077), follow the international norms (Mean = 4.13, Std. Dev. = 1.146), avoid child labour (Mean = 4.08, Std. Dev. = 1.199), transparency in the business activities (Mean = 4.08, Std. Dev. = 1.120), product responsibility (Mean = 4.07, Std. Dev. = 1.132), stakeholder interest (Mean = 4.06, Std. Dev. = 1.129), human rights

(Mean = 4.05, Std. Dev. = 1.246), corporate social responsibility (Mean = 4.03, Std. Dev. = 1.211) as shown in Figure 4.11.

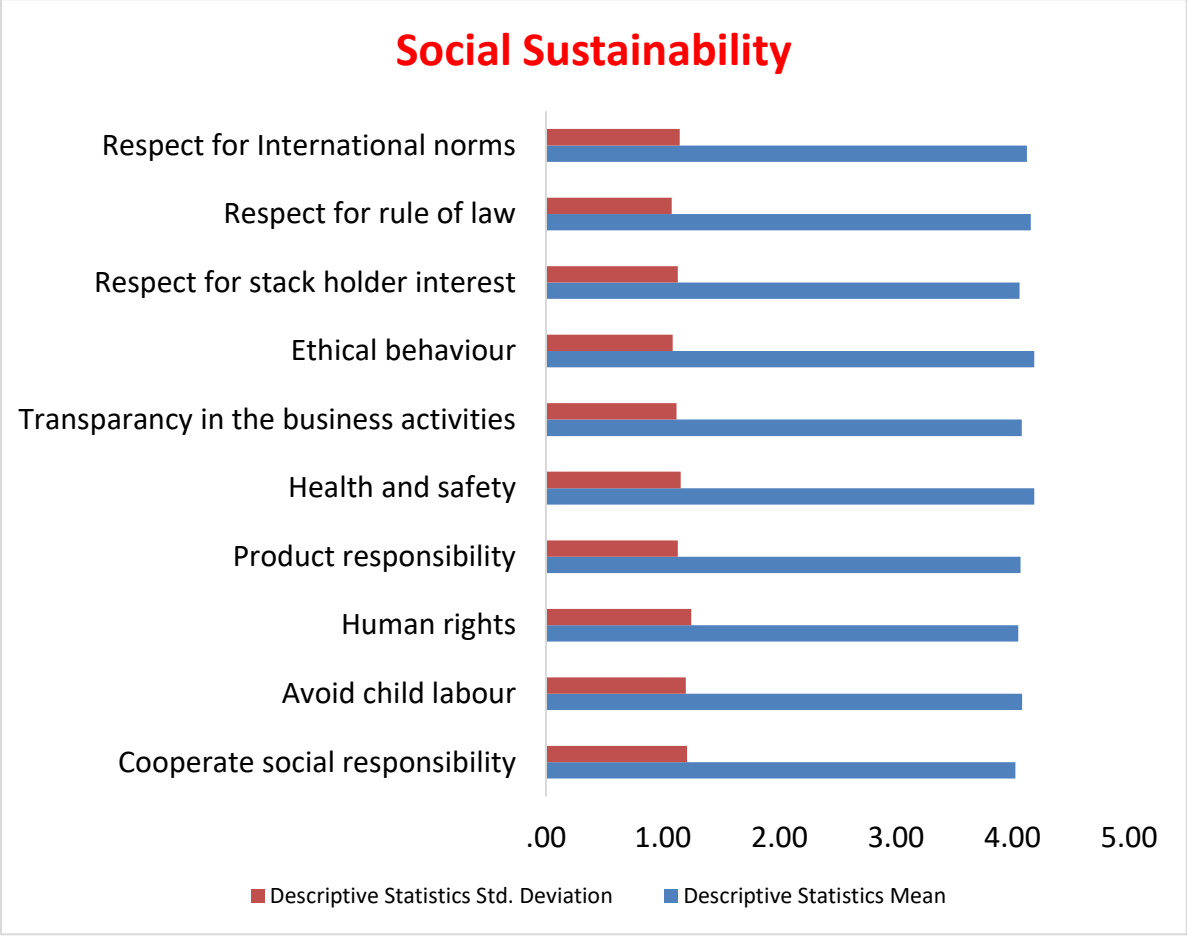


Figure 4.11: Factors to make organization socially sustainable

The majority of respondents prefer health and safety, as well as ethical behavior, among the numerous criteria of social sustainability.

Being a socially responsible business can help to improve a company's image and brand. Employees with a sense of social responsibility can use the available resources at their disposal to do good. Formal corporate social responsibility programs can improve

employee morale and increase workplace efficiency. There are several environmental, ethical, and social responsibility standards and regulations in place. The performance of an organization is influenced by its adherence to the rule of law.

4.6.9 Factors that make an organization economical sustainability

Innovation to cut down the costs, local infrastructure development, investment in research and development, and investment in preventative environmental measures are all the factors that help an organization's economic sustainability.

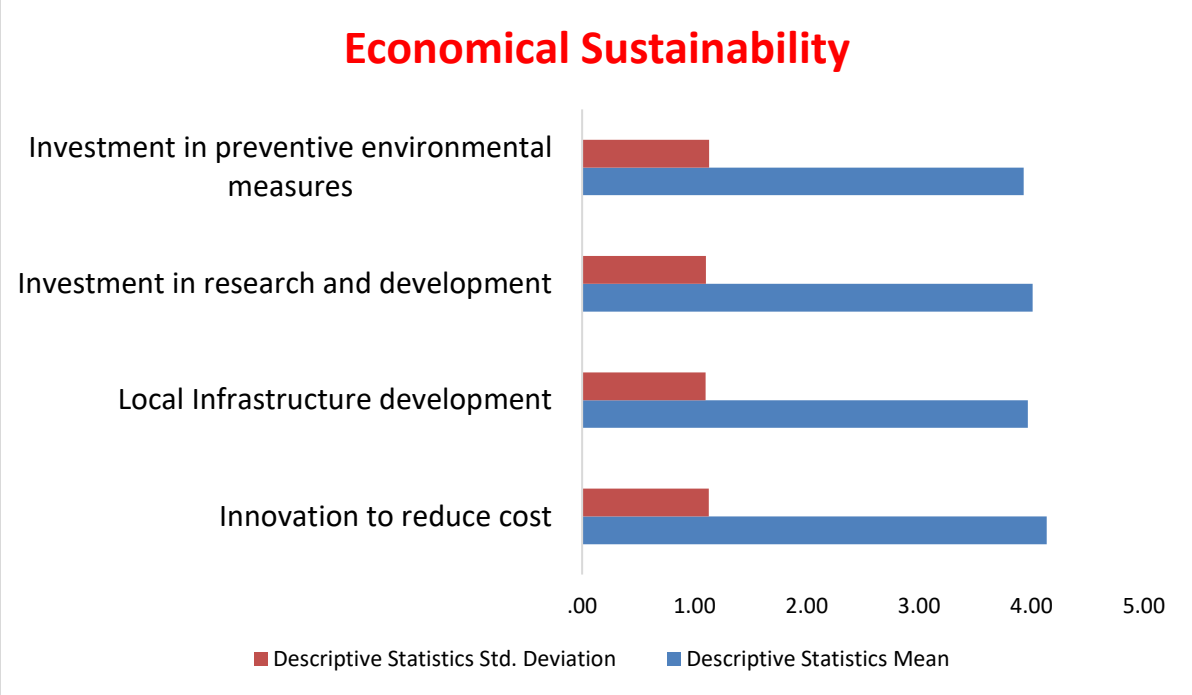


Figure 4.12: Important Factors to improve the economical sustainability organization

The respondents were asked to assign the weights to various factors of economical sustainability. It has been observed that innovation to cut down the cost (Mean = 4.14, Std

Dev. = 1.128) is the most important factor of economical sustainability followed by three other factors: investment in research and development (Mean = 4.01, Std. Dev. = 1.103), local infrastructure development (Mean = 3.97, Std Dev. = 1.100), investment in preventive environmental measures (Mean = 3.93, Std. Dev. = 1.132) as shown in Figure 4.12.

Most respondents chose innovation to cut down the cost among the numerous components of economic sustainability because innovation is vital for eliminating non-value-adding activity, which will help in cost reduction.

By providing services to households and industry, the infrastructure of service organizations plays an important role in society and the economy. Research and development (R&D) is one of the spending categories that produce and propels new technology. R&D plays a crucial part in expanding a company's capability since it encourages creative production methods, lowers costs, and improves product quality.

4.6.10 Factors influencing the performance of an organization

A service organization's overall performance can be improved by several things. Some of the essential factors are considered in this research to determine the importance of these factors on a 5-point Likert scale.

Revenue growth is the most critical element that determines the success of the organization. It can be achieved by increasing the sales volume. When companies optimize their operations, such as enhancing quality, cutting costs, producing an ecologically friendly product, and reducing waste, sustainable operations and IT are also essential factors. These actions serve to boost the overall performance of service organizations. The overall performance of a service organization depends on many factors. These factors,

broadly, grouped as market growth, human resource development, sustainable operations, and information technology, and revenue growth.

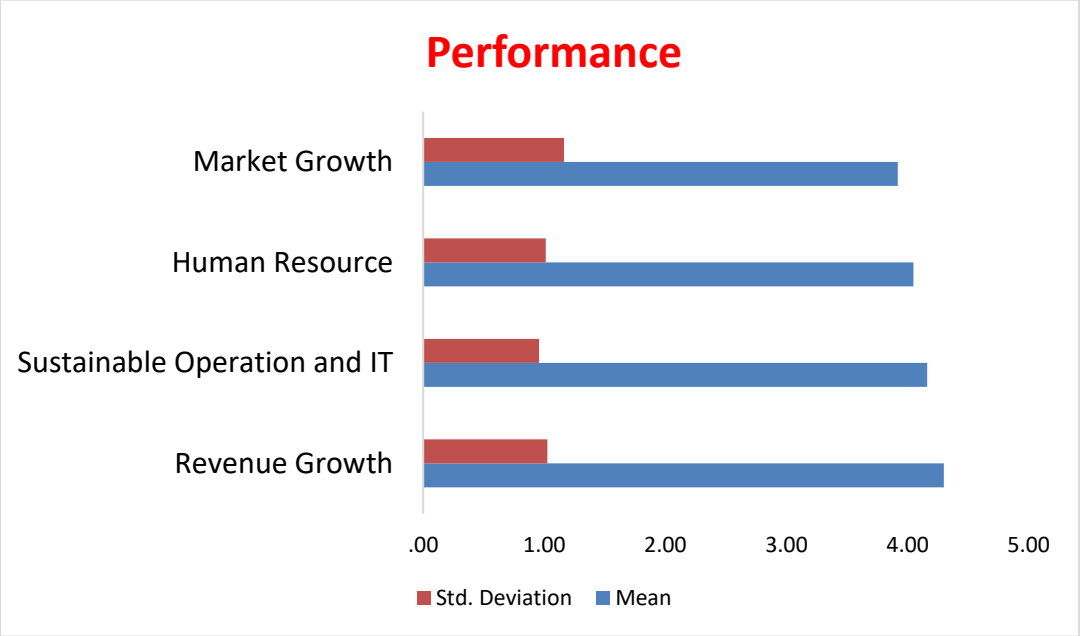


Figure 4.13: Important Factors to improve performance of the organization

4.7 CONCLUSION

This chapter discusses the findings from survey research questions distributed among employees in three different sectors: banking, telecommunications, and hospitals. Descriptive statistics are used and the result shows in the form of a bar chart. In Chapter 5, hypothesis testing is performed based on the data collected.

CHAPTER 5

HYPOTHESES TESTING

5.1 Introduction

In this chapter, the hypotheses proposed in chapter 2 are tested using statistical methods. The study is focused on the extent of the influences of various factors on the performance of a service organization. The hypotheses lead to finding the influence of a specific factor on the performance of the organization. It also shows the sectoral disparities regarding the adoption of environmental trust, human resources, operational performance, and information technology.

5.2 HYPOTHESES TESTING

Using the SMART PLS software, the hypotheses were tested using one-way ANOVA and partial least square structural equation modeling. The research incorporates some of the most important factors for influencing the success of service organizations including sustainability, service quality, operational performance, information systems, marketing, financial situation, and investments.

5.2.1 Hypothesis 1: There is a difference in perception between telecom, banking, and healthcare sectors regarding the practices of environmental sustainability.

To test the hypothesis, a one-way ANOVA is used (Table 5.1, Table 5.2). On a five-point Likert scale, respondents were asked to rate the importance of environmental

sustainability about the hypothesis. The scale of 1 indicates the least significant and 5 is the most important.

Employees from three different sectors, such as telecommunication, banking, and healthcare, were asked to give their opinion on the use of environmental sustainability in their respective organizations. Employees' attitudes toward environmental sustainability are likely varied due to the sector-specific environment. The difference in their perceptions regarding environmental sustainability is tested using a one-way ANOVA.

Table 5.1: Results of one-way ANOVA for environmental sustainable

Dependent Variable	**Sectors**			**F Stats (P-value)**	**Remark**
	Telecom	**Banking**	**Healthcare**		
	Mean (SD)	**Mean (SD)**	**Mean (SD)**		
Environment Sustainable	3.787 (0.683)	3.592 (0.929)	4.043 (0.799)	7.272 (0.001)	Significant diff found

The results demonstrate that the probability value of F statistics is less than a 5% level of significance (Table 5.1). As a result, it may be stated that personnel in the telecom, banking, and healthcare industries have quite different perspectives on environmental sustainability. The post hoc test (Table 5.2) shows that employees in the healthcare sector gave the highest importance to environmental sustainability (mean score = 4.043), whereas employees in the banking sector gave low priority to environmental sustainability (mean score = 3.592), As a result, hypothesis 1 was supported by the findings and hence, hypothesis 1 is accepted due to significant differences in the opinion of the respondents regarding the importance of environmental sustainability.

Table 5.2: Post Hoc Test for Environment Sustainable

Type of Organization	N	Subset for alpha = 0.05	
		1	2
Banking	96	3.592	
Telecom	139	3.787	
Healthcare	85		4.043

5.2.2 Hypothesis 2: There is a difference in perception between telecom, banking, and healthcare sectors concerning operational performance.

To test the hypothesis, a one-way ANOVA is used (Table 5.3, Table 5.4). On a five-point Likert scale, respondents were asked to rate the importance of operational performance. The scale of 1 indicates the least significant and 5 indicates the most important.

Table 5.3: Results of one-way ANOVA for operational performance

Dependent Variable	Sectors			F Stats (P-value)	Remark
	Telecom	Banking	Healthcare		
	Mean (SD)	Mean (SD)	Mean (SD)		
Operational Performance	3.312 (0.894)	3.366 (0.884)	3.392 (0.836)	0.239 (0.787)	No Significant diff found

Employees from three different sectors, such as telecommunications, banking, and healthcare, were asked to give their opinion on the use of operational performance in their respective organizations. The disparity in operational success could be related to sector-

specific characteristics. The differences in their perceptions regarding operational performance are tested using a one-way ANOVA.

The results (Table 5.3) reveal that the probability value of F statistics is greater than the 5% level of significance. As a result, it may be stated that personnel in the telecom, banking, and healthcare industries have similar opinions toward operational performance. The post hoc test (as shown in Table 5.4) also shows that personnel from various sectors fall into the same opinion, regarding operational performance. The result failed to support the hypothesis. Thus, hypothesis 2 is rejected.

Table 5.4: Post Hoc Test for Operational performance

Type of Organization	N	Subset for alpha = 0.05
		1
Banking	96	3.366
Telecom	139	3.312
Healthcare	85	3.392
Sig.		0.795

5.2.3 Hypothesis 3: There is a difference in perception between telecom, banking, and healthcare sectors concerning human resource management.

To test the hypothesis, a one-way ANOVA is used (Table 5.5, Table 5.6). On a five-point Likert scale, respondents were asked to rate the importance of human resource management concerning the hypothesis. The scale of 1 indicates the least significant and 5 indicates the most important.

Employees from sectors, such as telecommunication, banking, and healthcare, were asked to give their opinion on the use of human resource management in their respective organizations. The differences in human resource management could be attributable to

industry-specific characteristics. The differences, in their perceptions regarding human resource management, are tested using a one-way ANOVA.

Table 5.5: Results of one-way ANOVA for HRM

Dependent Variable	Sectors			F Stats (P-value)	Remark
	Telecom	Banking	Healthcare		
	Mean (SD)	Mean (SD)	Mean (SD)		
HRM	3.568 (0.819)	3.766 (0.935)	3.739 (0.959)	1.713 (0.182)	No Significant diff found

The results (Table 5.5) reveal that the probability value of F statistics is greater than the 5% level of significance. As a result, it can be stated that employees in the telecom, banking, and healthcare industries have similar attitudes toward HRM. The post hoc test (Table 5.6) also shows that employees from various industries fall into the same subset, indicating that they have the same attitude toward HRM. The result failed to support the hypothesis. Thus, hypothesis 3 is rejected.

Table 5.6: Post Hoc Test for HRM

Type of organization	N	Subset for alpha = 0.05
		1
Banking	96	3.766
Telecom	139	3.568
Healthcare	85	3.739
Sig.		0.254

5.2.4 Hypothesis 4: There is a difference in perception between telecom, banking, and healthcare sectors concerning information technology.

To test the hypothesis, a one-way ANOVA is used (Table 5.7, Table 5.8). On a five-point Likert scale, respondents were asked to rate the importance of information technology about the hypothesis. The scale of 1 indicates the least significant and 5 indicates the most important.

Employees from three different sectors, such as telecommunications, banking, and healthcare, were asked to give their opinion on the use of information technology in their respective organizations. The distinction in information technology could be attributed to sector-specific characteristics. The differences in their perceptions regarding information technology are tested using a one-way ANOVA.

Table 5.7 Results of one-way ANOVA for IT

Dependent Variable	Sectors			F Stats (P-value)	Remark
	Telecom	Banking	Healthcare		
	Mean (SD)	Mean (SD)	Mean (SD)		
IT	3.882 (0.795)	3.791 (1.035)	3.911 (1.047)	0.419 (0.658)	No Significant diff found

The results (Table 5.7) reveal that the probability value of F statistics is greater than the 5% level of significance. As a result, it may be stated that personnel in the telecom, banking, and healthcare industries have similar attitudes toward information technology. The post hoc test (as shown in Table 5.8) also shows that personnel from

various sectors fall into the same subset, with the same perception of operational performance. The result failed to support the hypothesis. Thus, hypothesis 4 is rejected.

Table 5.8: Post Hoc Test for IT

Type of organization	N	Subset for alpha = 0.05
		1
Banking	96	3.791
Telecom	139	3.882
Healthcare	85	3.911
Sig.		0.634

5.2.5 Hypotheses testing using PLS-SEM METHODOLOGY

The partial least square structural equation modeling method was used to test hypotheses 5 to 12. Banking, telecommunications, and healthcare were among the service industries represented in the sample. Partial Least Square Structural Equation Modeling is used to test the hypotheses.

The following hypotheses are tested using PLS-SEM

Hypothesis-5 The operational performance positively influences the service quality of the organization.

Hypothesis-6 Information system positively influences the service quality of an organization.

Hypothesis-7 Marketing feedback positively influences the service quality of an organization.

Hypothesis-8 Human Resource planning positively influences the performance of an organization.

Hypothesis-9 Financial support positively influences the service quality of an organization.

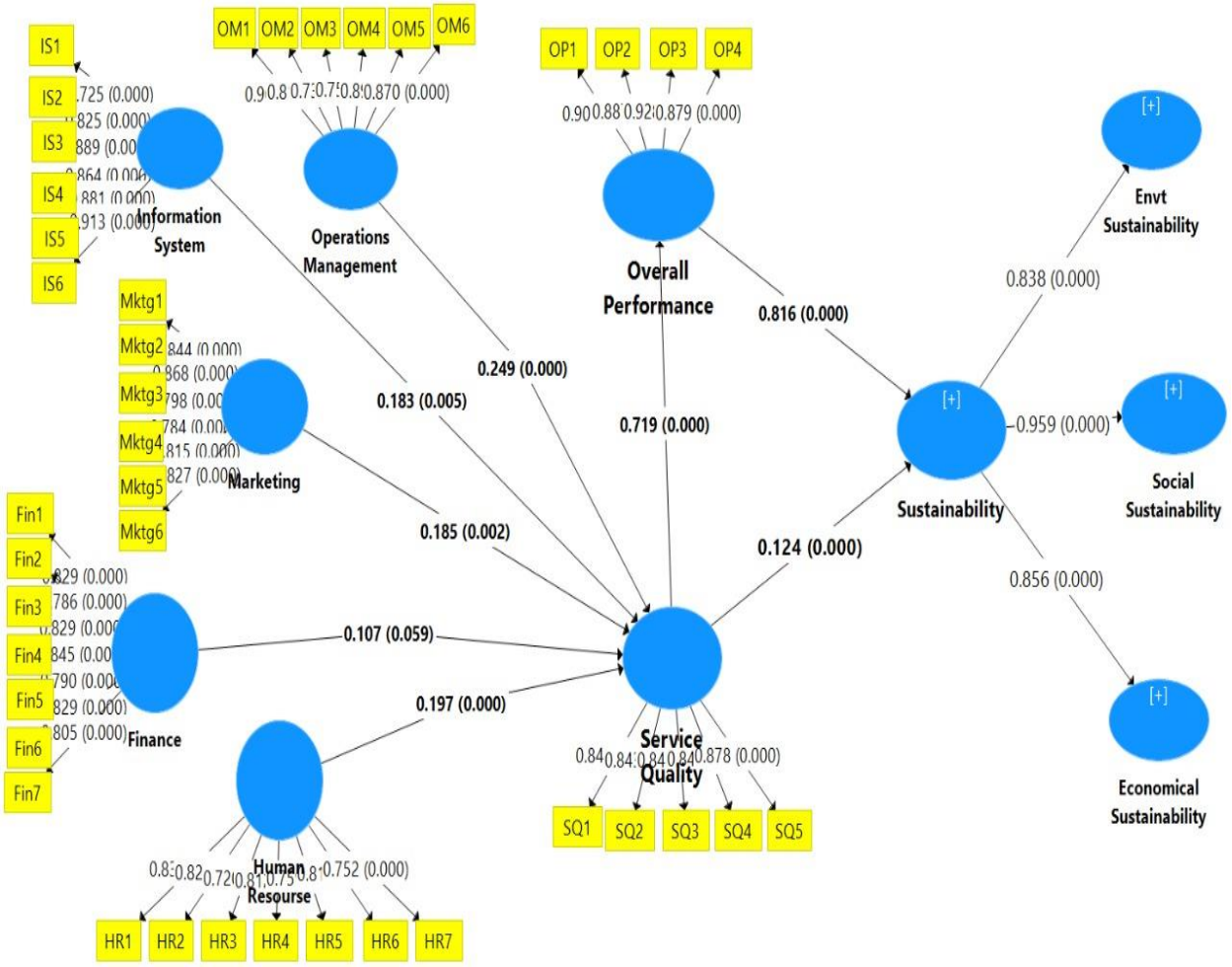


Figure 5.1: Structural Model assessment

Hypothesis-10 Service quality has a positive impact on an organization's performance.

Hypothesis-11 Performance of a service organization positively influences its overall sustainability.

Hypothesis-12 Service quality positively influences the sustainability of an organization.

Table-5.9: Hypotheses testing using Structural Model assessment

Hypothesis	Endogenous construct	Exogenous construct	Path Coefficients	Standard Error	T Statistics	R square	Conclusion
Finance has a direct impact on an organization's service quality.	Service Quality	Finance	0.107	0.053	2.008*	63.7%	Supported
Human resources have a direct impact on an organization's service quality.		Human Resource	0.197	0.053	3.742*		Supported
Information systems have a direct impact on an organization's service quality.		Information system	0.183	0.071	2.588*		Supported
Marketing has a direct impact on an organization's service quality.		Marketing	0.185	0.058	3.186*		Supported
Operational performance has a direct impact on an organization's service quality.		Operational performance	0.249	0.052	4.788*		Supported
A service organization's success has a direct impact on its long-term viability.	Sustainability	Performance	0.816	0.024	34.496*	68.4%	Supported
The performance of an organization is directly influenced by the quality of its services.	Performance	Service quality	0.719	0.037	19.217*	61.8%	Supported
Service quality has a direct impact on an organization's long-term viability.	Sustainability	Service quality	0.124	0.034	3.687*	62%	Supported

Reliability analysis

The reliability of all the different parameters is checked using Cronbach's alpha coefficient. Cronbach alpha scores for many aspects of performance measurement, such as service quality (0.906), operational management (0.909), information system (0.923), finance (0.917), human resource (0.899), marketing (0.905), and sustainability (0.905), were found to be satisfactory (0.913). As a result, the internal consistency reliability of all of the factors exceeds the required value of 0.7. Hair et al., 2014; Nunnally & Bernstein, 1994). A complete list of all the statements with factor loading and reliability is shown in Table 5.10.

Validity analysis

Using the Confirmatory Factor Analysis approach, the construct validity of the measurement scale reflecting performance measurement is then investigated. The measurement model is made up of all of the components that make up performance measurement, as well as the claims. The measurement model's discriminant validity and convergence were studied. According to discriminant validity, it "determines the degree to which measures of different statements are distinct." The statistical precision of the model (Cmin/df=1.759, CFI=.955, RMSEA=.057, TLI=.947) is also calculated. CFI cutoff values more than 0.90 and RMSEA cutoff values less than 0.08 are considered good fit models. All statistical fitness indices are found to be within a few percentage points of their predicted values. The average variance extracted (AVE) indications are larger than 0.5, indicating a composite Reliability of better than 0.7 for each component. Furthermore, the AVE estimates of each statement are bigger than the correlation between various construct pairings, suggesting that Fornell and Larcker discriminant validity is met (1981). In Table 5.10, the discriminant validity is explained.

Table 5.10: Reliability and validity testing

Construct	Item Code	Construct Loadings	Composite Reliability	Average Variance Extracted	Cronbach alpha
Finance	Fin1	0.907	0.916	0.610	0.917
	Fin2	0.762			
	Fin3	0.808			
	Fin4	0.832			
	Fin5	0.684			
	Fin6	0.726			
	Fin7	0.726			
Human resource	HR1	0.656	0.895	0.555	0.899
	HR2	0.920			
	HR3	0.697			
	HR4	0.916			
	HR5	0.660			
	HR6	0.666			
	HR7	0.638			
Information System	IS1	0.775	0.924	0.670	0.923
	IS2	0.737			
	IS3	0.838			
	IS4	0.840			
	IS5	0.841			
	IS6	0.873			
Marketing	Mktg1	0.853	0.904	0.613	0.905
	Mktg2	0.840			
	Mktg3	0.706			
	Mktg4	0.750			
	Mktg5	0.813			
	Mktg6	0.724			
Operational Performance	OM1	0.702	0.904	0.612	0.909
	OM2	0.801			
	OM3	0.856			
	OM4	0.853			
	OM5	0.734			
	OM6	0.733			

Overall Performance	OP1	0.907	0.922	0.748	0.922
	OP2	0.810			
	OP3	0.876			
	OP4	0.864			
Service quality	SQ1	0.808	0.905	0.657	0.906
	SQ2	0.844			
	SQ3	0.799			
	SQ4	0.772			
	SQ5	0.892			
Social Sustainability	Sus1	0.712	0.965	0.736	0.965
	Sus10	0.524			
	Sus2	0.710			
	Sus3	0.750			
	Sus4	0.774			
	Sus5	0.670			
	Sus6	0.735			
	Sus7	0.760			
	Sus8	0.766			
	Sus9	0.721			
Environmental sustainability	EnviS1	0.706	0.913	0.514	0.913
	EnviS2	0.728			
	EnviS3	0.683			
	EnviS4	0.760			
	EnviS5	0.615			
	EnviS6	0.800			
	EnviS7	0.750			
	EnviS8	0.745			
	EnviS9	0.717			
	EnviS10	0.645			
Economical Sustainability	ECOS1	0.937	0.923	0.750	0.923
	ECOS2	0.873			
	ECOS3	0.818			
	ECOS4	0.831			

The convergent validity of the measurement model representing performance management is tested using CR, AVE, and Construct loadings. According to Hair et al., (2014), Composite reliability (CR) is a better way for determining the convergent validity of a construct. CR is thought to be somewhere between 0.70 and 0.80. (Fornell and Larcker, 1981; Nunnally and Bernstein, 1994). According to Table 5.10, the structures depicting performance management in the measurement model have composite reliability greater than 0.70.

As a result, all performance management constructs are extremely trustworthy. The assertions' concept loadings are also utilized to assess for convergent validity. Factor loading more than 0.50 is regarded as appropriate to retain the statement in the concept (Hair et al., 2014). The greater construct loadings suggest that the observed item significantly represents the latent variable. The discriminant validity test determines how distinct two notions are (Hair et al., 2014). It is explored using MSV, which should be lower than the AVE estimate for each component. The MSV of each performance management construct is less than the AVE of each construct, suggesting discriminant validity of the measuring instrument.

Table 5.11: Goodness of fit and predictive accuracy

	RMSE	**MAE**	**Q^2 Predict**	**SRMR**
Economical Sustainability	0.728	0.577	0.481	0.072
Environmental Sustainability	0.743	0.629	0.457	
Overall Performance	0.588	0.468	0.660	
Service Quality	0.682	0.472	0.541	
Social Sustainability	0.649	0.504	0.587	
Sustainability	0.600	0.468	0.646	

As seen in Table 5.11, the predicted accuracy is quite high, as indicated by Q^2. More than 0.35 of each endogenous construct is estimated. The model's SRMR value is.072, which is less than the predicted value of 0.08, indicating that it is statistically fit. Values for RSME and MAE are not standard.

As stated in Table 5.12, the discriminant validity is tested using the Fornell and Larcker criteria. As demonstrated in Table 5.12, the square root of each performance management construct's AVE is less than the correlation of the construct with other constructs on the measuring scale. As a result, the construct validity requirements of convergent and discriminant validity are met by the measuring scale representing the organizations' performance management procedures.

Table-5.12: Fornell Larcker Criterion

	Finance	**Human Resource**	**Info System**	**Marketing**	**Operations Management**	**Overall Performance**	**Service Quality**	**Sustainability**
Finance	0.781							
Human Resource	0.548	0.745						
Information System	0.558	0.712	0.819					
Marketing	0.580	0.665	0.732	0.783				
Operations Management	0.441	0.646	0.630	0.595	0.782			
Overall Performance	0.689	0.740	0.814	0.780	0.725	0.865		
Service Quality	0.546	0.692	0.694	0.682	0.677	0.786	0.811	
Sustainability	0.666	0.660	0.694	0.680	0.624	0.798	0.761	0.715

5.3 RESULT AND DISCUSSION

A willingness to provide high-quality services is a key function and goal for the service sector, as service quality is regarded as the most important factor in a company's survival, growth, and profitability, and it is also a profitable business strategy. Client happiness and service quality are critical considerations in today's service firms. PLS-SEM is a Structural Equation Models (SEM) methodology that allows for the detection of correlations between constructs that influence the performance of service organizations. PLS-SEM analysis has been shown to provide less contradictory results. The R-square value is 61.8 percent, and the total performance p-value is 19.137. Finance is a modern company's lifeblood. Both fixed and operating capital need to be carefully managed. Financial planning needs to be done correctly. Capital investments must be closely controlled. Both excessive and inefficient use of capital should be avoided. Human resource factors are integrally tied to organizational services. Organizational growth, human resource development, and labor relations are all part of human resource management, according to the definition. Human resource functions in a firm include recruiting, induction, retention, welfare, appraisal, growth, training, skill development, attitude orientation, remuneration, motivation, industrial relations, and retirement (Rao and Pareek, 1982).

For sustainability, an organization's internal aptitude for identifying the factors affecting its long-term growth, gaining the necessary skill and knowledge to deal with the difficult aspects, and establishing continual improvements inside itself in a self-sufficient manner is required.

According to the studies, corporate sustainability has an impact on an organization’s profitability and overall performance in today's dynamic and challenging business climate. It establishes the foundation for service organizations to retain and enhance their value.

The operational performance of service delivery includes three fundamental performance factors (quality, dependability, and speed) that are often present in a service delivery system. Quality consistency, delivery reliability, and promptness (speed) are critical operations performance characteristics in service delivery systems. These operations elements are investigated in the context of a constraining factor, which in this study is referred to as "demand." Customer orders, which frequently indicate the need for a service activity from the outside world, are related to the framework's element 'demand.' Because marketing is so critical to a company's survival, it should be focused on customers and position them as the initial point of contact for all of their demands in the business sector. Marketers must employ all of their resources to select products and services that suit their clients' expectations and desires. A company's marketing mix is a collection of marketing strategies used to promote itself. Kotler and Keller (2012) combined tactical decisions about product variety, pricing policy, promotion, and place, which refers to how the firm distributes its offer and includes choices about channels, coverage, location, transportation, and stock level and is controlled by the company to generate the desired response from target customers (Doyle, 2008).

The quality of technical support has an impact on the quality of service, regardless of whether a user interacts with one or multiple information systems. As a result, both the customer and the eventual client benefit from technical assistance. Appropriate use of new

information technology greatly improves the degree of information flow in businesses, resulting in better service (Khan et al., 2016).

5.4 SUMMARY OF HYPOTHESIS TESTING

In table 5.13 summary of all the hypotheses tested are presented.

Table 5.13: Summary of hypotheses testing

Hypotheses	Conclusion
Hypothesis-1 There is a difference in perception between telecom, banking, and healthcare sectors concerning the practices of environmental sustainability.	Accepted
Hypothesis-2 There is a difference in perception between telecom, banking, and healthcare sectors concerning operational performance.	Rejected
Hypothesis-3 There is a difference in perception between the telecom, banking, and healthcare sectors concerning human resource management.	Rejected
Hypothesis-4 There is a difference in perception between telecom, banking, and healthcare sectors concerning information technology.	Rejected
Hypothesis-5 The operational performance positively influences the service quality of the organization.	Accepted
Hypothesis-6 Information system positively influences the service quality of an organization.	Accepted
Hypothesis-7 Marketing feedback positively influences the service quality of an organization.	Accepted
Hypothesis-8 Human Resource planning positively influences the performance of an organization.	Accepted
Hypothesis-9 Financial support positively influences the service quality of an organization.	Accepted
Hypothesis-10 Service quality has a positive impact on an organization's performance.	Accepted
Hypothesis-11 Performance of a service organization positively influences its overall sustainability.	Accepted
Hypothesis-12 Service quality positively influences the sustainability of an organization.	Accepted

5.5 CONCLUSION

This chapter employs the one-way ANOVA and PLS-SEM methodologies to test hypotheses and gain a deeper understanding of the factors that drive service organizations. The descriptive statistics from the survey have been supplied. The most important aspects of descriptive statistics have been highlighted. The Fornell Larcker Criteria are used to statistically test the hypothesis.

CHAPTER 6

TOTAL INTERPRETIVE STRUCTURAL MODELING

6.1 INTRODUCTION

In today's world, services are the most valuable commodity in customers' lives and account for a significant portion of the global economy. Transformative consumer research that affects consumer well-being has received little attention from researchers and practitioners. In this chapter, comprehensive interpretive structural modelling was used to investigate a causal relationship between the factors impacting the performance of an organization offering transformative services (TISM). The literature review helped to identify the factors that influence the services. Following the identification of the components, TISM was used to interpret the direct and substantial transitive links between them. The empirical findings reveal that top management has a significant impact on consumer well-being as well as societal welfare. The commitment of top management to corporate social responsibility and respect for the rule of law is essential for the well-being of society as a whole. Apart from employee satisfaction, superior service quality, information technology, and e-commerce, these are the primary variables impacting the organization's effectiveness.

Twenty Seven experts were consulted for their opinion regarding the interrelation among the factors influencing the performance of service organizations. The most common responses were incorporated in the development of interpretive structural hierarchy.

6.2 TISM Methodology

The TISM methodology is described in detail below, with a flow chart depicted in Figure 6.1.

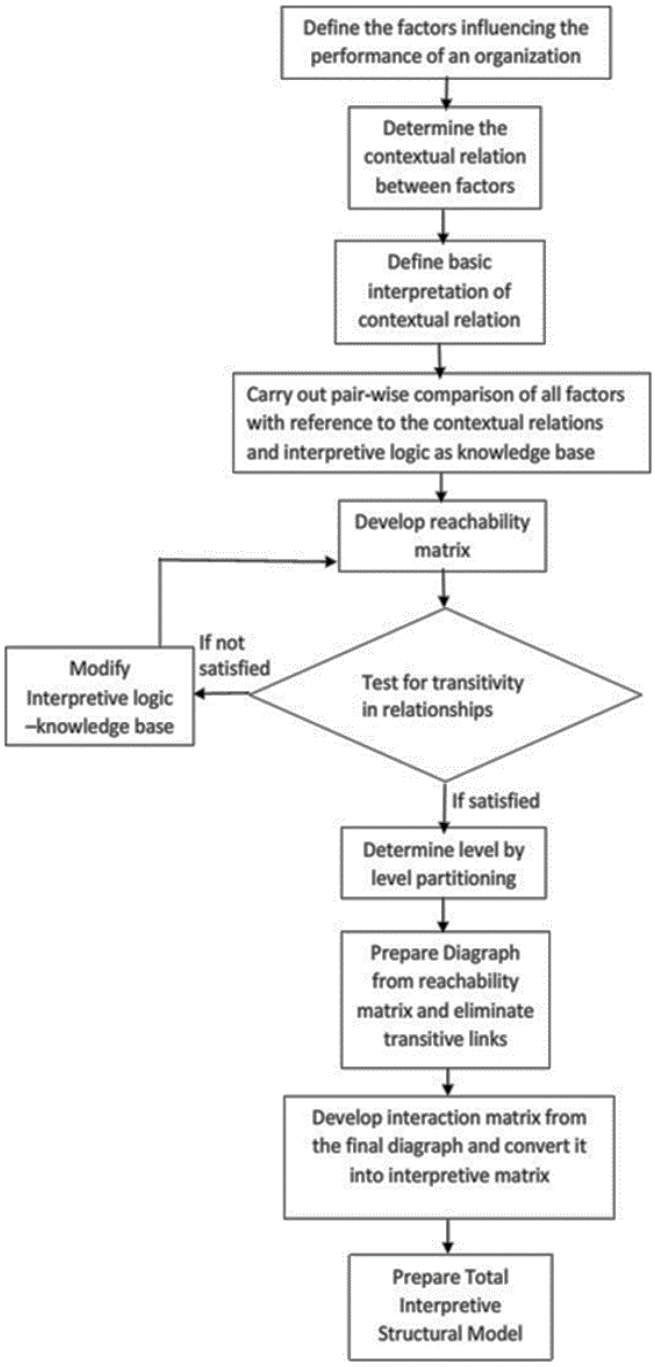


Figure 6.1: Structure of TISM

The entire process of drawing the hierarchy of factors using total interpretive structural modeling are discussed stepwise in the following paragraphs:

Step I: Factor identification

The literature review identifies the factors that influence the service organization's performance.

Step II: Establishment of interaction among factors

As shown in Table 6.1, four different sorts of symbols (V, A, X, and O) are employed to determine the interaction between the components in question.

Table 6.1: The symbols used in the self–interaction matrix

Symbol	Interaction among the concerned factors
V	Factor *i* influences factor *j* and factor *j* does not influence factor *i*
A	Factor *j* influences factor *i* and factor *i* does not influence factor *j*
X	Factor *i* and factor *j* both influences each other
O	Factors *i* and *j* have no relationship

A self-interaction matrix has been built based on these interactions, as illustrated in Table 6.2.

Step III: Interpretation of relationship

Because of the interpretation of the relationship of the influence of one component over another, the usage of TISM is advised. The experts in this study were asked if factor I affects factor j. If that's the case, how does factor I affect factor j? It aids in the acquisition

of in-depth knowledge. Appendix I summarizes relationships and their interpretation based on the most widely held professional opinion (supplementary materials).

Step IV: Initial and final Reachability matrices

The reasoning that the interaction yes is indicated by 1 and No is shown by 0 in the reachability matrix is used to create a binary pairwise comparison matrix, as illustrated in Table 6.3. The transitivity relationship is also tested in the matrix (if factor A influences factor B and factor B influences factor C, then factor A will also influence factor C). By altering the value 0 to 1 in the final reachability matrix, as illustrated in Table 6.4, these transitive links among the elements are integrated. The asterisk (*) sign denotes a transitive relationship.

Step V: Level partition of the factors

This methodology is extremely similar to that of the ISM. All of the factors are given levels as a result of this. The similarity of reachability sets and intersection sets is used to level the playing field. After a factor has been leveled, it is eliminated from all sets for the next iteration, and the next level of factors is discovered. Tables 6.5 to 6.14 depict the leveling procedure.

Table 6.2: Structural Self-Interaction Matrix (SSIM)

Factor No.	Factors	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
F1	Performance of Service Organization	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
F2	Customer Retention	A	A	A	A	A	A	A	A	A	A	V	A	A	A	A	A		
F3	Responsiveness of Service Providers	O	A	O	A	A	A	O	O	O	A	V	O	O	V	V			
F4	Lead Time Reduction	O	O	O	A	A	A	O	O	O	A	V	V	O	O				
F5	Quality Improvement	A	A	O	A	O	A	O	A	A	A	V	V	A					
F6	Employee participation	O	O	O	A	O	O	A	A	X	O	O	O						
F7	Cost Minimization	O	O	O	A	A	A	O	O	O	A	V							
F8	Brand Image/Market Reputation	A	A	A	A	A	A	A	A	A	A								
F9	Flexibility	O	O	O	A	A	A	O	O	O									
F10	Employee Satisfaction and Retention	A	A	A	A	O	O	A	A										
F11	Employee Empowerment	O	O	A	A	O	O	O											
F12	Job Security	O	O	A	A	O	O												
F13	Use of IT	O	O	O	A	V													
F14	E-Commerce	O	O	O	A														
F15	Top Management Commitment	V	V	V															
F16	Corporate Social Responsibility	X	V																
F17	Transparency in Customer Dealing	A																	
F18	Respect for the Rules of Law																		

Table 6.3: Initial reachability matrix

Factor No.	Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
F1	Performance of Service Organization	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F2	Customer Retention	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
F3	Responsiveness of Service Providers	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
F4	Lead Time Reduction	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
F5	Quality Improvement	1	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0
F6	Employees Participation	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0
F7	Cost Minimization	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
F8	Brand Image/Market Reputation	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
F9	Flexibility	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0
F10	Employee Satisfaction and Retention	1	1	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0
F11	Employee Empowerment	1	1	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0
F12	Job Security	1	1	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0
F13	Use of IT	1	1	1	1	1	0	1	1	1	0	0	0	1	1	0	0	0	0
F14	E-Commerce	1	1	1	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0
F15	Top Management Commitment	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
F16	Corporate Social Responsibility	1	1	0	0	0	0	0	1	0	1	1	1	0	0	0	1	1	1
F17	Transparency in Customer Dealing	1	1	1	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0
F18	Respect for the Rules of Law	1	1	0	0	1	0	0	1	0	1	0	0	0	0	0	1	1	1

Table 6.4: Final Reachability Matrix

Factor No.	Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Driving Power
F1	Performance of service organization	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
F2	Customer retention	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
F3	Responsiveness of service providers	1	1	1	1	1	0	*1**	1	0	0	0	0	0	0	0	0	0	0	7
F4	Lead Time reduction	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	5
F5	Quality improvement	1	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	5
F6	Employees participation	1	1	0	0	1	1	*1**	*1**	0	1	0	0	0	0	0	0	0	0	7
F7	Cost minimization	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	4
F8	Brand image/market reputation	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
F9	Flexibility	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	8
F10	Employee satisfaction and Retention	1	1	0	0	1	1	*1**	1	0	1	0	0	0	0	0	0	0	0	7
F11	Employee empowerment	1	1	0	0	1	1	*1**	1	0	1	1	0	0	0	0	0	0	0	8
F12	Job security	1	1	0	0	*1**	1	0	1	0	1	0	1	0	0	0	0	0	0	7
F13	Use of IT	1	1	1	1	1	0	1	1	1	0	0	0	1	1	0	0	0	0	10
F14	E-Commerce	1	1	1	1	*1**	0	1	1	1	0	0	0	0	1	0	0	0	0	9
F15	Top Management Commitment	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
F16	Corporate social responsibility	1	1	*1**	0	*1**	*1**	0	1	0	1	1	1	0	0	0	1	1	1	12
F17	Transparency in customer dealing	1	1	1	*1**	1	*1**	0	1	0	1	0	0	0	0	0	0	1	0	9
F18	Respect for the rule of law	1	1	*1**	0	1	*1**	*1**	1	0	1	*1**	*1**	0	0	0	1	1	1	13
	Dependence	18	16	*8*	*7*	13	*8*	*12*	17	4	8	*4*	*4*	2	3	1	3	4	3	

Table 6.5: First Iteration for Leveling of the Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F1	1	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17, 18	1	1
F2	1,2,8	2,3,4,5,6,7,9,10,11,12,13,14,15,16,17,18	2	
F3	1,2,3,4,5,7,8	3,9,13,14,15,16,17,18	3	
F4	1,2,4,7,8	3,4,9,13,14,15,17	4	
F5	1,2,5,7,8	3,5,6,9,10,11,12,13,14,15,16,17,18	5	
F6	1,2,5,6,7,8,10	6,10,11,12,15,16,17,18	6,10	
F7	1,2,7,8	3,4,5,6,7,9,10,11,13,14,15,18	7	
F8	1,8	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	8	
F9	1,2,3,4,5,7,8,9	9,13,14,15	9	
F10	1,2,5,6,7,8,10	6,10,11,12,15,16,17,18	6,10	
F11	1,2,5,6,7,8,10,11,	11,15,16,18	11	
F12	1,2,5,6,8,10,12	12,15,16,18	12	
F13	1,2,3,4,5,7,8,9,13,14	13,15	13	
F14	1,2,3,4,5,7,8,9,14	13,14,15	14	
F15	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	15	15	
F16	1,2,3,5,6,8,10,11,12, 16,17,18	15,16,18	16,18	
F17	1,2,3,4,5,6,8,10,17	15,16,17,18	17	
F18	1,2,3,5,6,7,8,10,11,12,16,17,18	15,16,18	16,18	

Table 6.6: Second Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F2	2,8	2,3,4,5,6,7,9,10,11,12,13,14,15,16,17,18	2	
F3	2,3,4,5,7,8	3,9,13,14,15,16,17,18	3	
F4	2,4,7,8	3,4,9,13,14,15,17	4	
F5	2,5,7,8	3,5,6,9,10,11,12,13,14,15,16,17,18	5	
F6	2,5,6,7,8,10	6,10,11,12,15,16,17,18	6,10	
F7	2,7,8	3,4,5,6,7,9,10,11,13,14,15,18	7	
F8	8	3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	8	II
F9	3,4,5,7,8,9	9,13,14,15	9	
F10	5,6,7,8,10	6,10,11,12,15,16,17,18	6,10	
F11	2,5,6,7,8,10,11,	11,15,16,18	11	
F12	2,5,6,8,10,12	12,15,16,18	12	
F13	2,3,4,5,7,8,9,13,14	13,15	13	
F14	2,3,4,5,7,8,9,14	13,14,15	14	
F15	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	15	15	
F16	2,3,5,6,8,10,11,12,16,17,18	15,16,18	16,18	
F17	2,3,4,5,6,8,10,17	15,16,17,18	17	
F18	2,3,5,6,7,8,10,11,12,16,17,18	15,16,18	16,18	

Table 6.7: Third Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F2	2	2,3,4,5,6,7,9,10,11,12,13,14,15,16,17,18	2	III
F3	2,3,4,5,7	3,9,13,14,15,16,17,18	3	
F4	2,4,7	3,4,9,13,14,15,17	4	
F5	2,5,7	3,5,6,9,10,11,12,13,14,15,16,17,18	5	
F6	2,5,6,7,10	6,10,11,12,15,16,17,18	6,10	
F7	2,7	3,4,5,6,7,9,10,11,13,14,15,18	7	
F9	3,4,5,7,9	9,13,14,15	9	
F10	5,6,7,10	6,10,11,12,15,16,17,18	6,10	
F11	2,5,6,7,10,11,	11,15,16,18	11	
F12	2,5,6,10,12	12,15,16,18	12	
F13	2,3,4,5,7,9,13,14	13,15	13	
F14	2,3,4,5,7,9,14	13,14,15	14	
F15	2,3,4,5,6,7,9,10,11,12,13,14,15,16,17,18	15	15	
F16	2,3,5,6,10,11,12,16,17,18	15,16,18	16,18	
F17	2,3,4,5,6,10,17	15,16,17,18	17	
F18	2,3,5,6,7,10,11,12,16,17,18	15,16,18	16,18	

Table 6.8: Fourth Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F3	3,4,5,7	3,9,13,14,15,16,17,18	3	
F4	4,7	3,4,9,13,14,15,17	4	
F5	5,7	3,5,6,9,10,11,12,13,14,15,16,17,18	5	
F6	5,6,7,10	6,10,11,12,15,16,17,18	6,10	
F7	7	3,4,5,6,7,9,10,11,13,14,15,18	7	IV
F9	3,4,5,7,9	9,13,14,15	9	
F10	5,6,7,10	6,10,11,12,15,16,17,18	6,10	
F11	5,6,7,10,11,	11,15,16,18	11	
F12	5,6,10,12	12,15,16,18	12	
F13	3,4,5,7,9,13,14	13,15	13	
F14	3,4,5,7,9,14	13,14,15	14	
F15	3,4,5,6,7,9,10,11,12,13,14,15,16,17,18	15	15	
F16	3,5,6,10,11,12,16,17,18	15,16,18	16,18	
F17	3,4,5,6,10,17	15,16,17,18	17	
F18	3,5,6,7,10,11,12,16,17,18	15,16,18	16,18	

Table 6.9: Fifth Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F3	3,4,5	3,9,13,14,15,16,17,18	3	
F4	4	3,4,9,13,14,15,17	4	V
F5	5	3,5,6,9,10,11,12,13,14,15,16,17,18	5	V
F6	5,6,10	6,10,11,12,15,16,17,18	6,10	
F9	3,4,5,9	9,13,14,15	9	
F10	5,6,10	6,10,11,12,15,16,17,18	6,10	
F11	5,6,10,11,	11,15,16,18	11	
F12	5,6,10,12	12,15,16,18	12	
F13	3,4,5,9,13,14	13,15	13	
F14	3,4,5,9,14	13,14,15	14	
F15	3,4,5,6,9,10,11,12,13,14,15,16,17,18	15	15	
F16	3,5,6,10,11,12,16,17,18	15,16,18	16,18	
F17	3,4,5,6,10,17	15,16,17,18	17	
F18	3,5,6,10,11,12,16,17,18	15,16,18	16,18	

Table 6.10: Sixth Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F3	3	3,9,13,14,15,16,17,18	3	VI
F6	6,10	6,10,11,12,15,16,17,18	6,10	VI
F9	3,9	9,13,14,15	9	
F10	6,10	6,10,11,12,15,16,17,18	6,10	VI
F11	6,10,11,	11,15,16,18	11	
F12	6,10,12	12,15,16,18	12	
F13	3,9,13,14	13,15	13	
F14	3,9,14	13,14,15	14	
F15	3,6,9,10,11,12,13,14,15,16,17,18	15	15	
F16	3,6,10,11,12,16,17,18	15,16,18	16,18	
F17.	3,6,10,17	15,16,17,18	17	
F18	3,6,10,11,12,16,17,18	15,16,18	16,18	

Table 6.11: Seventh Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F9	9	9,13,14,15	9	VII
F11	11	11,15,16,18	11	VII
F12	12	12,15,16,18	12	VII
F13	9,13,14	13,15	13	
F14	9,14	13,14,15	14	
F15	9,11,12,13,14,15,16,17,18	15	15	
F16	11,12,16,17,18	15,16,18	16,18	
F17	17	15,16,17,18	17	VII
F18	11,12,16,17,18	15,16,18	16,18	

Table 6.12: Eighth Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F13	13,14	13,15	13	
F14	14	13,14,15	14	VIII
F15	13,14,15,16,18	15	15	
F16	16,18	15,16,18	16,18	VIII
F18	16,18	15,16,18	16,18	VIII

Table 6.13 Ninth iteration for leveling of factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F13	13,14	13,15	13	IX
F15	13,14,15,16,18	15	15	

Table 6.14: Tenth Iteration for Leveling of Factors

Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
F15	13,15	15	15	X

Step VI: Driving Dependence diagram/ MICMAC analysis

Figure 6.2 depicts the factors' driving power and interdependence. Autonomous, dependent, linking, and driver are the four quadrants represented. The autonomous factors are represented in the first quadrant by their low driving power and low reliance. The dependent factors are shown in the second quadrant because they have a low driving power and a strong reliance. The linkage factors are shown in the third quadrant since they have a lot of driving power and depend on each other. The drivers in the fourth quadrant have a lot of driving power and aren't too reliant.

Step VII: Developing the digraph for TISM

As indicated in Table 8, the elements are organized hierarchically based on the levels iterated in Step V, and relationships are projected using a directed graph based on the relationship as shown in the reachability matrix. The transition connections that require interpretation are also included. Figure 6.3 depicts the digraph. The connective information and interpretations on the arrows are incorporated into the digraph.

In the final reachability matrix, the transitivity notion is employed to look for and incorporate indirect linkages. Table 6.4 shows the final reachability matrix. Table 6.5 shows the reachability sets, antecedent sets, and intersection sets for each factor. The final

iteration is achieved as shown in Table 8 based on the commonality of the reachability set and intersection set.

Table 6.15: Final Iterations and Leveling of Factors

Iterations	Factor No.	Reachability Set	Antecedent Set	Intersection Set	Level
I	F1	1	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	1	I
III	F2	1	2,3,4,5,6,7,9,10,11,12,13,14,15,16,17,18	2	III
VI	F3	3	3,9,13,14,15,16,17,18	3	VI
V	F4	4	3,4,9,13,14,15,17	4	V
V	F5	5	3,5,6,9,10,11,12,13,14,15,16,17,18	5	V
VI	F6	6,10	6,10,11,12,15,16,17,18	6,10	VI
IV	F7	7	3,4,5,6,7,9,10,11,13,14,15,18	7	IV
II	F8	8	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	8	II
VII	F9	9	9,13,14,15	9	VII
VI	F10	6,10	6,10,11,12,15,16,17,18	6,10	VI
VII	F11	11,	11,15,16,18	11	VII
VII	F12	12	12,15,16,18	12	VII
IX	F13	13	13,15	13	IX
VIII	F14	14	13,14,15	14	VIII
X	F15	15	15	15	X
VIII	F16	16,18	15,16,18	16,18	VIII
VII	F17.	17	15,16,17,18	17	VII
VIII	F18	16,18	15,16,18	16,18	VIII

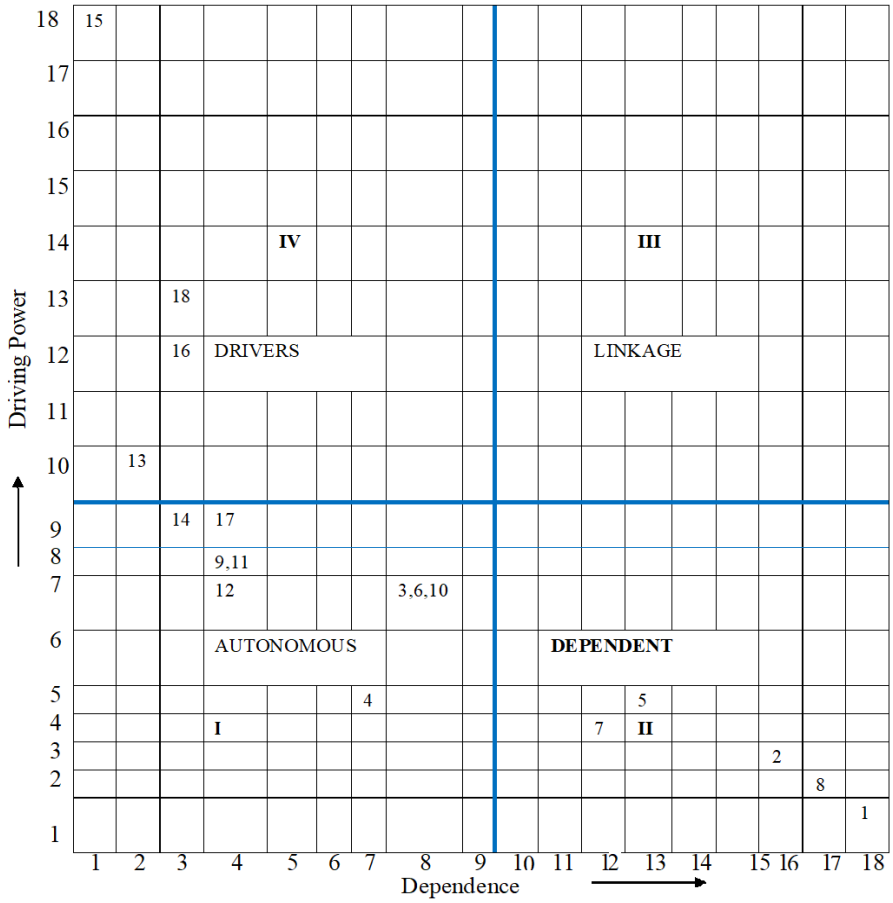


Figure 6.2: Driving Power and Dependence Diagram

The reachability set of factors includes itself and the other factors it influences, whereas the antecedent set includes itself and the elements that impact it. For all of the factors in Tables 7 and 8, the intersection of these sets is calculated. The top-level is accomplished by factors that have the same reachability and intersection sets. It is no longer considered when the top-level factor has been identified. The factors on the second level are then discovered using the same iteration process. The iterations are repeated until each factor's level is determined. The TISM model is created by arranging these levels into a digraph.

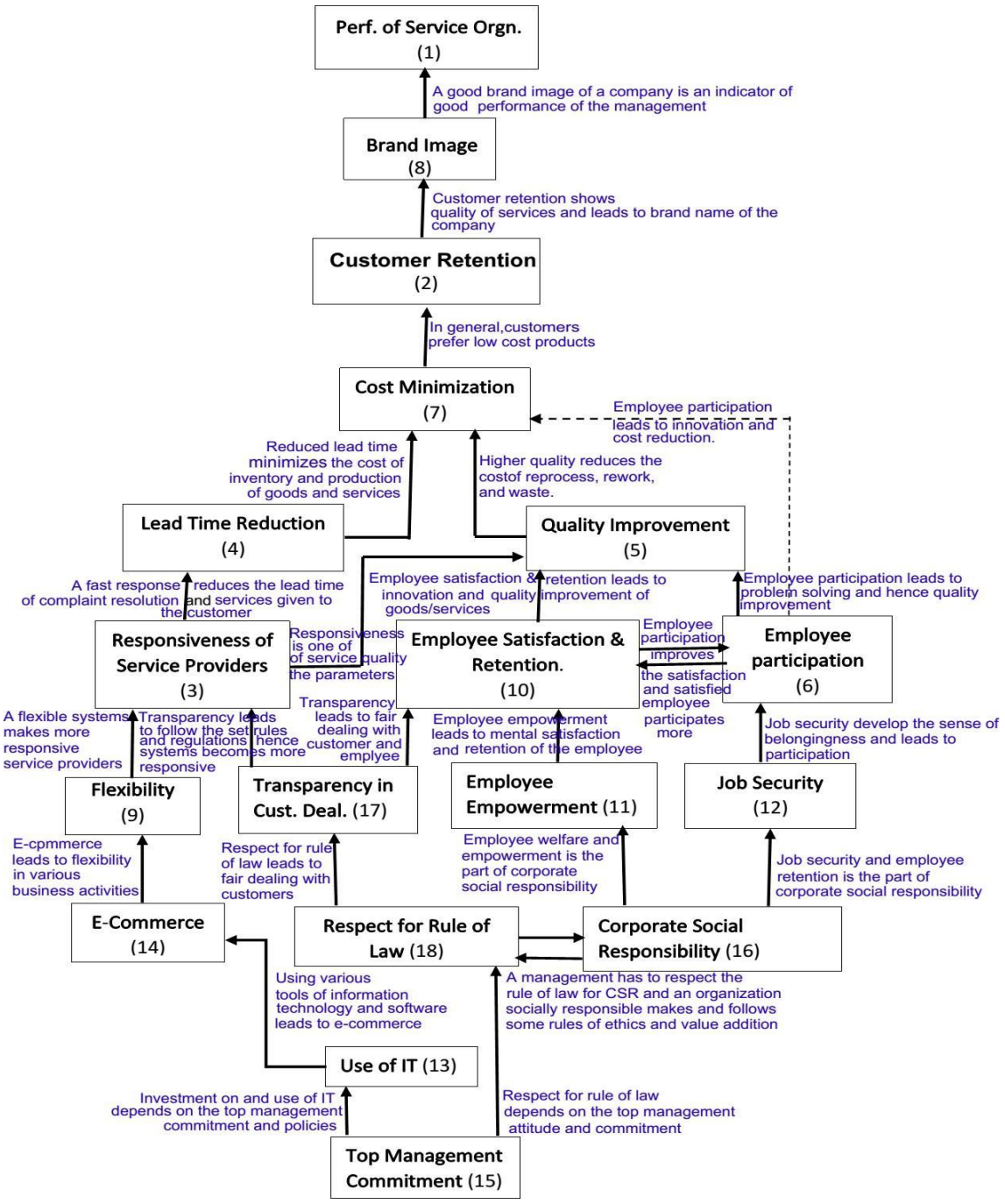


Figure 6.3: TISM Hierarchy of the Factors

The MICMAC analysis is focused on determining the driver power and the factors' interdependence. It is created by grouping the components into four categories, as

illustrated in Figure 2, namely Autonomous, Dependent, Linkage, and Drivers. In MICMAC analysis, the dependence is indicated on the x-axis and the driving power is shown on the y-axis. The sum of all ‘1s' in the rows of the final reachability matrix determines a factor's driving power, whereas the sum of all ‘1s' in the columns determines its reliance.

The hierarchy of variables influencing service organization performance has been constructed in digraph as shown in Figure 6.3, based on factor levelling over iterations and using the final reachability matrix. Only transitive relationships are depicted in this digraph, and their interpretation is critical. Solid lines represent direct relationships, while dotted lines represent substantial transitive links in a digraph.

6.3 CONCLUSION

In this chapter, Total interpretive structural modelling was used to examine the link between the elements impacting the performance of an organization offering transformative services (TISM). Top management dedication and leadership have been seen to play an essential influence in leading the organization. Top management commitment has high driving power because of its high leadership skills. They can lead the entire organization in the right direction with proper employee empowerment and participation. Total interpretive structural modelling was used to investigate the relationship between the factors impacting the performance of an organization offering transformative services (TISM). Employee empowerment, involvement, and satisfaction are critical factors in both service quality and societal sustainability.

CHAPTER 7

PERFORMANCE MEASUREMENT FRAMEWORK USING AHP AND PROMETHEE

7.1 Introduction

This chapter aims to assess the operational performance of India's cellular mobile telephone service providers (CMTSPs). In this part, an integrated approach is used to assess the operational performances of cellular mobile telephone service providers using the Analytic Hierarchy Process (AHP) and Preference Ranking Organization Method for Enrichment Evaluation (PROMETHEE). The most common response regarding the pair-wise comparison of the criteria has been taken from the questionnaire survey from the mobile phone users.

7.2 Telecom Industry

One of the world's fastest-growing industries is telecommunications. Communication companies in India are on the rise, and this sector has experienced phenomenal growth over the previous decade. India's telecommunications industry is one of the fastest-growing in the world, and it has also constructed the world's second-largest

communication network. The telecom business is an interesting industry to investigate not just because of its unpredictability in terms of technological advancements and strategy, but also because of the industry's tremendous development rate over the last few decades and its considerable contribution to these countries' economies. Over the last two decades, the world economy has changed dramatically as a result of continual development and up-gradation in information and communication technology (ICT). The telecom industry, in particular, has taken the lead in influencing worldwide transformation (Barman and Sengupta, 2017; Francis and Santosh, 2016; Debnath and Shankar, 2008). Making a phone call, utilizing the internet, high-speed data transfer, satellite communications, faxing, video conferencing, cable television, and other aspects of telecommunication are all part of our daily life. The telecommunications business is booming, but it's up against the stiff competition.

It is quite difficult for a telecom service provider (TSP) to thrive in the market unless it develops its operational strategy and increases service quality. In India, mobile phone businesses have had a golden era. Now that the telecom market in India is fast evolving, service providers will need to adapt their marketing and operational strategies (Dwivedi and Sharma, 2011). In the last two decades, India's telecommunications sector has grown significantly (Kumar and Kumar, 2013). India has surpassed China as the world's second-largest telecommunications market. In May 2015, there were 1002 million overall telephone subscriptions, with metropolitan areas accounting for 55.76 percent of telecom subscriptions and rural areas accounting for the remainder. Over the fiscal years 2007–15, the company's telephone subscriber base grew at a CAGR of 19.22% to 1002

million. The teledensity, which is defined as the number of telephone connections per hundred people, has climbed from 18.3 in FY2007 to 79.56 in FY 2015. (TRAI, 2015).

The telecommunications-based infrastructure is critical to a country's economic and industrial development. According to TRAI (2021), the number of telephone customers climbed dramatically in three months, from 1160.52 million at the end of June to 1168.66 million at the end of September, representing a 0.70 percent raise over the previous quarter. India's overall teledensity has increased from 85.85 percent in June to 86.22 percent in September. The country has consistently increased its infrastructure investment. Due to the fast pace of the telecom business, various studies for performance measurement of telephone service providers have been conducted, although the majority of research on telecom service performance is focused on a specific region or circle. To determine the performance of telecom service providers at the country level, extensive research is required.

Some Major Telecom Companies Working in India:

1. **Vodafone Idea Limited**
    - Vodafone Idea Limited is a joint venture between the Aditya Birla Group and the Vodafone Group. It is the largest telecom service provider in India.
    - The company owns the most spectrum of any Indian telecom operator, with 1,849.6 MHz spread across 22 circles, including 1,714.8 MHz of liberalized spectrum, and a market share of 31.5 percent.
    - Based on market share, it will be India's leading telecom operator in 2020.

2. **Reliance Jio**

- Reliance Jio Infocomm Limited, or Jio, is an Indian telecommunications services firm located in two major parts of India namely Mumbai, Maharashtra, and fully owned by Reliance Industries.
- It has a countrywide LTE network that covers all 22 telecom circles and has a 30.8 percent market share.
- The company is ranked second among India's top ten telecom companies.

3. **Airtel**

- Bharti Airtel Limited, also known as Bharti Airtel, was founded in July 1995 and is headquartered in New Delhi. Bharti Airtel Limited is a significant global telecommunications corporation with operations across Asia and Africa in 18 countries.
- The Company, which is headquartered in New Delhi, India, is one of the top three mobile service providers in the world in terms of users. 2G, 3G, and 4G cellular services, mobile commerce, fixed line services, high-speed home internet, DTH, and enterprise services are among the company's product offerings in India (including national & international long-distance services to carriers).
- The company is ranked third among India's top ten telecom companies.

4. Bharat Sanchar Nigam Ltd.

- On September 15, 2000, Bharat Sanchar Nigam Ltd. was formed. It absorbed the former Central Government Departments of Telecom Services (DTS) and Telecom Operations' business of providing telecom services and network management (DTO).
- With effect from October 1, 2000, the company has been run as a going concern. It is one of India's largest and most well-known public sector companies, offering a wide range of communication services.
- In the ICT industry, BSNL is the sole service provider undertaking concentrated efforts and well-planned measures to bridge the rural-urban digital divide. It is India's largest telecom operator, and it is owned by the Indian government. As of 2019, BSNL has 115.87 million cellular phones.

5. MTNL

- The Government of India established MTNL on April 1, 1986, to improve the quality of telecom services, extend the communication network, introduce new services, and raise money to support India's important metro cities' telecom growth needs.
- In 2001, it was listed on the New York Stock Exchange. It is one of India's government-owned telecom companies.

  It provides mobile services in Delhi, including the four outskirt towns of Noida, Gurgaon, Faridabad, and Ghaziabad, as well as Mumbai, including the Mumbai

Municipal Corporation, New Mumbai Corporation, and Thane Municipal Corporation.

7.3 Application of AHP and PROMETHEE

In India, a variety of telecom service companies offer their services. Internet access, 2G, 3G, and 4G cellular mobile phones, landline telephone services, and so on are examples of these services. Only 3G cellular mobile phone service is evaluated for the evaluation of telecom service providers' operational performance due to the complexity of the services. In addition, the majority of Indian consumers use the 3G service, which they use for both phone conversations and internet surfing on smartphones and other devices. In India, 4G services are still in their early stages, and performance and customer feedback will be available in a few years. In India, the number of smartphone users has been steadily expanding. For the operational performance review, those telecom service providers who function in the majority of India's common service areas are examined. Airtel, Aircel, Vodafone, Idea, TATA, Reliance Telecom Limited (RTL), Bharat Sanchar Nigam Limited (BSNL), Mahanagar Telephone Nigam Limited (MTNL), and Reliance Communication are among the telecom service providers (RCOM). Only Mumbai and Delhi are served by MTNL.

The Telecom Regulatory Authority of India collects data on telecom service providers' operational performance (TRAI). The criteria for performance evaluation are also chosen based on the availability of data, which is obtained from TRAI (Govt. of India). Some of the most essential factors for evaluating telecom service providers' performance are outlined below and are used in this study:

***BTS (Base Transceiver Station) accumulated downtime* (C1):** It is concerned with the availability of the network. Network availability will improve if BTS downtime is reduced. Antennas, transceivers, duplexers, and amplifiers make up the system. Any wireless technology, such as CDMA (Code Division Multiple Access), GSM (Global System for Mobile Communications), WiMAX (Worldwide Interoperability for Microwave Access), or Wi-Fi, can be used to create a network.

$$\text{BTSs accumulated downtime (\%)} = \frac{\text{Sum of downtime of BTSs in a month in hours}}{24\times(\text{No. of days in the month})\times(\text{No. of BTSs in the network in the licensed service area})}\times 100$$

Worst affected BTSs due to downtime (C2): If the accumulated downtime in a month exceeds more than 24 hours then BTS is considered as worst affected. Normally, downtime is recorded only when BTS is recorded more than an hour at a time in a day. It can be calculated as:

$$\textit{Worst affected BTSs due to downtime} = \frac{\textit{No. of BTSs having accumulated downtime of} > 24 \textit{ hours in a month}}{\textit{Total No. of BTSs in the licensed service area}}\times 100$$

The call setup success rate (CSSR) (C3): It's the ratio of successful call connection attempts to total call connection attempts for the phoned numbers (due to some reasons not all call attempts end with a connection to the dialed number). In most cases, the ratio is expressed as a proportion of all call attempts.

***SDC Channel (SDCCH) congestion* (C4):** The SDCCH stands for Stand-alone Dedicated Control Channel. It is defined as the chance of SDCCH failing during call setup.

***TCH (Traffic Channel) Congestion* (C5):** In GSM, there are two types of traffic channels: TCH/FS and TCH/HS. TCH/FS denotes a traffic channel with full-rate speech, whereas TCH/HS denotes a traffic channel with half-rate speech. The TCH congestion rate is calculated by dividing the number of TCH assignment failures by the number of TCH seizure requests.

***The dropped-call rate (DCR)* (C6):** It's the percentage of calls that are dropped before the end of the discussion compared to the total number of calls. It's calculated as a percentage of total phone calls.

***Worst affected cells having more than 3% TCH drop (call drop) rate* (C7):** Another metric is the number of areas or locations with a high call drop rate, which is defined as a drop in Traffic Channel Congestion of more than 3%. According to the definition, "average call drop in a service region during a month in which the call drop rate exceeds 3% during cell peak hours."

***Connection with good voice quality (CGVQ)* (C8):** The call is sometimes connected but the voice is distorted, indicating trouble hearing the caller's voice. A high-quality voice connection is a desirable operational feature.

Analytical Hierarchy Process (AHP)

***Step 1*:** AHP pair-wise comparison. Construct a pair-wise comparison matrix,

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{m1} \\ a_{21} & a_{22} & \dots & a_{m2} \\ \dots & \dots & \dots & \dots \\ a_{m1} & a_{m2} & \dots & a_{mm} \end{bmatrix},$$

where aij signifies the comparison of criterion ith to criterion jth, and m specifies the number of criteria. The comparison is based on the feedback from users of the services. Table 7.1 shows a nine-point scale for determining which criterion is more significant and by how much.

Table 7.1: AHP Pair-Wise Comparison Scale

Intensity	Importance	Explanation
1	Equal	Two activities contribute equally to the object
3	Moderate	Slightly favors one over another
5	Strong	Strongly of the over another
7	Very strong	The dominance of the demonstrated in practice
9	Extreme	Evidence favoring one over another of highest possible order of affirmation
2,4,6,8	Intermediate	When compromise is needed
Reciprocals of the above numbers		For inverse comparison

Step 2: AHP Synthesisation.

As indicated in equation, divide each entry (aij) in each column of matrix A by the total of the values of the corresponding column (4). The matrix is now a normalized pair-wise comparison matrix,

$$A' = \begin{bmatrix} \frac{a_{11}}{\sum_{j=1}^{m} a_{j1}} & \frac{a_{12}}{\sum_{j=1}^{m} a_{j2}} & \cdots & \frac{a_{1m}}{\sum_{j=1}^{m} a_{jm}} \\ \frac{a_{21}}{\sum_{j=1}^{m} a_{j1}} & \frac{a_{22}}{\sum_{j=1}^{m} a_{j2}} & \cdots & \frac{a_{2m}}{\sum_{j=1}^{m} a_{jm}} \\ \cdots & \cdots & \cdots & \cdots \\ \frac{a_{m1}}{\sum_{j=1}^{m} a_{j1}} & \frac{a_{m2}}{\sum_{j=1}^{m} a_{j2} \sum_{j=1}^{m} a_{j2}} & \cdots & \frac{a_{mm}}{\sum_{j=1}^{m} a_{jm}} \end{bmatrix}, \quad (4)$$

with m indicating the number of criteria.

Step 3: Compute the average of the entries in each row of matrix A' to yield column vector as shown in equation (5).

$$C = \begin{bmatrix} \frac{\frac{a_{11}}{\sum_{j=1}^{m} \sum a_{j1}} + \frac{a_{12}}{\sum_{j=1}^{m} \sum_{j=1}^{m} a_{j2}} + \frac{a_{1m}}{\sum_{j=1}^{m} \sum_{j=1}^{m} a_{jm}}}{m} \\ \frac{\frac{a_{21}}{\sum_{j=1}^{m} a_{j1}} + \frac{a_{22}}{\sum_{j=1}^{m} a_{j2}} + \frac{a_{2m}}{\sum_{j=1}^{m} a_{jm}}}{m} \\ \cdots \\ \frac{\frac{a_{m1}}{\sum_{j=1}^{m} a_{j1}} + \frac{a_{m2}}{\sum_{j=1}^{m} a_{j2}} + \frac{a_{mm}}{\sum_{j=1}^{m} a_{jm}}}{m} \end{bmatrix} = \begin{bmatrix} c_1 \\ \cdots \\ c_j \\ \cdots \\ c_m \end{bmatrix}, \quad (5)$$

where cj denotes the importance rating of jth criterion.

Step 4: AHP consistency verification.

Multiply each entry in column j of matrix A by cj. Then, divide the summation of values by m to yield the maximum Eigenvalue of matrix A as shown in equation (6).

$$\lambda_{\max} = \frac{\left\{ c_1 \begin{bmatrix} a_{11} \\ a_{21} \\ \dots \\ a_{m1} \end{bmatrix} + c_2 \begin{bmatrix} a_{12} \\ a_{22} \\ \dots \\ a_{m2} \end{bmatrix} + \dots + c_m \begin{bmatrix} a_{1m} \\ a_{2m} \\ \dots \\ a_{mm} \end{bmatrix} \right\}}{m}. \quad (6)$$

Step 5: Compute the consistency index (CI) as shown in equation (7),

$$CI = \frac{\lambda_{\max} - n}{n-1}, \quad (7)$$

where n is the number of criteria or the size of the matrix.

Step 7: Compute the consistency ratio (CR) as shown in equation (8).

$$CR = \frac{CI}{RI(n)}, \quad (8)$$

where RI(n) is a random index of which the value is dependent on the value of n, shown in Table 2.6. If the consistency ratio (CR) is greater than 0.1 then go to step 1 that means the comparison matrix is inconsistent and it needs to be revised.

Table 7.2: List random index values

N	2	3	4	5	6	7	8	9
Rl (n)	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45

After finding the importance of various criteria, the ratings of the TSPs are compared using PROMETHEE

PROMETHEE

Four steps are given for the decision-making in PROMETHEE II (Taillandier and Stinckwich, 2011).

Step 1: The preferred degree for a pair of decisions (a and b) is calculated in this step. If gj(a) and gj(b) are the values of the preference on criteria j for decisions a and b, respectively, then dj(a, b) can be found by subtracting the value of the preference for decisions a from the value of the preference for decisions b concerning a criterion j, as shown in equation (9).

$$d_j(a,b) = g_j(a) - g_j(b) \tag{9}$$

$$P(a,b) = F(d_j(a,b)) \; with \; \forall x \in \;]-\infty, \infty[\, , 0 \le F(x) \le 1.$$

Thus, $0 \le P(a,b) \le 1.$

P (a, b) = 0 no preferences, indifference,

P (a, b) ≈ 0 weak preference g (a) > g (b),

P (a, b) ≈ 1 strong preference g (a) >> g (b),

P (a, b) = 1 strict preference g (a) >>> g (b)

where P(a, b) is the value of the preference degree for two decisions a and b with respect to criterion j. The preference functions are used to find these preference degrees using equation (10). ((,)) F j d ab is an increasing function between 0 and 1. It is the function of the observed deviation (,) j d ab between ( ) j g a and ( ) j g b , which increases if gj(a) – gj(b) is large, and becomes zero if gj(α) ≤ gj(b). To estimate the value of Fj(a, b), six basic types of preference functions are used as discussed in this manuscript, also.

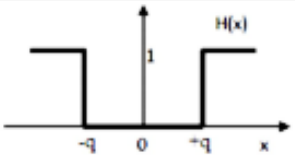
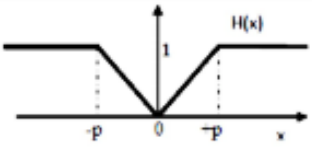
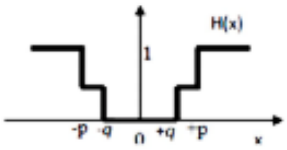
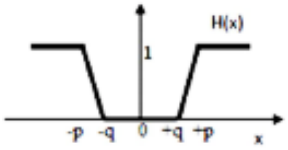
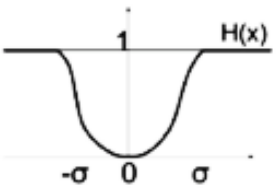
Type of Attributes	Figure	Preference function
Type I: Usual Attribute		$p(x) = \begin{cases} 0 & \forall x \leq 0 \\ 1 & \forall x > 0 \end{cases}$
Type II: Quasi Attribute		$p(x) = \begin{cases} 0, & x \leq q \\ 1, & x > q \end{cases}$
Type III: Attribute with Linear Preference		$p(x) = \begin{cases} \frac{x}{p}, & x \leq p \\ 1, & x \geq p \end{cases}$
Type IV: Level-Attribute		$p(x) = \begin{cases} 0, & x \leq q, \\ \frac{1}{2}, & q < x \leq p \\ 1, & x > p \end{cases}$
Type V: Attribute with Linear Preference and Indifference Area		$p(x) = \begin{cases} 0, & x \leq q \\ \frac{x-q}{p-q}, & q \leq x \leq p \\ 1, & x \geq p \end{cases}$
Type VI: Gaussian Attribute		$p(x) = \begin{cases} 0, & x \leq 0 \\ 1 - e^{-\frac{x^2}{2\sigma^2}} & x \geq 0 \end{cases}$

Figure 7.1: Six basic types of preference functions of PROMETHEE

PROMETHEE proposes six main forms of preference functions, as indicated in Figure 1. Only two parameters (threshold q, p, or s) are to be fixed in each scenario (Brans and Mareschal, 1994; Brans and Vincke, 1985). The Preference threshold (p), Indifference threshold (q), and Gaussian threshold are the three parameters (s). If the difference between the two acts' evaluations is greater than the preference threshold (p), one of the two acts

will be favored. If the difference between the two acts' evaluations is less than the indifference threshold (q), preference will be zero, indicating that there is no difference between them. The difference between 0 and 1 for a criterion produced by two alternative decisions is defined by the preference function.

Step 2: I For each pair of decisions, t is the step for aggregating the preference degrees of all the criteria. A global preference index is defined as π ( ) a b. A weighted average of the preference degrees for the pair of decisions a and b is used to create it. If C is a set of criteria, and wj is the weight given to criterion j, Equation (11) can be used to calculate π ( ) a b:

$$\pi(a,b)=\sum_{j\in C}\left[w_j\times P_j(a,b)\right] \qquad (11)$$

$$\sum_{j\in C} w_j = 1$$

Step 3: With the computation of outranking flows, this phase is utilized to rank the available decisions. For each conceivable decision a, the positive outranking flow φ + (a) and the negative outranking flow φ – (a) are calculated. The positive outranking flow of a possible decision can be computed using equation if A is the set of potential decisions and n is the number of possible decisions (12).

$$\phi^{+}(a)=\frac{1}{n-1}=\sum_{x\in A}\pi(a,x). \qquad (12)$$

The negative outranking flow of a possible decision a is computed by equation (13):

$$\phi^{-}(a)=\frac{1}{n-1}=\sum_{x\in A}\pi(x,a). \qquad (13)$$

Step 4: Using outranking flows, this stage establishes the total ranking of the alternative decisions. The overall ranking is determined by net outranking flows. Equation can be used to compute the net outranking flow φ (a) of a possible decision (14).

$$\phi(a) = \phi^{+}(a) - \phi^{-}(a). \quad (14)$$

The higher the value of a decision's net outranking flow, the better the decision. PROMETHEE has recently been used as an MCDM tool for a variety of applications, including equipment selection (Dadeviren, 2008), material handling equipment selection (Tuzkaya et al., 2010), ranking alternative energy exploitation projects (Goumas and Lygerou, 2000), stock trading (Albadvi et al., 2007), and so on.

The importance of each of the eight attributes described above may or may not be equal. As a result, AHP was used to calculate the relative importance of these criteria. Table 7.3 shows the pairwise comparison, priority in percentage, and rank of the criteria.

The dependability of the criteria's priority score is tested using Equations (6), (7), and (8). (8). The consistency ratio is 0.058, which is less than 0.1, and the major eigenvalue is 8.569.

The Eqns. (1) and (2) are used to calculate the performance rating of telecom service providers on a national level based on several parameters. In PROMETHEE Table 7.2, these ratings are used. The weights of criteria are shown in the second row, the standard values of criteria are shown in the third row, the decision-preference maker's function is shown in the fourth row, and the indifference, preference, and Gaussian thresholds are shown in the fifth, sixth, and seventh rows, respectively. The ratings of the alternatives, i.e. telecom service providers, are displayed in the PROMETHEE Table's remaining rows. The

positive and negative preference flows, as well as the consequent preference flows, are shown in Table 7.3. The CMTSPs are ranked based on the preference flows that result.

Table 7.3: Pair-Wise Comparison and Priority of the Criteria Based on AHP.

		Criteria								Priority	Rank
		C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**		
Criteria	**C1**	1	2	1/7	1/2	1/2	1/7	1/3	1/6	3.7%	8
	C2	½	1	1/5	1	1/2	1/5	1	1/5	4.1%	6
	C3	7	5	1	7	3	2	6	2	29.6%	1
	C4	2	1	1/7	1	1/3	1/5	½	1/5	4.0%	7
	C5	2	2	1/3	3	1	½	2	1	10.3%	4
	C6	7	5	1/2	5	2	1	5	5	27.3%	2
	C7	3	1	1/6	2	1/2	1/5	1	1/4	5.6%	5
	C8	6	5	1/2	5	1	1/5	4	1	15.3%	3

Table 7.4: PROMETHEE Table

Criteria →	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**
Weights →	3.7%	4.1%	29.6%	4.0%	10.3%	27.3%	5.6%	15.3%
Standard value →	<2%	<2%	>98%	<1%	<2%	<2%	<3%	>95%
Preference Function →	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear
Q: Indifference →	0	0	0.98	0	0	0	0	0.95
P: Preference →	0.02	0.02	1.00	0.01	0.02	0.02	0.03	1.00
S: Gaussian →	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Alternatives ↓								
AIRTEL (A1)	0.20	0.53	99.14	0.34	0.48	1.58	2.00	96.34
BSNL (A2)	1.15	1.48	90.23	0.56	0.89	1.97	2.46	90.21
RJIO (A3)	0.19	0.76	99.58	0.00	0.00	0.34	0.44	95.17
VODAFONE (A4)	0.26	1.02	98.92	0.43	0.80	1.74	2.42	98.75
IDEA (A5)	0.26	1.04	98.91	0.39	0.74	1.70	2.37	98.71
MTNL (A6)	0.02	0.04	7.59	0.01	0.05	0.11	0.15	7.62

Table 7.5: Preference Flows

COMPANIES	∅+	∅-	∅	Rank
Airtel (A1)	0.1353	0.1007	0.0347	2
BSNL (A2)	0.0743	0.2268	-0.1525	6
RJIO (A3)	0.3112	0.0144	0.2968	1
Vodafone (A4)	0.1043	0.1349	-0.0306	4
Idea (A5)	0.1079	0.1276	-0.0198	3
MTNL (A6)	0.2730	0.4016	-0.1286	5

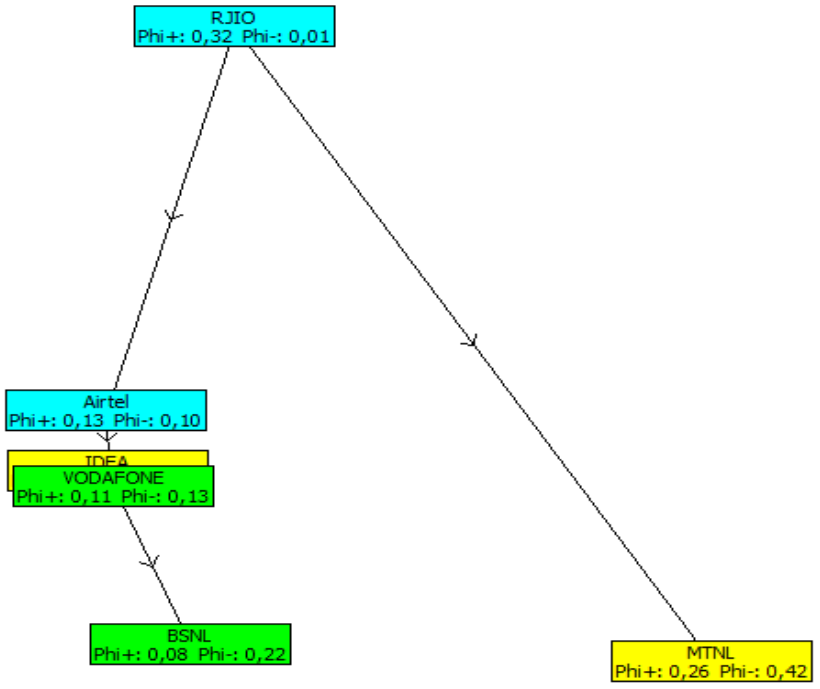


Figure 7.2: PROMETHEE II Complete Ranking

Reliance Jio has the best operational performance in India, according to the report (Figure 7.2). In rural, semi-urban, urban, and metro areas, it has a substantial network. Other telecom service providers provide excellent service as well, but Reliance Jio has a stronger market position, particularly in rural India. The Idea has the third-best

performance, while Airtel has the second-best. The performance of Idea and Vodafone differs only slightly. However, the Idea outperforms the Idea in terms of call setup success rate and BTS cumulative downtime. Vodafone is now ranked fourth in India. Similarly, MTNL and BSNL are ranked fifth and sixth, respectively, in terms of operational performance. According to the data, MTNL has bad performance in terms of BTS accumulated downtime, call setup success rate, congestion rate, good voice quality connection, and so on. MTNL's services are limited to Delhi and Mumbai. Due to the concentration of resources in only two metro centres, MTNL might deliver the finest service, but this is not the case. The quality of service provided by RJIO and Airtel is quite similar. Similarly, the quality of service provided by Idea and Vodafone is pretty similar. As a result, these telecom service providers are fiercely competitive.

7.4 CONCLUSION

The analysis incorporates three key characteristics that include eight criteria for the evaluation of the performance of telecom companies. These three parameters are network availability, connection accessibility, and connection retention. These three-parameter covers the criteria such as base transceiver station accumulated downtime, worst affected BTS due to downtime, call set up success rate, stand-alone dedicated control channel congestion, traffic channel congestion, dropped-call rate, call drop rate, connection with good voice quality. According to the results of the analysis, Reliance Jio is ranked top, Airtel is in second place, Idea is in third, Vodafone is in fourth, and MTNL and BSNL are in fifth and sixth place, respectively, in terms of operational performance. This chapter may aid management in developing a plan of action to improve the company's performance by evaluating operational parameters against this model.

CHAPTER-8

RESULTS AND DISCUSSION

8.1 INTRODUCTION

The results of statistical analysis and mathematical modeling have been summarised in this chapter. Statistical analysis was utilized to determine the effects of one factor on another, while mathematical modeling was employed to determine the rank of service organizations and the hierarchy of relationships between the operational factors.

8.2 Partial Least Square-Structural Equation Modeling

The various factors influencing the performance of service organizations are examined in this research. Through a literature review and statistical analysis utilizing the PLS-SEM approach, many constructs such as service quality, operational management, information system, finance, human resource, marketing, and sustainability were investigated with subfactors. Service quality is recognized as the most significant aspect of a company's survival, growth, and profitability. Therefore, a willingness to deliver high-quality services is vital in the service sector. In today's service processes, customer satisfaction and meeting service quality are essential issues. PLS-SEM is a Structural Equation Models (SEM) methodology that enables the finding of correlations between factors that influence service organization performance. The goal of this research was to determine the quantitative relationship between several elements that influence the quality of service organization performance. These elements have an impact on the overall

performance of a service organization. Service quality and the overall performance of service organizations have an impact on their sustainability.

PLS-SEM was used to observe factor loading of various constructs influencing service organization performance. The PLS-SEM approach was used to develop a model that connects different variables. The inner and outer models are set up at the model specification stage. The relationships between the indicator variables and their respective constructs are evaluated using the outer models, also known as measurement models. The validity of a model is tested using a measurement model. All the constructs have factor loading of more than 0.7. It implies that all statements are trustworthy. Composite reliability is greater than 0.7, and the average variance extracted is greater than 0.5 in this measurement model. The Cronbach alpha is also more than 0.7. All of the variables are substantially linked. As a result, the construct validity requirements of convergent and discriminant validity are met by the measuring scale representing the organization's performance measurement processes.

The inner model, also known as the structural model, depicts the links between the constructs that are being assessed. The link between the constructs is represented by the path coefficient. The path coefficient should be between 0 and 1. The path coefficient value between overall performance and sustainability was found to be 0.816. It demonstrates that an organization's total performance has a significant impact on overall sustainability. The path coefficient value between service quality and overall performance is 0.719. It demonstrates that service quality has a significant impact on overall performance. The entire performance R-square value is 61.8 percent. This indicates that all the constructs considered in the analysis are determining 61.8% of the performance of service

organizations. Rests depend on some other factors/constructs that are to be explored. The values of all endogenous constructs are greater than 50%. Operational performance, financial performance, marketing, information technology, and human resource performance are all intertwined in the organization's success.

Table 8.1 Summary of Hypotheses

Hypothesis	Conclusion
Hypo 1: There is a difference in perception between telecom, banking, and healthcare sectors concerning the practices of environmental sustainability.	Accepted
Hypo 2: There is a difference in perception between telecom, banking, and healthcare sectors concerning operational performance.	Rejected
Hypo 3: There is a difference in perception between telecom, banking, and healthcare sectors concerning human resource management.	Rejected
Hypo 4: There is a difference in perception between telecom, banking, and healthcare sectors concerning informational technology.	Rejected
Hypo 5: The operational performance positively influences the service quality of the organization.	Accepted
Hypo 6: Information system positively influences the service quality of an organization.	Accepted
Hypo 7: Marketing effort positively influences the service quality of an organization.	Accepted
Hypo 8: Human resource planning positively influences the service quality of an organization.	Accepted
Hypo 9: Financial support positively influences the service quality of an organization.	Accepted
Hypo 10: Service quality positively influences the performance of an organization.	Accepted
Hypo 11: Performance of a service organization positively influences its overall sustainability.	Accepted
Hypo 12: Service quality positively influences the sustainability of an organization.	Accepted

All of the hypotheses formulated are accepted except hypothesis 1: "There is no difference in perception between the telecom, banking, and healthcare industries regarding

environmental sustainability policies." The result of the hypotheses testing are summarized in Table 8.1.

8.3 Total Interpretive Structural Modeling

Total interpretive structural modeling leads to the establishment of the causal relationship among the factors and preparation of the hierarchy of the factors as per the driving power and dependence. Customer happiness is not solely determined by the quality of services provided; it can also be influenced by several other factors, some of which are highlighted in this study such as employee empowerment and participation, responsiveness, lead-time reduction, corporate social responsibility, use of information technology and e-commerce, respect for the rule of laws, brand image, and market reputation and so on. The hierarchy of factors influencing service organization performance was derived in this study. Some factors have a direct relationship with other factors (as shown by the solid lines in figure 6.3, chapter 6), while others have transient relationships (as shown by the dotted lines in figure 6.3, chapter 6). Only vital and relevant relationships are shown with a transitory relationship. Transient relationships aren't all that important. Top management commitment is the most essential component that determines all of the factors that affect an organization's performance. It consists of the vision, trade policy, leadership, employee motivation, coordination, and so forth. Top management is in charge of the entire organization and provides leadership to help it achieve its objectives. It benefits the employee, the consumer, and society as a whole. It is linked to social responsibility as well as a few other significant variables. Many authors have already placed the highest significance to top management commitment in the literature on performance assessment

(Kumar et al., 2018; Zakuan et al., 2012); Arshida and Agil, 2013; Kumar et al., 2008). In this study, top management commitment is found at the bottom of the TISM hierarchy, indicating considerable driving power and low dependence. It also lies in the fourth cluster of the dependence-driving power diagram indicating high driving power and less dependence (Figure 6.2, Chapter 6).

In today's world, information technology has become an integral aspect of business operations. It applies to the majority of the organization's functions. It might be used in supply chain coordination and integration, forecasting, inventory, e-commerce, business-to-business communication, business-to-customer communication, customer relationship management, supplier relationship management, automation, and so on. Chen and Hsiao (2012), have emphasized the relevance of information technology (2008) in performance improvement. In this study, it lies at the 9th level of the hierarchy, i.e. just above the bottom which indicates the high driving power and less dependence. It also lies in the fourth cluster of the dependence-driving power diagram indicating high driving power and less dependence. This study confirms the results from earlier studies that top management commitment has the highest priority.

The performance cannot be measured only in terms of the profit earned by the organization. It also includes the efforts made by the organization for corporate social responsibility, environmental protection, and respect for the rule of law. Ethics, e-commerce, etc. These factors lie in the 8th level of the hierarchy. The management of an organization always has some social linkage and should invest some of the profits in social welfare up to some extent. Social welfare may include education to poor people, sanitation and clean water, elimination of poverty, infrastructure development, etc. Also, the

management should respect the rule of law in terms of emission control and environmental protection. E-commerce is also useful in minimizing lead-time and managing relationships with stakeholders. The importance of these factors has also been highlighted by Jiang et al. (2016); Li et al. (2013), and Zurn et al. (2012).

Flexibility is a tool to accommodate the change required in the systems as per the requirement of the market. The systems must be flexible to change themselves for changes in the design and demand of products and services. Flexibility is the tool to improve customer satisfaction as per their requirement. Another tool to make the customer satisfied is transparency in dealing with various business activities. The systems must be transparent for all and able to deal with the customers with ethics and responsibility. Employee-related factors are very important, especially in the service organization. The employee or the service providers are in direct contact with the customers; and the behavior, individual attention on the customer, fast response, and ability to provide reliable and promised services to the customer are an integral part of the employee. An employee can provide all the above-mentioned services only when they are motivated and empowered sufficiently. Thus, employee empowerment and job security influence the performance of the employee. All these factors (flexibility, transparency in customer dealing, employee empowerment, and job security) are responsible for customer satisfaction and demand management and lie at the 7th level of the hierarchy of the TISM. The importance of these factors is also highlighted by Herzog et al. (2014), Wachsen and Blind (2011), Altuzarra and Serrano (2010), Backes and Tour (2010), Rawlins (2009), Bateman and Snell (2007).

The factors at the 6th level of the hierarchy of the TISM are also the subsets of the employee-related behaviors such as responsiveness of service providers, employee

participation in decision making, employee satisfaction, and retention. These factors are derived from employee empowerment and job security which affect the working performance of the employee. The importance of these factors is also highlighted by Masrurul (2019), Pakurar et. al., (2019), Pradhan and Jena (2017), Ariani (2015). These factors lie in the first and second clusters of the dependence-driving power diagram and are more dependent on the other factors.

Lead-time reduction and quality improvement lie at the 5th level of the hierarchy. The lead-time can be reduced with proper coordination and collaboration, cooperation of the employee, flexibility, use of information technology, etc. Quality improvement means the elimination of the gap between customer expectation and perception. All the factors at the bottom such as employee empowerment, employee participation, use of information technology, customer focus are the philosophies of total quality management. The factors, lead-time reduction, and quality improvement lie in the second cluster of the dependence-driving power diagram which shows more dependency and less driving power. These factors are also highlighted by Moore et al. (2019), Jaff and Ivanov (2016), and Karki (2012).

After the quality, the cost is an important factor that influences the customer. This can be minimized by maintaining the quality, eliminating the wastes, increasing the economy of scale, use of optimal design and development of products and services, etc. It lies at the 4th level of the hierarchy and in the second cluster of the dependence-driving power diagram. It has a high dependency on other factors and less driving power. The cost has already been an important parameter for the performance measurement as highlighted by Beamon and Balcik (2008).

Customer retention is a big indicator of the performance of an organization. The customers can only be retained when they can be provided the right services at the right time at minimum costs. Thus, on-time delivery of services with minimum cost and quality of the services plays an important role in the retention of the customer. Customer retention may be called a mirror for the performance evaluation of an organization. It lies at the 3rd level of the hierarchy and has the highest dependency on many factors as shown at the bottom of the hierarchy. Its importance has also been observed by Kim et al. (2015), Hossain and Suchy (2013), Kumar and Vandana (2011), Williams and Nauman (2011).

Brand image lies at the 2nd level of the hierarchy of the TISM. The large market size or high customer retention is the indicator of the good brand image of an organization. It has a high dependency on the other factors responsible for the good performance of an organization. Lastly, the performance of the service organization is highly correlated with the brand image of the organization. A good brand image means a high performance of the organization. It has the highest dependency on all the other factors as shown in the hierarchy. Its importance has also been observed by Kotler and Keller (2016).

The main similarity of the study regarding the previous research is the identification of the factors influencing service performance as all these factors are extracted through the literature review. In most of the previous research articles, the performance of the service providers and the quality of the services are determined using these factors. Many articles are concerned with the improvement of service quality and profit earning of the organization. Correlation and regression analysis has been used in many research articles. But very few articles have been devoted to observing the direction and interpretation of the linkage between the factors. Also, in this study, more focus is given to the well-being of

the consumers and employees as a part of the transformative services. Qualitative and subjective aspects of the factors (such as corporate social responsibility, respect for rules of law, transparency in customer dealing, employee participation, empowerment, satisfaction, customer satisfaction, and retention, etc.) and interpretation of the linkage between them are the major contribution of the study. To improve the service performance including the well-being of the employees, consumers, and society to know the exact interrelationship between these factors is very important.

Nowadays, organizational performance doesn't only depend on the quality of products and services and certain business activities but also the factors related to the well-being of consumers and the welfare of employees and societies. In this study, it has been observed that many factors are required for subjective assessment for performance analysis of a service organization. The proper relationship with service providers and customers with welfare initiatives for the society is very important to build a brand image/ market reputation that shows the overall performance of the organization. This study also shows that the top management commitment towards the implementation of information technology, corporate social responsibility, employee empowerment and participation, customer satisfaction plays an important role. It has been observed that the factors related to the wellness of employees, consumers, and broader society play an important role in the overall performance of a transformative service organization due to the fully awake customers. It has been observed that the top management commitment, use of IT and e-commerce, corporate social responsibility, respect for the rule of law have more driving power. They affect employee satisfaction, customer satisfaction, quality improvement, cost reduction, etc., and also help in achieving a higher brand image/market reputation. Top

Management Commitment has high driving power and is the most important.

8.4 Analytical Hierarchy Process and Preference Ranking Organization Method for Enrichment Evaluation

This research aimed to develop a complete method for ranking and selecting cellular mobile phone service providers in India. The selection of the best service provider is a crucial issue for service subscription, and it can be solved using an outranking strategy, such as the AHP and PROMETHEE combined approach. Various characteristics and sub-parameters must be considered before deciding on which telecom service providers to choose, to establish and recognize every last trace of critical criteria such as network availability (BTS accumulated downtime and worst affected BTS due to downtime), connection accessibility (call setup success rate, channel congestion, and TCH congestion) and connection retainability (call drop rate, TCH drop and connection with good voice quality). The service providers should have lower values of BTS accumulated downtime, channel, and TCH congestion and call drop rate; whereas they should have higher values of call setup success rate and connection with good voice quality.

For operational performance measurement of cellular mobile telephone service providers, various states in India were evaluated and weighted based on the number of subscribers. Because the importance rating of the criteria is based on the majority of the users' opinions, the analysis result can vary from one decision-maker to the next. The call drop rate is currently India's most serious problem. It has been deemed a major concern by India's Telephone Regulatory Authority. Reliance Jio has the lowest call drop rate and the greatest call setup success rate, according to research. This is why Reliance Jio is at the top of the list. The call drop rate for BSNL is the highest, and the call setup success rate is the

lowest. This is why BSNL is ranked last, and they should address these concerns to enhance their performance, as the telecom sector in India is rapidly growing and very competitive.

This research uncovered the factors that contribute to a service provider's negative rating. It's crucial to have a low call drop rate and a high call setup success rate. The Telecom Regulatory Authority of India is quite concerned about these characteristics. The combination of AHP and PROMETHEE gives a framework for academics to rank service providers based on a variety of criteria and subcategories.

This research may aid managers and CMTSPs in focusing on lagging areas to improve service quality. It also serves as a benchmark for other service providers by using the service levels of a top-ranked service provider. A corporation can attract additional telecom service users by improving the quality of its offerings. As a result, one of the most essential concerns of service providers to remain in competitive markets would be service quality. Reliance Jio is considered to have the best operational performance in India. Airtel is in second place, Idea is in third, Vodafone is in fourth, and MTNL and BSNL are in fifth and sixth place, respectively, in terms of operational performance.

Table 7.3, Chapter 7 shows the positive and negative preference flows with resultant preference flows. Based on resultant preference flows the ranking of the CMTSPs is decided. The result shows that the maximum φ value is 0.2968 for Reliance Jio. It shows Reliance Jio has the first ranking. The second maximum φ value is 0.0347 for Airtel. It shows Airtel has the second-ranking. The idea has the third ranking with φ value -0.0198. Vodafone has the fourth-ranking with φ value -0.0306. MTNL has the fifth ranking with φ value -0.1286. BSNL has the sixth ranking with a φ value of -0.1525. Figure 8.1 shows the mapping of gaps, objectives, hypotheses, and models.

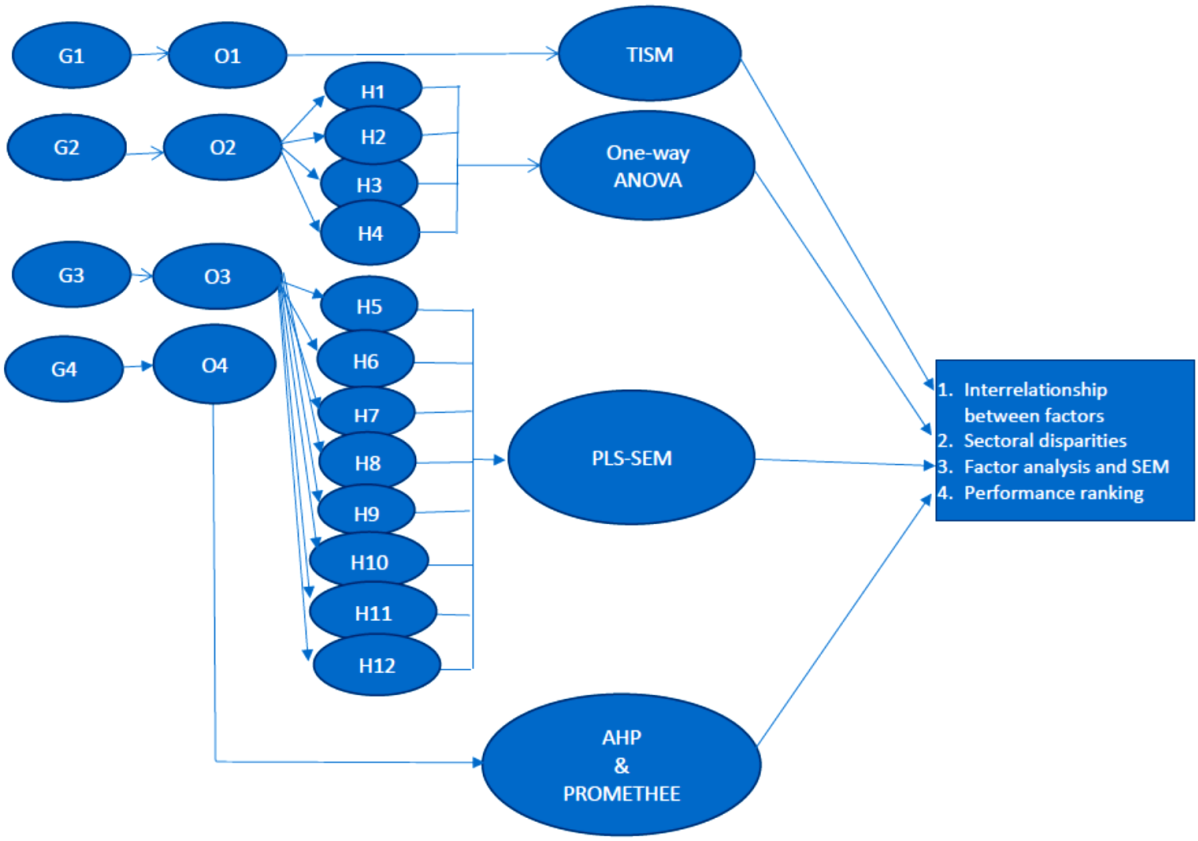


Figure 8.1: Mapping of Gaps, Objectives, Hypotheses, and Models.

8.5 CONCLUSION

In this chapter, the results obtained through the various statistical and mathematical analyses were discussed. These analyses are Partial least square structural equation modeling, Total interpretive structural modeling, AHP and PROMETHEE, Hypotheses testing. The research's primary findings are discussed in this chapter. There are some drawbacks to the research. In Chapter 9, the limitations and future scope of this research are highlighted.

CHAPTER-9

SUMMARY, LIMITATIONS, AND SCOPE OF FUTURE WORK

9.1 INTRODUCTION

This study was conducted to address some of the gaps in contemporary research on factors influencing service organization performance. The opinion of various stakeholders was taken through a qualitative survey and analyzed using statistical and other mathematical analysis. This chapter summarises the results and presents the limitations and scope of future work.

9.2 SUMMARY OF WORK DONE

In this section, the major work done in this research is summarized as given below:

- An extensive literature review has been conducted to identify the factors influencing the performance of service organizations and some literature gaps were identified to find the issues related to performance measurement and improvement.
- A set of research hypotheses is formulated based on a literature review and discussions with academia and industry experts.
- A questionnaire was designed and administrated to elicit replies from industry experts and users in three different service sectors: telecommunications, banking, and hospitals. The replies to the survey allowed us to learn about industry perspectives of various challenges affecting the performance of these service

sectors in India. Some operational concerns regarding the performance of service organizations, such as significant areas of investment, marketing performance, human resource considerations, and environmental and socio-economic sustainability elements were the major part of the questionnaire. The content and construct validity, reliability, descriptive statistics, and statistical analysis were used to analyze the response/information gathered.

- The case studies involving three different sectors were conducted to observe the current practices in the service organizations. These sectors are telecom, banking, and healthcare. PLS-SEM approach was used to examine to extent of relationships among the performance-related factors. Total interpretive structural modeling was also used to interpret the relationship among the operational factors.
- In the telecom industry, a case study was conducted using AHP and PROMETHEE combined techniques to rank the performance of service organizations.

9.3 Major Findings from the Research

The findings are linked to a research gap concerning sectoral differences in employees' perceptions of factors; the factors used in the performance measurement model for service organizations, including the triple bottom line of sustainability; and the measurement of operational performance of telecom companies providing cellular mobile phone services.

- Some major factors observed through this study are top management commitment, corporate social responsibility, respect for the rules of law, and transparency in dealing. The details of these factors are established through the partial least square structural equation modeling as shown in Figure 5.1, Chapter 5. The causal

relationship amongst the operational factors are established through total interpretive structural modeling as shown in Figure 6.3, Chapter 6. The factors lying at the bottom of the hierarchy of the TISM have influence on all the other factors directly or indirectly.

- It has been observed that all the three sectors (Banking, healthcare, and telecom) differ in terms of environmental sustainability-related practices but there was no significant difference was observed related to IT application, operational performance, and human resource-related issues. Thus, the environmental sustainability related issues vary from one organization to another.
- The partial least square-structural equation modeling was used to test the hypotheses related to performance evaluation concerning the triple bottom line. The factors concerned with the triple bottom line are shown in Figure 5.1, Chapter 5.
- An integrated model of AHP & PROMETHEE was used to find the rank of the performance of some major telecom service providers in India. It was observed that Reliance Jio, Airtel were at the top considering the operational performance. Considering the performance at the country level. Reliance Jio is performing well. The major competitor of Jio was Airtel which is having approximately same performance. Rest of the telecom companies incorporated for performance measurement were Vodafone, Idea, MTNL, BSNL (Figure 7.1, Chapter 7).

9.4 IMPLICATIONS OF THE RESEARCH

9.4.1 Implication for Academics

The research has several important consequences for academics.

- The research gaps observed in this thesis can be used as a foundation for future research on service organization performance measurement addressing the various issues in the service organization. These issues may be concerned with internal practices, policy, employee, customer, social implications, environmental impact, marketing and information systems, etc.
- The questionnaire produced in this study could be utilized to conduct other empirical studies in service organizations.
- This research leads to the use of methodologies to connect the various factors that influence service performance. These methodologies may be used further at a larger scale considering other concerned organizations.
- SMART-PLS is used to examine the hypotheses in this study. This tool may be used further to incorporate some more factors to conduct exhaustive research.

9.4.2 Implications for Managers

- The extensive literature review and its outcome could assist service managers in identifying the critical factors that influence organizational performance. These factors may help the manager to improve the specific performance of the organization.
- This study may help the manager to define the criteria to evaluate the current practices used in the organization.
- The interplay of the components may assist the management in determining the causal relationships between the factors and their impact on overall performance.

9.5 Limitations and Scope of Future Work

- This study, like every research, has some limitations. These limitations are mentioned also in this section, which may lead to finding the scope of future research.
- The TISM model is unable to provide information on the degree to which one component affects another, i.e. the degree of influence. Furthermore, this model does not provide a performance index for comparing one organization's performance to that of another. Thus, some other models can be extracted which leads to finding the extent of influence of one factor over another. Also, it may be focused on finding the performance index.
- The statistical analysis of the data gathered from the respondents is the second limitation. The analysis is based on the respondents'/experts' opinions. The opinions expressed by the respondents may be biased or influenced by some other factors. However, the mean and standard deviation were also measured in the analysis.
- Other limitations are related to the factors involved in the statistical analysis. Some more factors may need to be explored as per the nature of service operations and the service organizations.
- The case companies in this study are market leaders in their respective fields. But, these limited case studies can not be the representative of entire service organizations. Thus, some more organizations leading to different specialization in the service sector may be considered for further analysis.
- The Total interpretive structural modeling is used for the analysis of only

operational factors of telecom companies. Some more concerned factors concerned with the overall performance of the companies may be further explored.

9.6 CONCLUSION

This research incorporates a number of ways to analyze the facts related to the performance measurement of service organizations. Various tools such as the Partial least square method- Structural equation modeling, total interpretive structural modeling, Analytical hierarchy process, and Preference ranking organization method of enrichment evaluation have been used to fulfill the objective and test the various hypotheses.

AHP and PROMETHEE integrated incorporate three key characteristics that consist of eight criteria: network availability, connection accessibility, and connection retention. According to the results of the analysis, Reliance Jio is ranked top, while BSNL is ranked last based on the operational parameter (used by TRAI). The case study may assist the management in developing a plan of action to improve the company's performance.

Total interpretive structural modeling was used to investigate the relationship between the factors impacting the performance of an organization offering transformative services (TISM). Top management dedication and leadership have been seen to play an essential role in leading the organization. Top management commitment including corporate social responsibility, respect for the rules of law, and transparency in dealing entails dedication to businesses and properly leading the employees to improve performance and customer satisfaction.

This study may help the management in determining the essential factors that influence organizational performance. The interaction between the factors may help the manager in determining the link between one factor and another for performance improvement. This study can also be used to rank different service organizations in a specific industry.

- Information technology, e-commerce, corporate social responsibility, and respect for the rule of law are some of the variables that have a strong driving force. Other elements with a high driving force influence an organization's performance in terms of employee happiness and retention, employee empowerment, staff involvement, customer retention, lead time reduction, cost minimization, and brand image.
- Operational performance, financial performance, information technology performance, and human resource performance are all tied to the organization's performance. The effect of factor loading on the performance of various structures has been examined using partial least square structural equation modeling.
- This thesis has addressed the various issues related to the performance of the service organization. The performance leads to various areas such as operations, marketing, information systems, marketing, information systems, and human resource management.

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APPENDIX 1
QUESTIONNAIRE

Delhi Technological University, Delhi
Department of Mechanical Engineering,
Shahbad-Daulatpur, Bawana Road,
Delhi-110042

Research Supervisors: Dr. Pravin Kumar **Mobile: 9818273764**

Subject: Study of Factors Influencing the Performance of Service Organization

Dear sir/Madam,

Nowadays, the role of service organizations in the economy of most of the country is increased. Thus, the performance of the service organization has become an important area of research. As a part of Ph.D. research we are conducting a survey to assess the performance of different types of service organizations including the rating of the factors influencing the overall performance of the organizations. To make it possible, the industry and academia must share their views. Your feedback in this regard will give a significant values to this study. We request you to spare some time in responding to the enclosed questionnaire.

We would be grateful to you if you fill the questionnaire and return back to me. The objective of the survey is purely research and academic oriented; therefore, all responses will be kept confidential.

With kind regards

Garima Sharma

Respondent profile

1. Name (if you please): Your E-mail (if you please):
2. Designation:
(a) CEO [ ] (b) Sr. Manager [ ] (c) Manager [ ] (d) Supervisor [ ] (e) junior staff (f) customer [ ]
3. Your functional area:
(a) Operations [ ] (b) IT/MIS [ ] (c) Marketing [ ] (d) Finance [ ] (e) HR [ ]
4. Your association in years with current organization:
(a) Less than 5 [ ] (b) 5-7 [ ] (c) 8-10 [ ] (d) More than 10 [ ]
5. Would you like to share the findings of the survey (a) Yes [ ] (b) No [ ]

Section1: Organization profile

1. Please indicate the type of your organization:
(A) Telecom Service provider (B) Banking Organization (C) Health care organization
[ ] [ ] [ ]

2. Please indicate your company approximate annual turnover in crores:
(A) Under 5 (B) 5-10 (C) 10-50 (D) 50-100 (E) Over 100 (F) Can't say
[ ] [ ] [ ] [ ] [ ] [ ]

3. Please indicate the average annual profits during the last three years:
(A) Increased up to 10% (B) More than 10% (C) Almost Constant (D) Decreased up to 10% (E) Don't know
[ ] [ ] [ ] [ ] [ ]

Section 2

4. Where do you rate the following parameters for more customer satisfaction:
Rate on a 5-point marking scale

Most Important **Least Important**

	1	**2**	**3**	**4**	**5**
A. Reliability					
B. Responsiveness					
C. Empathy					
D. Assurance					
E. Tangibility					

5. Provide the importance of the following factors for better operational performance:
Rate on a 5-point marking scale

Least Important **Most important**

	1	**2**	**3**	**4**	**5**
A. Lead time reduction					
B. Quality improvement					
C. Productivity improvement					
D. Facility location and layout					
E. Products/ services customization					
F. Cost minimization					

6. How the following factors influence the marketing performance
Rate on a 5-point marking scale

	Least influential 1	2	3	4	Most influential 5
A. Market share					
B. Market reputation/ brand image					
C. Flexibility					
D. Agility					
E. Market penetration					
F. Customer loyalty/ retention					

7. How the following factors influence the performance of human resources management:
Rate on a 5-point marking scale

	Least influential 1	2	3	4	Most influential 5
A. Employee satisfaction and retention					
B. Employee empowerment					
C. Incentives to employee					
D. Employee participation					
E. Training and development					
F. Job security					
G. Innovation and creativity					

8. How the following factors are important to improve the information technology services:
Rate on 5-point marking scale

	Least important 1	2	3	4	Most important 5
A. Use of IT software					
B. Digitization of the processes					
C. Integration of activities					
D. Interdepartmental coordination					
E. Use of e-commerce					
F. Elimination of information gap					

9. How the following factors are important to measure the financial performance of your company:
Rate on 5-point marking scale

	Least important 1	2	3	4	Most important 5
A. Annual turnover					
B. Liability					
C. Operating cash flow					
D. Working capital					

E. Current ratio					
F. Debt equity ratio					
G. Return on equity					

10. Where do you rate the following factors to make your organization environmentally sustainable?
Rate on a 5-point marking scale

	Least important 1	2	3	4	Most important 5
A. Top management commitment					
B. Environmental awareness of employees and customers					
C. Implementation of government rules and regulations					
D. Use of non-hazardous material					
E. Green packaging					
F. Implementation of environmental management systems					
G. Energy consumption and efficiency					
H. Water consumption and efficiency					
I. Resource circulating					
J. Control of hazardous waste and radiation					

11. Where do you rate the following factors to make your organization social sustainability?
Rate on a 5-point marking scale

	Least important 1	2	3	4	Most important 5
A. Cooperate social responsibility					
B. Avoid child labor					
C. Human rights					
D. Product responsibility					
E. Health and safety					
F. Transparency in the business activities					
G. Ethical behavior					
H. Respect for stack holder interest					
I. Respect for rule of law					
J. Respect for international norms					

12. Where do you rate the following factors to improve the economical sustainability of your organization?
Rate on a 5 point marking scale

	Least important 1	2	3	4	Most important 5
A. Innovation to reduce cost					
B. Local infrastructure development					
C. Investment in Research and development					

D. Investment in preventive environmental measures					

13. Where do you rate the following factors which contribute to the overall performance of the organization: Rate on 5 point marking scale

	Least important				Most important
	1	2	3	4	5
A. Revenue Growth					
B. Sustainable Operation and IT					
C. Human Resource					
D. Market Growth					

Section 3

14. Please rate the importance of one criteria over the other criteria on Sarty's 9 point rating scale

14.1 BTSs accumulated downtime Vs Worst affected BTSs due to downtime

14.2 BTSs accumulated downtime Vs Call setup success rate

14.3 BTSs accumulated downtime Vs SDC Channel congestion

14.4 BTSs accumulated downtime Vs Traffic Channel Congestion

14.5 BTSs accumulated downtime Vs Dropped Call Rate

14.6 BTSs accumulated downtime Vs Worst affected Cells TCH drop Rate

14.7 BTSs accumulated downtime Vs Connection with good voice quality

14.8 Worst affected BTSs due to downtime Vs Call setup success rate

14.9 Worst affected BTSs due to downtime Vs SDC Channel congestion

14.10 Worst affected BTSs due to downtime Vs Traffic Channel Congestion

14.27 Dropped Call rate Vs Connection with good voice quality 

14.28 Worst affected Cells TCH drop Rate with Connection with good voice quality 

Section 4: Interpretation of Relationship between factors

Factor	Factors' Relation-ship	Paired Comparison of Factors	Yes/No	In what way, a factor will influence or help in enabling the other, Give the reason.
F1: Performance of Service Organization				
F1	F1 – F18	Performance of service organization leads to Respect for rule of law.		
	F18 – F1	Respect for rule of law leads to performance of service organization		
	F1 – F17	Performance of service organization leads to Transparency in customer dealing.		
	F17 – F1	Transparency in customer dealing leads to performance of service organization		
	F1 – F16	Performance of service organization leads to Corporate social responsibility.		
	F16 – F1	Corporate social responsibility leads to performance of service organization		
	F1 – F15	Performance of service organization leads to top management commitment.		
	F15 – F1	Top management commitment leads to performance of service organization		
	F1 – F14	Performance of service organization leads to E- commerce.		
	F14 – F1	E-commerce leads to performance of service organization		
	F1 – F13	Performance of service organization leads to Use of IT.		
	F13 – F1	Use of IT leads to performance of service organization		
	F1 – F12	Performance of service organization leads to Job security.		
	F12 – F1	Job security leads to performance of service organization		

	F1 – F11	Performance of service organization leads to employee empowerment.		
	F11 – F1	Employee empowerment leads to performance of service organization		
	F1 – F10	Performance of service organization leads to Employee satisfaction and retention.		
	F10 – F1	Employee satisfaction and retention leads to performance of service organization		
	F1 – F9	Performance of service organization leads to flexibility.		
	F9 – F1	Flexibility leads to performance of service organization		
	F1 – F8	Performance of service organization leads to Brand image / Market reputation.		
	F8 – F1	Brand image/market reputation leads to performance of service organization.		
	F1 – F7	Performance of service organization leads to cost minimization.		
	F7 – F1	Cost minimization leads to performance of service organization.		
	F1 – F6	Performance of service organization leads to employees participation.		
	F6 – F1	Employee participation leads to performance of service organization.		
	F1 – F5	Performance of service organization leads to quality Improvement.		
	F5 – F1	Quality improvement leads to performance of service organization.		
	F1 – F4	Performance of service organization leads to lead time reduction.		
	F4 – F1	Lead Time reduction leads to performance of service organization.		
	F1 – F3	Performance of service organization leads to responsiveness of service providers.		
	F3 – F1	Responsiveness of service providers leads to performance of service organization.		
	F1 – F2	Performance of service organization leads to customer retention.		

	F2 – F1	Customer retention leads to performance of service organization.		
F2: Customer Retention				
F2	F2 – F18	Customer retention leads to respect for rule of law.		
	F18 – F2	Respect for rule of law leads to customer retention		
	F2 – F17	Customer retention leads to transparency in customer dealing.		
	F17 – F2	Transparency in customer dealing leads to customer retention		
	F2 – F16	Customer retention leads to Corporate social responsibility.		
	F16 – F2	Corporate social responsibility leads to customer retention.		
	F2 – F15	Customer retention does not lead to Top management commitment.		
	F15 – F2	Top management commitment leads to customer retention		
	F2 – F14	Customer retention does not lead to E- commerce.		
	F14 – F2	E-commerce leads to customer retention		
	F2 – F13	Customer retention does not lead to Use of IT.		
	F13 – F2	Use of IT leads to customer retention		
	F2 – F12	Customer retention does not lead to Job security.		
	F12 – F2	Job security leads to customer retention.		
	F2 – F11	Customer retention leads to Employee empowerment.		
	F11 – F2	Employee empowerment leads to customer retention.		
	F2 – F10	Customer retention leads to Employee satisfaction and retention.		
	F10 – F2	Employee satisfaction and retention leads to customer retention.		
	F2 – F9	Customer retention leads to Flexibility.		
	F9 – F2	Flexibility leads to customer retention		
	F2 – F8	Customer retention leads to brand image/market reputation.		

	F8 – F2	Brand image/market reputation leads to customer retention		
	F2 – F7	Customer retention leads to cost minimization.		
	F7 – F2	Cost minimization leads to Customer retention.		
	F2 – F6	Customer retention leads to Employees participation.		
	F6 – F2	Employee participation leads to customer retention.		
	F2 – F5	Customer retention leads to Quality Improvement		
	F5 – F2	Quality improvement leads to Customer retention.		
	F2 – F4	Customer retention leads to lead time reduction.		
	F4 – F2	Lead Time reduction leads to Customer retention.		
	F2 – F3	Customer retention leads to responsiveness of service providers.		
	F3 – F2	Responsiveness of service providers leads to customer retention.		
F3: Responsiveness of Service Providers				
F3	F3 – F18	Responsiveness of service providers leads to Respect for rule of law.		
	F18 – F3	Respect for rule of law leads to Responsiveness of service providers		
	F3 – F17	Responsiveness of service providers leads to transparency in customer dealing.		
	F17 – F3	Transparency in customer dealing leads to responsiveness of service providers		
	F3 – F16	Responsiveness of service providers leads to corporate social responsibility.		
	F16 – F3	Corporate social responsibility leads to responsiveness of service providers		
	F3 – F15	Responsiveness of service providers leads to top management commitment.		
	F15 – F3	Top management commitment leads to responsiveness		
	F3 – F14	Responsiveness of service providers leads to E- commerce.		

	F14 – F3	E-commerce leads to responsiveness of service providers		
	F3 – F13	Responsiveness of service providers leads to Use of IT.		
	F13 – F3	Use of IT leads to responsiveness of service providers.		
	F3 – F12	Responsiveness of service providers leads to Job security.		
	F12 – F3	Job security leads to responsiveness of service providers		
	F3 – F11	Responsiveness of service providers leads to employee empowerment.		
	F11 – F3	Employee empowerment leads to Responsiveness of service providers		
	F3 – F10	Responsiveness of service providers leads to Employee satisfaction and retention.		
	F10 – F3	Employee satisfaction and retention leads to Responsiveness of service providers		
	F3 – F9	Responsiveness of service providers leads to Flexibility.		
	F9 – F3	Flexibility leads to responsiveness of service providers		
	F3 – F8	Responsiveness of service providers leads to brand image/market reputation.		
	F8 – F3	Brand image/market reputation leads to Responsiveness of service providers		
	F3 – F7	Responsiveness of service providers leads to Cost minimization.		
	F7 – F3	Cost minimization leads to Responsiveness of service providers		
	F3 – F6	Responsiveness of service providers leads to Employees participation.		
	F6 – F3	Employee participation leads to Responsiveness of service providers.		
	F3 – F5	Responsiveness of service providers leads to Quality Improvement.		
	F5 – F3	Quality improvement leads to responsiveness of service providers.		
	F3 – F4	Responsiveness of service providers leads to Lead- time reduction.		
	F4 – F3	Lead Time reduction leads to Responsiveness of service		

		providers.		
F4: Lead-Time Reduction				
F4	F4 – F18	Lead Time reduction leads to Respect for rule of law.		
	F18 – F4	Respect for rule of law leads to Lead Time reduction		
	F4 – F17	Lead Time reduction leads to transparency in customer dealing.		
	F17 – F4	Transparency in customer dealing leads to Lead Time reduction		
	F4 – F16	Lead Time reduction leads to Corporate social responsibility.		
	F16 – F4	Corporate social responsibility leads to Lead Time reduction.		
	F4 – F15	Lead Time reduction leads to Top management commitment.		
	F15 – F4	Top management commitment leads to lead- time reduction		
	F4 – F14	Lead Time reduction leads to E-commerce.		
	F14 – F4	E-commerce leads to lead time reduction		
	F4 – F13	Lead Time reduction leads to Use of IT.		
	F13 – F4	Use of IT leads to lead time reduction.		
	F4 – F12	Lead Time reduction leads to Job security.		
	F12 – F4	Job security leads to Lead Time reduction		
	F4 – F11	Lead Time reduction leads to Employee empowerment.		
	F11 – F4	Employee empowerment leads to Lead Time reduction		
	F4 – F10	Lead Time reduction leads to employee satisfaction and retention.		
	F10 – F4	Employee satisfaction and retention leads to lead Time reduction.		
	F4 – F9	Lead Time reduction leads to flexibility.		
	F9 – F4	Flexibility leads to lead-time reduction.		
	F4 – F8	Lead Time reduction leads to brand image/market reputation.		
	F8 – F4	Brand image/market reputation leads to lead time reduction.		

	F4 – F7	Lead Time reduction leads to cost minimization.		
	F7 – F4	Cost minimization leads to lead time reduction		
	F4 – F6	Lead Time reduction leads to employee participation.		
	F6 – F4	employee participation leads to lead time reduction		
	F4 – F5	Lead Time reduction leads to quality improvement.		
	F5 – F4	Quality improvement leads to Lead Time reduction		
F5: Quality Improvement				
F5	F5 – F18	Quality improvement leads to Respect for rule of law.		
	F18 – F5	Respect for rule of law leads to quality improvement		
	F5 – F17	Quality improvement leads to transparency in customer dealing.		
	F17 – F5	Transparency in customer dealing leads to quality improvement		
	F5 – F16	Quality improvement leads to corporate social responsibility.		
	F16 – F5	Corporate social responsibility leads to quality improvement		
	F5 – F15	Quality improvement leads to top management commitment.		
	F15 – F5	Top management commitment leads to quality improvement		
	F5 – F14	Quality improvement leads to E-commerce.		
	F14 – F5	E-commerce leads to quality improvement		
	F5 – F13	Quality improvement does not lead to use of IT.		
	F13 – F5	Use of IT leads to quality improvement		
	F5 – F12	Quality improvement leads to Job security.		
	F12 – F5	Job security leads to quality improvement.		
	F5 – F11	Quality improvement leads to Employee empowerment.		
	F11 – F5	Employee empowerment leads to quality improvement		

	F5 – F10	Quality improvement leads to Employee satisfaction and retention.		
	F10 – F5	Employee satisfaction and retention leads to quality improvement		
	F5 – F9	Quality improvement leads to Flexibility.		
	F9 – F5	Flexibility leads to quality improvement.		
	F5 – F8	Quality improvement leads to brand image/market reputation.		
	F8 – F5	Brand image/market reputation leads to quality improvement		
	F5 – F7	Quality improvement leads to cost minimization.		
	F7 – F5	Cost minimization leads to quality improvement.		
	F5 – F6	Quality improvement leads to employee participation		
	F6 – F5	Employee participation leads to quality Improvement.		
F6: Employee Participation				
F6	F6 – F18	Employee participation leads to respect for rule of law.		
	F18 – F6	Respect for rule of law leads to employee participation		
	F6 – F17	Employee participation leads to Transparency in customer dealing.		
	F17 – F6	Transparency in customer dealing leads to employee participation		
	F6 – F16	Employee participation leads to Corporate social responsibility.		
	F16 – F6	Corporate social responsibility leads to employee participation.		
	F6 – F15	Employee participation leads to top management commitment.		
	F15 – F6	Top management commitment leads to employee participation		
	F6 – F14	Employee participation does not lead to E-commerce.		
	F14 – F6	E-commerce leads to employee participation.		
	F6 – F13	Employee participation leads to Use of IT.		
	F13 – F6	Use of IT leads to employee participation		
	F6 – F12	Employee participation does not lead to Job security.		
	F12 – F6	Job security leads to employee		

		participation.		
	F6 – F11	Employee participation leads to Employee empowerment.		
	F11 – F6	Employee empowerment leads to employee participation.		
	F6 – F10	Employee participation leads to employee satisfaction and retention.		
	F10 – F6	Employee satisfaction and retention leads to employee participation		
	F6 – F9	Employee participation leads to flexibility		
	F9 – F6	Flexibility leads to employee participation		
	F6 – F8	Employee participation leads to brand image/market reputation.		
	F8 – F6	Brand image/market reputation leads to employee participation		
	F6 – F7	Employee participation leads to cost minimization.		
	F7 – F6	Cost minimization leads to employee participation.		
F7: Cost Minimization				
F7	F7 – F18	Cost minimization leads to respect for rule of law.		
	F18 – F7	Respect for rule of law leads to cost minimization.		
	F7 – F17	Cost minimization leads to Transparency in customer dealing.		
	F17 – F7	Transparency in customer dealing leads to cost minimization		
	F7 – F16	Cost minimization leads to Corporate social responsibility		
	F16 – F7	Corporate social responsibility leads to cost minimization		
	F7 – F15	Cost minimization leads to top management commitment		
	F15 – F7	Top management commitment leads to cost minimization		
	F7 – F14	Cost minimization leads to E-commerce.		
	F14 – F7	E-commerce leads to cost minimization.		
	F7 – F13	Cost minimization leads to Use of IT.		
	F13 – F7	Use of IT leads to cost minimization		
	F7 – F12	Cost minimization leads to Job security.		

	F12 – F7	Job security leads to cost minimization.		
	F7 – F11	Cost minimization leads to employee empowerment.		
	F11 – F7	Employee empowerment leads to cost minimization.		
	F7 – F10	Cost minimization leads to Employee satisfaction and retention.		
	F10 – F7	Employee satisfaction and retention leads to cost minimization.		
	F7 – F9	Cost minimization leads to flexibility.		
	F9 – F7	Flexibility leads to cost minimization.		
	F7 – F8	Cost minimization leads to brand image/market reputation.		
	F8 – F7	Brand image/market reputation leads to cost minimization		
F8: Brand Image/Market Reputation				
F8	F8 – F18	Brand image/market reputation leads to respect for rule of law		
	F18 – F8	Respect for rule of law leads to brand image/market reputation		
	F8 – F17	Brand image/market reputation leads to transparency in customer dealing		
	F17 – F8	Transparency in customer dealing leads to brand image/market reputation		
	F8 – F16	Brand image/market reputation leads to corporate social responsibility.		
	F16 – F8	Corporate social responsibility leads to brand image and market reputation		
	F8 – F15	Brand image/market reputation leads to topman agement commitment.		
	F15 – F8	Top management commitment leads to brand image and market reputation		
	F8 – F14	Brand image/market reputation leads to E-commerce.		
	F14 – F8	E-commerce leads to brand image and market reputation		
	F8 – F13	Brand image and market reputation leads to use of IT		

	F13 – F8	Use of IT leads to brand image and market reputation		
	F8 – F12	Brand image and market reputation leads to job security		
	F12 – F8	Job security leads to brand image and market reputation.		
	F8 – F11	Brand image and market reputation leads to Employee empowerment		
	F11 – F8	Employee empowerment leads to brand image and market reputation.		
	F8 – F10	Brand image and market reputation leads to employee satisfaction and retention		
	F10 – F8	Employee satisfaction and retention leads to brand image/market reputation		
	F8 – F9	Brand image and market reputation leads to flexibility		
	F9 – F8	Flexibility leads to brand image/market reputation.		
F9: Flexibility				
F9	F9 – F18	Flexibility leads to respect for rule of law.		
	F18 – F9	Respect for rule of law leads		
	F9 – F17	Flexibility leads to transparency in customer dealing		
	F17 – F9	Transparency in customer dealing		
	F9 – F16	Flexibility leads to corporate social responsibility.		
	F16 – F9	Corporate social responsibility leads to flexibility.		
	F9 – F15	Flexibility leads to top management commitment.		
	F15 – F9	Top management commitment leads to flexibility		
	F9 – F14	Flexibility leads to e-commerce		
	F14 – F9	E-commerce leads to flexibility		
	F9 – F13	Flexibility leads to use of IT.		
	F13 – F9	Use of IT leads to flexibility		
	F9 – F12	Flexibility leads to job security.		
	F12 – F9	Job security leads to flexibility.		
	F9 – F11	Flexibility leads to Employee empowerment.		
	F11 – F9	Employee empowerment leads to		

		flexibility.		
	F9 – F10	Flexibility leads to employee satisfaction and retention		
	F10 – F9	Employee satisfaction and retention leads to flexibility.		
F10: Employee Satisfaction				
F10	F10 – F18	Employee satisfaction and retention leads to respect for rule of law.		
	F18 – F10	Respect for rule of law leads to employee satisfaction and retention		
	F10 – F17	Employee satisfaction and retention leads to transparency in customer dealing		
	F17 – F10	Transparency in customer dealing leads to employee satisfaction		
	F10 – F16	Employee satisfaction and retention leads to corporate social responsibility		
	F16 – F10	Corporate social responsibility leads to employee satisfaction and retention		
	F10 – F15	Employee satisfaction and retention leads to top management commitment.		
	F15 – F10	Top management commitment leads to employee satisfaction and retention		
	F10 – F14	Employee satisfaction and retention leads to E-commerce.		
	F14 – F10	E-commerce leads to employee satisfaction and retention.		
	F10 – F13	Employee satisfaction and retention leads to use of IT.		
	F13 – F10	Use of IT leads to Employee satisfaction and retention.		
	F10 – F12	Employee satisfaction and retention leads to Job Security		
	F12 – F10	Job security leads to employee satisfaction and retention.		
	F10 – F11	Employee satisfaction and retention leads to employee empowerment.		
	F11 – F10	Employee empowerment leads to employee satisfaction and retention.		
F11: Employee Empowerment				
F11	F11 – F18	Employee empowerment leads to respect for rule of law leads		

	F18 – F11	Respect for rule of law leads to employee empowerment.		
	F11 – F17	Employee empowerment leads to transparency in customer dealing		
	F17 – F11	Transparency in customer dealing leads to employee empowerment.		
	F11 – F16	Employee empowerment leads to Corporate social responsibility.		
	F16 – F11	Corporate social responsibility leads to employee empowerment		
	F11 – F15	Employee empowerment leads to top management commitment		
	F15 – F11	Top management commitment leads to employee empowerment		
	F11 – F14	Employee empowerment leads to E-commerce.		
	F14 – F11	E-commerce leads to employee empowerment.		
	F11 – F13	Employee empowerment leads to use of IT.		
	F13 – F11	Use of IT leads to Employee empowerment.		
	F11 – F12	Employee empowerment leads to job security.		
	F12 – F11	Job security leads to employee empowerment.		
F12: Job Security				
F12	F12 – F18	Job security leads to respect for rule of law.		
	F18 – F12	Respect for rule of law leads job security		
	F12 – F17	Job security leads to transparency in customer dealing		
	F17 – F12	Transparency in customer dealing leads to job security		
	F12 – F16	Job security leads to corporate social responsibility		
	F16 – F12	Corporate social responsibility leads to job security		
	F12 – F15	Job security leads to corporate social responsibility.		
	F15 – F12	Top management commitment leads to job security		
	F12 – F14	Job security leads to E-commerce.		
	F14 – F12	E-commerce leads to job security.		
	F12 – F13	Job security leads to use of IT.		
	F13 – F12	Use of IT leads to job security.		
F13: Use of IT				
F13	F13 – F18	Use of IT leads to respect for rule of		

		law.		
	F18 – F13	Respect for rule of law leads to use of IT.		
	F13 – F17	Use of IT leads to transparency in customer dealing.		
	F17 – F13	Transparency in customer dealing leads to use of IT.		
	F13 – F16	Use of IT leads to corporate social responsibility.		
	F16 – F13	Corporate social responsibility leads to use of IT.		
	F13 – F15	Use of IT leads to		
	F15 – F13	Top management commitment leads to use of IT		
	F13 – F14	Use of IT leads to e-commerce		
	F14 – F13	E-commerce leads to use of IT.		
F14: E-commerce				
F14	F14 – F18	E-commerce leads to respect for rule of law.		
	F18 – F14	Respect for rule of law leads to e-commerce.		
	F14 – F17	E-commerce leads to transparency in customer dealing		
	F17 – F14	Transparency in customer dealing leads to e- commerce.		
	F14 – F16	E-commerce leads to Corporate social responsibility		
	F16 – F14	Corporate social responsibility leads to e- commerce.		
	F14 – F15	E-commerce leads to top management commitment.		
	F15 – F14	Top management commitment leads to e- commerce		
F15: Top Management Commitment				
F15	F15 – F18	Top management commitment leads to respect for rule of law		
	F18 – F15	Respect for rule of law leads to top management commitment.		
	F15 – F17	Top management commitment leads to transparency in customer dealing		
	F17 – F15	Transparency in customer dealing leads to top management commitment.		
	F15 – F16	Top management commitment leads to corporate social responsibility		
	F16 – F15	Corporate social responsibility leads to top management commitment.		

F16: Corporate Social Responsibility				
F16	F16 – F18	Corporate social responsibility leads to respect for rule of law		
	F18 – F16	Respect for rule of law leads to corporate social responsibility		
	F16 – F17	Corporate social responsibility leads to transparency in customer dealing		
	F17 – F16	Transparency in customer dealing leads to corporate social responsibility.		
F17: Transparency in Customer Dealing				
F17	F17 – F18	Transparency in customer dealing leads to respect for rule of law.		
F18: Respect for Rule of Law				
	F18 – F17	Respect for rule of law leads to transparency in customer dealing		

A Brief Biographical Sketch

Garima Sharma

Garima Sharma is presently working as an Assistant Professor in the Mechanical and Automation Engineering Department of Maharaja Agrasen Institute Of Technology, Delhi. She obtained her master's degree from the National Institute of Technical Teachers Training & Research, Chandigarh, Punjab in the year 2012. She has approx. 16 years of experience in the academic sector of teaching engineering undergraduate students. She has taught various subjects like Engineering Graphics, Manufacturing Process, Engineering Mechanics, Workshop Technology, Production Technology, Machine Drawing, Strength of Materials, Total Quality Management, and Advance Methods of Machining. Apart from teaching, she has publications in various international journals and conferences. Her current research area involves Industrial Engineering.

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Academics

- Pursuing PhD, Delhi Technical University (DTU), Delhi
- M.E (Manufacturing Technology), from NITTTR, Chandigarh, Punjab University, 2012
- B.E (Production and Industrial Engineering) from MAIT, Jaipur, Rajasthan University, 2005

Experience (Total 16 years)

- Working as Assistant Professor (Mechanical & Automation Engineering) in Maharaja Agrasen Institute of Technology since August 2008 to till date.
- Worked as `lecturer (Mechanical & Automation Engineering) in Northern India Engineering College (affiliated to GGSIPU) since March 2007 to July 2008
- Worked as lecturer (Mechanical Engineering) in Jagannath Gupta Institute of Engineering and Technology since February 2006 to January 2007

Books Published

- Industrial Engineering-1 by Neelkanth Publishers (P) Ltd. 2006
- Industrial Engineering by Vardhan publishers and distributors, 2008

Publication in International Journals

- "An Analysis of causal relationship among the factors affecting the performance of a service organization "Published in Sage Open (SSCI), 2021
- "An integrated Approach for performance measurement of Indian Telecom service providers" Published in International Journal of Mobile communications (SSCI), 2019
- "Implementation issues in FMS" A literature Published in International Journal, 2013

Publication in International Conference

- "Analysis of interdependencies of the factors affecting the service performance of an organization: An approach of structural equation modeling" in ICARI 2021
- "An analysis of the interrelationships of the factors impacting an organization's service performance: An approach of Partial least squares structural equation modeling (PLS-SEM)" in ICARI , 2021
- "A review of performance measurement of Services: A case of Telecom Sector in India" in ICARI ,2020
- "An analysis of Factors influencing the performance of Service organization: An approach of interpretive structural Modelling" in 19 Global conference IIT Roorkee, 2019
- "Effects of Innovation on Six Sigma and Quality Practices" in Internal Conference on Contemporary Innovative Practices in Management , 2012
- "Achieving Quality goals by lean Six Sigma Technique "in International Conference at Amity University, 2012.

Publication in National Conference

- "Productivity improvement in manufacturing industry using Total Quality Management" in National Conference at Maharaja Agrasen Institute of Technology, 2012.
- "Change management concepts in Mass production" in NISTM , 2012
- "Lean Manufacturing opportunities and obstacles" in NCAMT , 2013
- " Application of Six Sigma for productivity improvement in a manufacturing" in FTSE , 2011

Workshop Attended

- 5 days workshop in 'Production Planning for Manufacturing Excellence' at Delhi Technical University, July'2016
- 2 weeks ISTE Workshop on Fluid Mechanics at Maharaja Agrasen Institute of Technology, May'2014
- 1 day Workshop on Mechatronics system at Maharaja Agrasen Institute of Technology, 2013
- 2 weeks ISTE Workshop on Engineering Mechanics at Maharaja Agrasen Institute of Technology, 2013
- 2 weeks ISTE Workshop on Engineering Mechanics at Maharaja Agrasen Institute of Technology, 2013
- 2 weeks ISTE Workshop on Engineering Thermodynamics at Maharaja Agrasen Institute of Technology, 2012
- 2 days Workshop on "Recent Trends in New & sustainable Energy Sources " , February 2009
- 1 week workshop in "Engineering trends in Engg. and technology" conducted by NITTR Chandigarh & JNIT Jaipur , 2006

Seminar Attended

- 1 day seminar in 'Recent Trends in Renewable Energy for Mechanical Applications' at Maharaja Agrasen Institute of Technology, 2014
- 1 day Industry Institute Interaction Seminar at Maharaja Agrasen Institute of Technology, 2013
- 4 days seminar in 'Recent Developments in mechanical engineering' at Maharaja Agrasen Institute of Technology, 2012

Training / FDP

- 1 week FDP on Green Energy-Clean Energy at Maharaja Agrasen Institute of Technology, 2018
- 1 week FDP on Recent Advances in Mechanical Engineering at Maharaja Agrasen Institute of Technology, 2017
- 1 week FDP on Recent developments in Mechanical Engineering at Maharaja Agrasen Institute of Technology, 2012
- 2 week FDP on Power Station operation and control organized by AICTE jointly with Maharaja Agrasen institute of Technology, 2009

Academic Administration

- Setup Laboratory for Engineering Mechanics and Production Technology
- Anchored for various events conducted by Maharaja Agrasen Institute of Technology
- Team member for Various organizing committees at Maharaja Agrasen Institute of Technology