

**“A STUDY ON ASSESSMENT OF CRITICAL SUCCESS FACTORS FOR SIX
SIGMA IMPLEMENTATION IN INDUSTRIES WITH REFERENCE TO
MANGALORE CITY”**

A PROJECT REPORT

SUBMITTED TO

MANGALORE UNIVERSITY

In partial fulfillment of the requirements for the award of

MASTER OF BUSINESS ADMINISTRATION

SUBMITTED BY

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Reg. No: P05AJ21M0098

Under the guidance of

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DECLARATION

I, Mr. MOHAMMED ZAMEER, hereby declare that this project report entitled “**A STUDY ON ASSESSMENT OF CRITICAL SUCCESS FACTORS FOR SIX SIGMA IMPLEMENTATION IN INDUSTRIES WITH REFERANCE TO MANGALORE CITY**” has been carried out under the valuable guidance and supervision of Ms. DEEKSHA RAO, Assistant Professor of A.J. INSTITUTE OF MANAGEMENT (AJIM), affiliated to Mangalore University, in partial fulfillment of the requirements for the award of MASTER OF BUSINESS ADMINISTRATION during the year 2021-2023.

I also declare that the data and the information collected during the project work are authentic and true to my knowledge. The above-titled project has not been submitted to any other university for the award of any other degree.

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ABSTRACT

The implementation of Six Sigma strategy in Indian industry has gained significant attention due to its potential for enhancing operational efficiency, quality management, and overall business performance. This abstract provides an overview of the key aspects and benefits of implementing Six Sigma in the Indian industrial context. Six Sigma, originally developed by Motorola and popularized by General Electric, is a data-driven methodology that aims to minimize process variations and defects, resulting in improved customer satisfaction, cost reduction, and increased profitability. The Indian industry, comprising diverse sectors such as manufacturing, IT services, healthcare, and financial services, has recognized the value of Six Sigma as a comprehensive approach to achieve operational excellence. The implementation of Six Sigma in the Indian industry offers several potential benefits, including improved product quality, enhanced process efficiency, increased customer satisfaction, reduced defects and waste, and cost savings. However, challenges such as cultural barriers, resistance to change, and limited awareness of Six Sigma principles need to be addressed for successful adoption and implementation. This abstract concludes that the implementation of Six Sigma in the Indian industry holds immense potential for achieving operational excellence, driving competitiveness, and meeting the evolving needs of customers. By embracing Six Sigma principles and methodologies, Indian organizations can streamline processes, reduce variation, and continuously improve their operations, positioning themselves as leaders in the global marketplace.

CHAPTER -1

INTRODUCTION

1.1 BACKGROUND OF TOPIC:

Overall operational excellence is one of the most significant key requirements of any business to have global competence with sustained growth. Indian industries are not the exception to this. For global competitiveness, Indian industries are trying many improvement measures. The majority of the measures being tried by them are efficient enough of producing the desired results but trouble remain with their implementation and longer time span to realise the benefits. The requirement is for a break through strategy, which can deliver multidirectional benefits in relatively shorter duration of time. Six Sigma is the methodology having statistical base focusing on removing causes of variations or defects in the product or core business processes. This quantitative approach aims at improving efficiency and effectiveness of the organisation. In the existing dynamic industrial scenario, quality alone is not the winning criteria. Customers can become happy with consistently good quality products, meeting other implicit requirements and committed delivery schedules. Six Sigma methodology addresses the major root causes and guarantees the targeted results, both in terms of improvements desired and time span fixed. It is a disciplined, data-driven approach and methodology for eliminating defects in any process – from manufacturing to transactional, from products to services. This breakthrough improvement strategy delivers results of productivity, profitability and quality improvements based on its highly effective approach (Desai, 2008). Six Sigma is a systematic, highly disciplined, customer-centric and profit-driven organisation-wide strategic business improvement initiative that is based on a rigorous process focused and data-driven methodology (Tang et al., 2007). It drives customer satisfaction and bottom-line results by systematically reducing variation in processes and thereby promoting a competitive advantage (Antony and Desai, 2009). From the researches and surveys conducted and published so far, it appears that Six Sigma is not being explored by the developing economies to its full potential and Indian is not an exception in this (Desai and Patel, 2009). Many Indian industries have successfully exploited this breakthrough business improvement strategy to their overall benefits. Still the penetration Six Sigma in Indian industries is not as encouraging as it should be. There are certain issues preventing the full use of Six Sigma as an overall business improvement strategy by Indian industries (Desai and Patel,

2010). And there are certain advantages too for Indian industries, which can be further strengthened to have an edge in the global market by effectively utilising Six Sigma strategy (Desai and Patel, 2009). This study is an attempt to analyse the critical success factors (CSFs) of Six Sigma implementation in Indian industries. The results of exploratory empirical investigation are presented in this study. It also provides exhaustive analysis of cross-sectional study of CSFs of Six Sigma implementation for different sizes and sectors of Indian industries. There are publications discussing specific implementation cases of Six Sigma in small- and medium-sized Indian industries (Desai, 2006, 2008). But very little research has been carried out relating to the CSFs of six sigma implementation in the Indian industry. Thus, this study will provide value to Six Sigma practitioners, researchers and academicians.

1.2 IMPORTANCE OF THE STUDY:

The study on the assessment of critical success factors for Six Sigma implementation in the Indian industry holds significant importance in enhancing organizational efficiency, productivity, and competitiveness. Six Sigma is a rigorous data-driven methodology aimed at improving process quality and reducing defects to near-perfect levels. By conducting a comprehensive examination of the factors that contribute to successful Six Sigma implementation in the context of the Indian industry, several key benefits can be realized.

Firstly, the findings of this study can provide valuable insights into the specific challenges and opportunities that Indian companies face when adopting Six Sigma. Understanding these unique aspects allows organizations to tailor their implementation strategies to address local requirements effectively. It helps companies overcome barriers related to cultural differences, varying levels of workforce expertise, and specific industry challenges, thereby optimizing the chances of successful implementation.

Secondly, identifying critical success factors (CSFs) enables Indian industries to allocate resources more efficiently. By focusing on the most influential factors, companies can prioritize their efforts and investments, ensuring that the implementation

process is cost-effective and streamlined. This strategic approach also prevents wasted resources on less impactful aspects, ultimately leading to a higher return on investment.

Furthermore, the study's insights can foster a culture of continuous improvement within Indian organizations. By recognizing the factors that contribute to success, companies can align their leadership, workforce, and processes towards the pursuit of excellence. This not only strengthens their commitment to Six Sigma principles but also instills a mindset of continuous learning and adaptation, which is crucial for long-term success in today's rapidly changing business landscape.

Moreover, the study's findings can serve as a benchmark for Indian industries to compare their progress with best practices and industry standards. By gauging their performance against established CSFs, organizations can identify gaps and areas for improvement, enabling them to refine their implementation strategies and achieve higher levels of operational excellence.

In conclusion, the study on the assessment of critical success factors for Six Sigma implementation in the Indian industry has far-reaching implications. It empowers organizations to understand the unique challenges they face, allocate resources strategically, foster a culture of continuous improvement, and benchmark their progress. By embracing Six Sigma and leveraging these findings, Indian industries can drive significant improvements in efficiency, quality, and overall business performance, positioning themselves competitively on both domestic and global fronts.

1.3 OBJECTIVES OF THE STUDY:

1. To identify the critical success factors of six sigma.
2. To understand the effectiveness of six sigma in an organisation.
3. To examine the integration of six sigma to the quality and process improvement.
4. To study the satisfaction level of organisations on achieving ROI from six sigma initiatives.

1.4 NEED FOR THE STUDY:

The study of critical success factors for Six Sigma implementation in the Indian industry is of paramount importance due to several reasons. Six Sigma is a powerful methodology aimed at improving process efficiency, reducing defects, and enhancing overall product and service quality. In the context of the Indian industry, which operates in a highly competitive and rapidly evolving global market, the need for implementing Six Sigma practices becomes even more significant.

Firstly, the Indian industry faces stiff competition from both domestic and international players. To stay ahead in this cutthroat environment, businesses must strive for continuous improvement and operational excellence. Six Sigma provides a structured approach that helps organizations identify and eliminate defects, leading to increased customer satisfaction and loyalty. By understanding the critical success factors for Six Sigma implementation, Indian companies can effectively align their strategies to ensure successful deployment and reap the benefits of enhanced competitiveness.

Secondly, India's diverse and dynamic business landscape poses unique challenges that demand tailored approaches to process improvement. Factors such as cultural diversity, varying regulatory frameworks, and infrastructural disparities can impact the implementation of Six Sigma initiatives. A comprehensive study of critical success factors can shed light on the specific contextual elements that need to be considered, thereby enhancing the relevance and efficacy of Six Sigma practices in the Indian context.

Moreover, Indian industry sectors span a wide range of domains, including manufacturing, services, IT, healthcare, and more. Each sector may have distinct requirements and priorities, necessitating a nuanced understanding of the critical success factors that align with specific industry verticals. Such insights can aid organizations in crafting targeted strategies for successful Six Sigma adoption, ultimately resulting in improved process efficiency, cost reduction, and increased profitability.

Furthermore, investing in Six Sigma implementation requires significant resources, including financial investments, time, and efforts from employees at all levels. Without

a clear understanding of the critical success factors, organizations run the risk of misallocating resources or encountering implementation roadblocks, leading to suboptimal outcomes. By conducting a thorough study of the factors that influence the success of Six Sigma projects, Indian businesses can make informed decisions and optimize their investments to achieve sustainable long-term benefits.

In conclusion, the study of critical success factors for Six Sigma implementation in the Indian industry is essential to drive continuous improvement and maintain competitiveness in a challenging and diverse business environment. By identifying and addressing the unique challenges and opportunities that India presents, organizations can harness the full potential of Six Sigma and pave the way for sustained growth and success.

1.5 STATEMENT OF THE PROBLEM:

One of the main challenges faced by Indian industries in implementing Six Sigma strategy is the lack of awareness and understanding of the methodology. Many organizations in India are still unfamiliar with Six Sigma and its benefits, and therefore may be reluctant to invest in the necessary training and resources. Another challenge is the availability of qualified personnel and experts who are trained in Six Sigma methodology. There is a shortage of qualified Six Sigma professionals in India, which can make it difficult for organizations to implement the methodology effectively. In addition, cultural factors and resistance to change can pose a challenge in the implementation of Six Sigma. Many Indian organizations have long-standing traditions and ways of doing things and may be resistant to change. This can make it difficult to implement the Six Sigma methodology, which requires a significant shift in the way organizations approach quality and process improvement. Another challenge is the lack of standardization and consistency in quality across different industries and sectors in India. This can make it difficult to apply Six Sigma methodology consistently and effectively and can also make it challenging to compare performance across different organizations. Finally, the lack of support from top management and the absence of a clear strategy and roadmap for implementation can also be a significant barrier to the successful adoption of Six Sigma in Indian industries. Without the necessary support

and resources, it may be difficult for organizations to fully realize the benefits of Six Sigma.

In common words research means to search for knowledge. One can also define research as a scientific and systematic search for information on a specific topic. In fact, research is an art of specific investigation. Research methodology is the way to systematically solve the problem. It describes the procedure which has been used in the research. Six sigma Provide an overview of the Six Sigma strategy and its benefits. Highlight the importance of implementing Six Sigma in the Indian industry. State the objective of the research study Assess the current state of Six Sigma implementation in the Indian industry. Identify the challenges faced by Indian organizations in adopting Six Sigma. Propose strategies for successful implementation of Six Sigma in the Indian context. For this study Researcher collected data from interviews and focus groups to gather qualitative data on challenges, success factors, and strategies. Design and administer a survey questionnaire to collect quantitative data on Six Sigma implementation status, performance metrics, and organizational characteristics. The data are collected by the researcher for this study from primary and secondary sources. The present study titled **“ASSESSMENT OF CRITICAL SUCCESS FACTORS FOR SIX SIGMA IMPLEMENTATION IN INDUSTRIES WITH REFERENCE TO MANGALORE CITY”** is an analytical and descriptive study. The study has been undertaken to find out the Implementation of six Sigma strategy in Indian industry

1.6 CURRENT SCENARIO:

The implementation of Six Sigma strategy in Indian industry has gained momentum in recent years. Many Indian organizations, particularly those in the manufacturing, IT, and service sectors, have recognized the benefits of Six Sigma and are actively implementing the methodology. Several large Indian companies such as TATA Motors, Reliance Industries, Wipro, and Infosys have successfully implemented Six Sigma and have reported significant improvements in quality, efficiency, and profitability. However, the implementation of Six Sigma is still at a relatively nascent stage in many Indian organizations. While some companies have implemented Six Sigma in their core business processes, others have only implemented it in select departments or projects. There is also a wide variation in the level of adoption of Six Sigma across different

industries and sectors in India. The availability of trained professionals and experts in Six Sigma methodology remains a challenge, particularly in smaller organizations and those in non-urban areas. There is also a need for more standardized and consistent approaches to quality management across different industries and sectors. Overall, while the implementation of Six Sigma in Indian industry is still in its early stages, there is a growing awareness and understanding of the methodology, and more and more organizations are expected to adopt Six Sigma in the coming years.

1.7 THEORITICAL/CONCEPTUAL ANALYSIS:

Six Sigma is to identify and eliminate or reduce defects, errors, or variations in a process, ultimately leading to improved efficiency, quality, and customer satisfaction. It utilizes a systematic approach known as DMAIC (Define, Measure, Analyse, Improve, and Control) to achieve these goals. Each phase of the DMAIC cycle has specific tools and techniques to analyse and improve processes. The present study was conducted to find Implementation of six Sigma strategy in Indian industry

1.8 RESEARCH QUESTIONS

- What are the critical success factors of six sigma?
- How can six sigma be integrated to the quality and process improvement?
- What is the current level of satisfaction of organisation on achieving the ROI from six sigma initiatives?
- How can organizations ensure the sustainability of Six Sigma results over time?

1.9 PROBLEM DEFINITION

The present study titled “**IMPLEMENTATION OF SIX SIGMA STRATEGY IN INDIAN INDUSTRY**” is undertaken to understand the implementation of the Six Sigma strategy in the Indian industry has encountered several challenges and issues. Six Sigma is a data-driven approach used to improve business processes by reducing defects and variations. While it has been successfully implemented in many organizations worldwide, the adoption and effective implementation of Six Sigma in Indian industries have faced specific problems. The key problem areas are as follows:

Lack of Awareness and Understanding: One of the primary challenges in implementing Six Sigma in Indian industries is the lack of awareness and understanding of the methodology. Many organizations are unfamiliar with the principles, concepts, and benefits of Six Sigma. This lack of knowledge often leads to resistance and scepticism towards its implementation.

Cultural Factors: Indian culture is characterized by hierarchical structures and a high power-distance index. This can hinder the effective implementation of Six Sigma, as it requires a bottom-up approach and active participation from employees at all levels. The hierarchical mindset and resistance to change can pose challenges in empowering employees to take ownership of the improvement initiatives.

Limited Leadership Support: Successful implementation of Six Sigma requires strong leadership commitment and support. In some Indian organizations, leaders may not fully understand the value and potential of Six Sigma or fail to provide the necessary resources and time for its implementation. This lack of leadership support can undermine the implementation process and hinder the establishment of a Six Sigma culture.

Inadequate Training and Skill Development: Six Sigma requires specialized training and skill development for employees involved in the implementation process. However, in some Indian industries, there is a shortage of qualified Six Sigma professionals and a lack of comprehensive training programs. This leads to inadequate knowledge and skills among employees, limiting their ability to effectively apply Six Sigma tools and techniques.

Resistance to Change: The implementation of Six Sigma often requires significant changes in processes, roles, and responsibilities. Resistance to change is a common challenge faced by organizations worldwide, and the Indian industry is no exception. Employees may resist Six Sigma initiatives due to fear of job loss, uncertainty about new processes, or resistance to data-driven decision-making approaches.

Data Availability and Accuracy: Six Sigma relies heavily on data analysis and measurement to identify and quantify process variations. However, in some Indian industries, there may be challenges related to data availability, accuracy, and reliability.

Inconsistent data collection practices, outdated measurement systems, and limited data analysis capabilities can hinder the successful implementation of Six Sigma.

Addressing these challenges requires a comprehensive approach that focuses on creating awareness, building leadership support, providing adequate training, fostering a culture of continuous improvement, and addressing cultural barriers. Overcoming these problems will enable Indian industries to harness the benefits of Six Sigma, such as improved process efficiency, reduced defects, enhanced customer satisfaction, and increased profitability.

CHAPTER-2

RESEARCH DESIGN

2.1 LITERATURE REVIEW

Sharma, S. (2012). Explored and analysed Six Sigma critical success factors (CSFs) in the context of Indian manufacturing organizations— A factor analysis was used to finally reduce the 22 factors to seven groups of underlying CSFs, the top factors being use of right tools, measurement assurance, innovation and supplier collaboration. Based on the factors extracted, a Six Sigma adoption model has been proposed in the Asian context. The significance of Six Sigma as a management approach to bring about dramatic improvements in operational processes and thereby company's bottom line is now undisputed. Six Sigma approach is gradually being adopted by organizations all over the globe in an attempt to increase market share, bring down production costs, increasing process yields through reduction of waste and scrap thereby increase profits by improving the quality of their products and services.

Antony, J. (2009). It is presented from the results from an empirical investigation of six sigma status in the Indian industry and underrepresented region of investigation on six sigma implementations. A survey questionnaire which applied in the UK industry is applied in India. The survey is adapted so that it is suitable to Indian industry. The results of the study are based on descriptive statistics. The results of this empirical study reflect the reasons for application of six sigma by Indian organizations, the most and least commonly used tools and techniques, critical success factors (CSFs) for the implementation of six sigma, and common impediments in the implementation Six sigma is a systematic, highly disciplined, customer-centric and profit-driven organization-wide strategic business improvement initiative that is based on a rigorous process focused and data-driven methodology (Tang et al., 2007). It drives customer satisfaction and bottom-line results by systematically reducing variation in processes and thereby promoting a competitive advantage. Six sigma is considered a strategic corporate initiative to boost profitability, increase market share and improve customer satisfaction through statistical tools and techniques that can lead to breakthrough quantum gains in quality. Six sigma blends management, financial and methodological elements to make improvement to process and products concurrently and (Voelkel, 2002)

Desai, D (2012) Empirical investigation of Six Sigma status in Indian industry, especially to highlight critical success factors (CSFs) of Six Sigma implementation in a developing economy like India. The study is based on survey questionnaire suitable for Indian industries. The results of the study are based on descriptive statistics. The results of this exploratory empirical study reflect the impact of different CSFs of Six Sigma implementation in different sizes and sectors of Indian industries. Overall operational excellence is one of the most significant key requirements of any business to have global competence with sustained growth. Indian industries are not the exception to this. For global competitiveness, Indian industries are trying many improvement measures. Six Sigma is the methodology having statistical base focusing on removing causes of variations or defects in the product or core business processes. This quantitative approach aims at improving efficiency and effectiveness of the organisation. In the existing dynamic industrial scenario, quality alone is not the winning criteria. Customers can become happy with consistently good quality products, meeting

N. Venkatesh and C. Sumangala (2010) Six Sigma is a phenomenal quality management concepts which has helped many organizations to overcome quality crisis in the recent past. Six Sigma is observed as a very promising quality management tool for any organization to make its presence felt in the corporate world as it emphasizes on obtaining a fruitful solution to improve accuracy, reduce defect thereby reduce the cost and improve profits. The main objective of this investigation is to unearth the extent to which the companies have been benefitted due to Six Sigma implementation. This article presents the results based on the analysis of collective opinion of employees of various Indian manufacturing industries that have implemented Six Sigma. This research also examines interrelationship among various parameters defined in the research.

Michael Sony (2012) It is investigated from the relationship between Six Sigma, organizational learning and innovation performance. Also, whether organizational learning advance innovation performance by playing a mediating role between Six Sigma and innovation performance, probing the moderating effects of organizational types between six sigma and organizational learning, and also testing a proposed model to explain the relationships among Six Sigma, organizational type organizational

learning, and innovation performance through an empirical examination in the Indian industry context. This study proves the positive relationship between Six Sigma and organizational learning. It also confirms that Six Sigma role structure and Six Sigma focus on metrics contributes positively to organizational innovation, however, Six Sigma structured improvement procedure was found to be negatively related to organizational innovation, thus contributing to Six Sigma-Innovation Paradox. This study also rejects moderating effects of organizational type between Six Sigma and organizational learning.

Vikas Kumar (2012) Although Six Sigma approach to quality and process improvement has been predominantly used by manufacturing organizations, today the popularity of Six Sigma in the other sectors is growing exponentially, especially in banks, hospital sector, financial services, airline industry, utility services and so on (Antony et al., 2007; Gijo and Antony, 2013; Gijo and Sarkar, 2013). Over the last decade or so, it appears that a large number of Indian industries have embarked on Process Excellence methodologies such as Six Sigma and Lean. Although a decent number of Six Sigma applications related papers have been published, research has shown that very few empirical based papers on Six Sigma in Indian industries have been reported in the current literature. After globalization and liberalization, quality has been surfaced as one of the major areas of concern along with productivity.

Virender Narula, Sandeep Grover (2010) There has been considerable number of papers published related to Six Sigma applications in manufacturing and service organizations. However, very few studies are done on reviewing the literature of Six Sigma in all the areas including manufacturing, construction, education, financial service, BPOs and healthcare etc. Considering the contribution of Six Sigma in recent time, a more comprehensive review is presented in this paper. The authors have reviewed Six Sigma literatures in the way that would help research academicians and practitioners to take a closer look at the growth, development, and applications of this technique. The authors have reviewed various journal papers and suggested different schemes of classification. In addition, certain gap areas are identified that would help researchers in further research. The paper has been categorized in four sections. Section one & two present introduction to Six Sigma and preamble to literature review

respectively. Section three presents classification of Six Sigma papers based on research methodology & research contents. Section four presents key findings, conclusion and areas for future research.

Shree Ranga Bhat (2021) The aim of the article is to ascertain the challenges, lessons learned and managerial implications in the deployment of Lean Six Sigma (LSS) competitiveness to micro, small and medium Enterprises (MSME) in India and to establish doctrines to strengthen the initiatives of the government. strengthen the initiatives of the government. Design/methodology/approach – The research adopts the Action Research methodology to develop a case study, which is carried out in the printing industry in a Tier III city using the LSS DMAIC (Define-Measure Analyse-Improve-Control) approach. It utilizes LSS tools to deploy the strategy and to unearth the challenges and success factors in improving the printing process of a specific batch of a product

Vikas Swarnakar, Anil kr Tiwari, and A. R. Singh (2012) Lean manufacturing objective is to eliminate the waste from the manufacturing process, and six sigma is grasping the variations within the process and tries to reduce them. Lean manufacturing or six sigma alone cannot improve the quality, customer satisfaction rate, net earnings and also cannot reduce the overall production cost of the organization, but the combined approach may solve these issues. Lean six sigma (LSS) is a combined approach which maximizes the overall value and minimizes the production cost by applying their tools and techniques such as VSM, JIT, 5S, Kaizen, and Kanban. The objective of this paper is to assess the benefits of LSS approach in a manufacturing organization. The data are collected through convenient sampling approach from manufacturing organizations situated in India and analysed through integrated relative importance index and simple regression analysis approach. The findings of the study contributed to manufacturing industries and lay down a few suggestions for implementing lean six sigma in case manufacturing organizations. The three different manufacturing organizations considered performing this study. The study concluded that the implementation of LSS supports the case industries to improve their quality, cost, delivery, production capacity, net earnings, overall savings, customer satisfaction and reduce their defects, inventory, cycle time, and machine breakdown. The study helps LSS practitioners and

academician to better understand the benefits observed while implementing the lean six sigma approach in manufacturing organizations.

Dr. Rajeshkumar U. Sambhe(2012) As per automotive survey, the Indian automobile industry is the largest three wheeler market in the world, 2nd largest two wheeler market in the world, 4th largest passenger vehicle market in Asia, 4th largest tractor market in the world and 5th largest commercial vehicle market in the world (A report by KPMG for IBEF, 2006). India is emerging as one of the most attractive automotive markets in the globe, and is poised to become a key sourcing base for auto components. Many enterprises think to shift in the higher tier but no production enterprise can expect persistence success without company detainment on product quality. The productive capacity in auto ancillary enterprises in India is in essence excelling than contrasting sectors and it has an elephantine potency to promote improvement, which in turn will extract the effectiveness of absolute manufacturing sector. Hence it becomes imperative to ascertain ingredients that frame manufacturing in India to deliver right quality and perk up the competitiveness. The attainment of large company's quality is essentially relying on the delivery of goods with elevated quality and honest services from suppliers, which are most likely to be small medium scale enterprises (SMEs) and are the vital spark of modern economies. SMEs should remain combative and compose high quality yield is of importance notability at the small and mid-sized but also for giant enterprises. In case, destitution of commodity quality in SMEs would impinge upon and affect the competence of the larger corporations.

Tejaskumar S.Parsana , Dr.Darshak A. Desai(2012) At present competitive market is focusing on industrial efforts to produce high quality products with the lowest possible cost. To help accomplish this objective, various quality improvement philosophies have been put forward in recent years and of these Six Sigma has emerged as perhaps the most viable and efficient approach for process quality improvement. The objective of this paper is to review and examine the advancement and encounters of six sigma practices in Indian manufacturing SMEs and identify the key tools for each step in successful Six Sigma project execution. The paper also integrates the lessons learned from successful six sigma projects and their prospective applications in various manufacturing SMEs. Large scale organizations are expecting high quality products

from their suppliers and are owners of Small and Medium Enterprises (SMEs). The vast range of products are manufactured in the SMEs, the nature of the export composition makes it amply clear that products from mostly smaller enterprises have hardly improved quality through supportive engrossments towards product/process modernizations, diversification and larger market access. In today scenario, many Indian SMEs operate their processes at the two to three sigma quality levels. So, there is Six Sigma implementation needs and have been appealing much attention.

Venkateswarlu Pula Kanam and Kevin E. Voges (2010) Organizations are increasingly adopting Six Sigma in a bid to improve the quality of their processes and products, and thus achieve competitive advantage. Six Sigma was developed by Motorola in the 1980s, but gained momentum after its adoption by General Electric in the mid-1990s. Six Sigma is a disciplined approach for dramatically reducing defects and producing measurable financial results (Goh et al., 2003). It provides an organizational structure in which improvement projects are led by so called Black Belts (BBs) and Green Belts (GBs), typically selected from middle management. To guide Black Belts and Green Belts through the execution of an improvement project, the program provides a collection of long-standing management and statistical tools and a problem-solving methodology known as DMAIC (Define - Measure - Analyse - Improve - Control).

Amit Yadav and V. K. Sukhwani(2016). Six Sigma is the most popular quality and process improvement methodology which strives for elimination of defects in the processes whose origin is traced back to the pioneering and innovation work done at Motorola and its adoption by many companies including GE, Ford, General Motors, Xerox etc. The primary objective of Six Sigma is to reduce variations, in products and processes, to achieve quality levels of less than 3.4 defects per million opportunities (DPMO) (Bhote K.R, 2007). The important point to be noted is reducing the defects involve measurements in terms of millions of opportunities instead of thousands. A term Sigma Quality Level is used as an indicator of a process goodness. Lower Sigma quality level means greater possibility of defective products, while, higher Sigma quality level means smaller possibility of defective products within process

Anupama Prashar (2014) It is demonstrated from the systematic application of Six Sigma tools for identification and reduction of cost of poor quality (COPQ). The study examines one of the chronic problems of failure of cooling fan assembly at repair division of a company dealing in helicopter components – After completing the Define, Measure and Analyse phase, it was found that use of extreme tolerances and cross-fitment of bearings are the root cause of cooling fan assembly failure. The major recommendations made during the Improve phase were to design a bearing matching software for improving the cross-fitment of bearings and to procure a hydraulic jig with electronic jig instead of manual jig. The value of implementing these recommended solutions equate to a saving of INR 34 lacs per annum. Since it was a chronic problem, the company expects this to be a recurring saving

Saja Ahmed Albliwi(2015) It is explored from the most common themes within Lean Six Sigma (LSS) in the manufacturing sector, and to identify any gaps in those themes that may be preventing users from getting the most benefit from their LSS strategy. This paper also identifies the gaps in current literature and develops an agenda for future research into LSS themes – Many issues have emerged in this paper and important theme have cited which are: benefits, motivation factors, limitations and impeding factors. The analysis of 19 case studies in the manufacturing sector has resulted in significant benefits cited in this paper. However, many gaps and limitations need to be explored in future research as there have been little written on LSS as a holistic strategy for business improvement.

Ravi S. Reosekar(2013) Six Sigma has emerged as a powerful tool in quality management over the recent years and the approach is widely used across all sectors of manufacturing, service logistics and health & hospitality. In today's competitive environment to sustain global competition means to be the best in the field at each competitive priority and to demonstrate industry best quality improvement practices like six sigma. A little work has been done in the area of framework of six sigma implementation but none of the existing frameworks was found to be suitable for the Indian scenario, and the completeness of existing Indian six sigma frameworks was also found to be lacking. Hence this paper aims to focus on the development of a new framework for providing direction and guidance for implementation of six sigma in

Indian scenario. Total 67 frameworks of six sigma implementation as proposed by various researchers, consultants, international agencies and individuals were identified through literature review. Comparative analysis of these identified frameworks was carried out and a new framework is suggested after considering domain knowledge of six sigma and through discussion with experts. Some unique elements/attributes of six sigma were identified through comparative analysis which represent/forms the pillars of six sigma

Manoj Hudnurkar and Suhas Ambekar (2018). Managing quality is at the core of operations strategy (Hitt et al., 2016; Anand and Gray, 2017) and aligns operational activities with overall business strategy. Among various quality management practices, Six Sigma continues to attract the attention of the industry. Six Sigma is a continuous improvement methodology which aims at reducing process variability (Banuelas Coronado and Antony, 2002). Six Sigma helps to achieve customer satisfaction through the elimination of defects and thus contributes to the objective of total quality management (TQM) (Majstorovic and Sibalija, 2015). As Six Sigma attempts to attain similar values (like reducing waste, achieving cost-effectiveness and increasing productivity) as that of TQM, it is regarded as part of overall TQM framework (Andersson et al., 2006). But Six Sigma has provided the needed infrastructure and specific culture of continuous improvement which was missing in TQM philosophy (Antony, 2009). Six Sigma is also a quality management practice which aligns with business strategy to improve the performance of the organisation

Sanjit Ray (2011). It is utilized from the power of Six Sigma, a disciplined approach to improve quality of product, process or service quality, for accident prevention in the manufacturing industry. Six Sigma is considered as a business strategy that focuses on improving the understanding of customer requirements, business systems, productivity and financial performance (Kwak and Anbari, 2006). It focuses on improving quality by reducing variation and thus helping an organization to produce products and services better, faster and cheaper (Mahanti and Antony, 2005). Normally, an organization uses the Six Sigma methods to achieve bottom line benefits or customer satisfaction. It is a project-driven scheme that employs a well-structured methodology, called DMAIC, comprising of the five phases: define, measure, analyse, improve and control.

According to Coronado and Antony (2002), this approach reduces process variation, waste and cycle time, thus enhances profitability and customer satisfaction via effective application of statistical techniques. Park (2002) has stated that Six Sigma is a scientific and statistical quality assessment for all processes in the organization through measurement of quality level, which provides the opportunity and discipline to eliminate mistakes, improve moral and thus reduce cost.

Jagdeep Singh (2017). Lean manufacturing (LM) may be defined as the application of techniques that are used to reduce or eliminate the wastes (Wilson, 2009). It is more than one-dimensional approach and encompasses a large range of management practices including JIT, quality systems, teamwork, cellular manufacturing, supplier management, the organizations are facing many difficulties due to changing customer demands, increasing dissimilarity in products and demands for world class quality. The changing environment is forcing industrial units to focus upon customer satisfaction and to reduce the lead time (Saraswatet al., 2015). In modern times, many organizations have tried to implement or have already implemented LM tools/techniques/processes, whereas some have adopted the LM principles in totality. According to the lean concept, excess inventory of raw materials, work in progress (WIP) and finished products, over-production, waiting for equipment and human resources, space occupied by unused machines and materials, unused creativity, frequent warranty claims, etc., are considered as wastes (Doolen and Hacker, 2005). The lean principles provide perfect quality to satisfy the customer's demand and at the same time minimize the non-value-adding activities.

Saja Ahmed Albliwi (2015) It is explored from the most common themes within Lean Six Sigma (LSS) in the manufacturing sector, and to identify any gaps in those themes that may be preventing users from getting the most benefit from their LSS strategy. This paper also identifies the gaps in current literature and develops an agenda for future research into LSS themes. – Many issues have emerged in these paper and important themes have cited which are: benefits, motivation factors, limitations and impeding factors. The analysis of 19 case studies in the manufacturing sector has resulted in significant benefits cited in this paper. However, many gaps and limitations need to be explored in future research as there have been little written on LSS as a holistic strategy

for business improvement in recent years, Lean and Six Sigma (LSS) have become the most popular business strategies for deploying continuous improvement (CI) in manufacturing and service sectors, as well as in the public sector. CI is the main aim for any organization in the world to help them to achieve quality and operational excellence and to enhance performance

Mohamad Reeduan Mustapha (2019). This paper aims to report the results of a study on the implementation of Lean Six Sigma (LSS) in a developing country. The purpose of this paper is to determine the barriers, critical success factors (CSFs) and implementation strategy of LSS. The literature and interviews show that any organization can customize these methodologies according to their needs. This also indicates that there are no stringent rules to follow, and that the process of adoption and implementation is quite flexible. The findings from the multiple-case study identify that the CSFs for implementing LSS are management support and commitment, communication, culture change, education and training and a recognition and reward system. The salient features which serve as barriers are lack of top management commitment, lack of knowledge, lack of training, and internal resistance. Lean and Six Sigma have a complementary relationship that is widely accepted today, and more companies are establishing those programs, especially after the proven capability of Lean and Six Sigma in leading companies such as Toyota and Motorola. However, there are some fundamental differences between both approaches to process management and improvement, such as the application of Six Sigma methodology requires more intense training compared to Lean methodology, and Lean is fundamentally used to tackle process inefficiency, whereas Six Sigma is primarily used to tackle process effectiveness issues. Thus, there are many different definitions of Lean Six Sigma (LSS). However, the founder and President of The George Group, the largest LSS consulting practice in the USA, George (2002) defines LSS as “A methodology that maximizes shareholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed and invested capital.”

AREA OF STUDY:

Data for the study was gathered from various manufacturing and service industries around Mangalore to assess the critical success factors for six sigma implementations in industries.

2.2 METHODOLOGY OF THE STUDY:

The study obtained data from both primary and secondary sources. Primary data was collected through structured questionnaires using nominal and ordinal scales. Secondary data was gathered from diverse sources such as journals, magazines, books, and research theories. The data collection process involved 60 respondents, with a combination of online and offline modes. Data analysis included simple percentage analysis and descriptive analysis. Microsoft Excel and SPSS was utilized for data collection, and statistical tools like graphs and tables were used.

2.3 SCOPE OF THE STUDY:

The assessment of critical success factors for Six Sigma implementation in the Indian industry is a crucial endeavour that holds significant potential for driving organizational success and enhancing competitiveness. Six Sigma, a data-driven approach to process improvement, has gained popularity in various sectors of the Indian economy due to its ability to reduce defects, improve efficiency, and increase customer satisfaction.

In this assessment, several key areas need to be considered. Firstly, the alignment of Six Sigma initiatives with the overall strategic goals of the organization is paramount. Understanding the specific needs and priorities of the Indian industry is essential for tailoring Six Sigma methodologies to suit the unique challenges and cultural context of the region.

Secondly, organizational commitment and leadership support play a pivotal role in the success of Six Sigma implementation. Top management's active involvement in championing the initiative, allocating resources, and fostering a culture of continuous improvement are critical factors that can positively influence the outcomes.

Thirdly, an assessment of the workforce's readiness for Six Sigma is vital. Adequate training and development programs must be in place to equip employees with the necessary skills and knowledge to participate effectively in Six Sigma projects.

Another critical aspect to evaluate is the selection of appropriate projects. Identifying high-impact projects that align with the organization's objectives and possess a reasonable chance of success is essential. Prioritizing projects based on potential benefits and resource availability can help maximize the return on investment in Six Sigma initiatives.

Lastly, an evaluation of the performance measurement and feedback mechanisms is necessary. Implementing Six Sigma requires continuous monitoring and evaluation of project outcomes to identify successes, challenges, and areas for improvement.

In conclusion, the scope of assessing critical success factors for Six Sigma implementation in the Indian industry encompasses various elements such as strategic alignment, leadership support, workforce readiness, project selection, technology utilization, and performance measurement. A comprehensive evaluation of these factors can help organizations in the Indian industry leverage Six Sigma to drive continuous improvement and achieve sustainable success in a highly competitive business landscape.

2.4 LIMITATION OF THE STUDY:

- Interaction with respondents was limited due to their busy schedules, and the sample size was limited to 60 due to time constraints.
- The sample size has been set at 60, which may not be representative of the entire population.
- Fear of the respondents not answering all questions.
- Lack of personnel interaction and other factors affected accuracy information.
- The Universe for the present study is restricted to Mangalore region and if the same research would have been carried in another city, the results may vary.
- The present study is constrained by time, cost and physical limitations of the researcher.

CHAPTER-3

INDUSTRY PROFILE

3.1 INDUSTRY PROFILE

Six Sigma has emerged as one of the most effective business improvement strategies over the years. This quantitative approach aims at improving efficiency and effectiveness of the organization. It is the methodology having statistical base focusing on removing causes of variations or defects in the product or core business processes. The improvement focus is on business outputs which are of critical importance to the customers. In the current dynamic industrial scenario, quality alone is not the winning criteria; consistent supply of quality goods as per the committed delivery schedules makes the customers happy. Six Sigma methodology addresses the major root causes and guarantees the targeted results, both in terms of improvements desired and time span fixed. It is a disciplined, data-driven approach and methodology for eliminating defects in any process –from manufacturing to transactional, from products to services. This breakthrough improvement strategy delivers results of productivity, profitability and quality improvements based on its highly effective approach (Desai, 2008)

3.2 A BRIEF OVERVIEW:

As per Park (2002) Six Sigma implies three things: statistical measurement, management strategy and quality culture. It tells us how good products, services and processes really are, through statistical measuring of quality level. It is new management strategy under leadership of the top management to create quality innovation and total customer satisfaction. It is also a quality culture. It provides the way to do things right the first time and to work smarter by using data information. Antony, Kumar and Madu (2005) stated that Six Sigma provides business leaders and executives with the strategy, methods, tools and techniques to change their organizations. As per them, there are four aspects of the Six Sigma strategy that are not emphasized in other business improvement methodologies and total quality management (TQM). First of all, Six Sigma places a clear focus on bottom-line savings. Second, Six Sigma has been very successful in integrating both human aspects (culture change, training, customer focus etc.) and process aspects (process stability, variation reduction, capability etc.) of continuous improvement. Third, Six Sigma methodology (DMAIC) links the tools and techniques in a sequential manner. Finally, Six Sigma creates a powerful infrastructure for training of champions, master black belts, black

belts, green belts, and yellow belts. As per Voelkel (2002) the business-oriented definition of Six Sigma states that it blends correct management, financial and methodological elements to make improvement to process and products in ways that surpass other approaches. While as per Magnusson, Kroslid and Bergman (2003) Six Sigma is a business process that allows companies to drastically improve their bottom line by designing and monitoring everyday business activities in ways that minimize waste and resources while increasing customer satisfaction by some of its proponents. Linderman, Schroeder, Zaheer and Choo (2003) in defining Six Sigma stress up on process improvement and new product development by stating that Six Sigma is an organized and systematic method for strategic process improvement and new product and service development that relies on statistical methods and the scientific method to make dramatic reductions in customer defined defect rates.

3.3 SIX SIGMA IN INDIAN INDUSTRIES:

Six Sigma has been utilized considerably by Indian industries during last decade. Especially large concerns have successfully tried this breakthrough improvement strategy to get solutions in many of their chronic problems. But small and medium enterprises are still ignorant regarding strengths of this improvement drive, of course there may be few exceptions. Sparing some sporadic articles and case studies in the corporate publications and magazines, the research publications illustrating wide-ranging studies regarding penetration of Six Sigma among Indian industries as a whole are not available so far. Specific case illustrations are there discussing successful application of Six Sigma at small and medium sized Indian industries (Desai, 2008, 2006). But an exhaustive analysis of the experience of different size and sectors of Indian industries with Six Sigma is not available in research publications. Some studies targeting on quality engineering and management scenario in Indian industries as a whole did provide a glimpse on status of Six Sigma in Indian industries. But that is not enough to draw a comprehensive conclusion regarding experience of Indian industries with Six Sigma as a whole (Khanna, Virat, Sahay, & Shankar, 2002; Kumar, Garg, & Mehta, 2002).

3.4 SIX SIGMA IN MANUFACTURING INDUSTRY:

Six Sigma in manufacturing is a process improvement method that helps to minimize waste and produce goods more efficiently. Created in the 1980s by Motorola engineer Bill Smith, six sigma derives its name from standard deviation (typically represented by the Greek letter sigma, σ). The goal of six sigma initiatives is to reduce variation to the point that defects are counted in the parts per million. Six Sigma in manufacturing is often closely associated with lean manufacturing. Lean manufacturing and six sigma initiatives both seek to improve quality and efficiency by eliminating manufacturing defects and waste. The approach taken in six sigma manufacturing differs from that taken in lean manufacturing. Lean manufacturing uses a five-step process to create continuous improvement:

- Identify value
- Create a value stream map
- Generate a process flow
- Establish “pull” (create an on-demand process)
- Continuously improve and perfect

Six Sigma in manufacturing focuses on eliminating variation, which results in reduced costs and greater customer satisfaction. The starting point with six sigma is the customer’s experience, and the methodology is data-driven.

3.5 CHALLENGES IN THE MANUFACTURING INDUSTRY:

There are several challenges that companies in India face when implementing Six Sigma strategies in the manufacturing industry. Some of these challenges include:

- Cultural differences: India has a unique culture, and this can affect the implementation of Six Sigma strategies. Many Indian workers are used to working in a hierarchical environment, which can make it difficult to implement the collaborative, team-based approach of Six Sigma.
- Limited resources: Many companies in India face resource constraints, such as limited budgets and a shortage of skilled professionals. This can make it challenging to invest in Six Sigma training and implementation.

- Lack of understanding: There is often a lack of understanding among Indian workers about what Six Sigma is and how it can benefit the company. This can lead to resistance to change and a lack of commitment to the Six Sigma approach.
- Complex supply chains: Many Indian companies operate within complex supply chains, which can make it difficult to implement Six Sigma strategies across the entire chain. This can result in inconsistencies and variations in the quality of products and services.
- Regulatory environment: India has a complex regulatory environment, and this can pose challenges for companies trying to implement Six Sigma strategies. Regulations can vary from state to state and can impact the implementation of quality control processes.
- Lack of leadership support: The success of Six Sigma implementation depends on leadership support and commitment. However, in some Indian companies, there may be a lack of understanding or commitment to Six Sigma among top-level management.

To overcome these challenges, companies in India need to invest in Six Sigma training and education, create a culture of continuous improvement, and develop strong leadership support for Six Sigma initiatives. They also need to ensure that the Six Sigma strategies are tailored to meet the specific needs of the Indian market and take into account the unique cultural, regulatory, and resource constraints that exist in the country.

3.6 PROSPECTIVES IN MANUFACTURING INDUSTRY:

Despite the challenges, there are several promising prospects for the Six Sigma strategy in the Indian manufacturing industry. Here are a few:

- Improved quality: The primary benefit of implementing Six Sigma in manufacturing is improved quality. By reducing variation in processes and products, companies can produce high-quality goods that meet customer expectations.

- Increased efficiency: Six Sigma can help companies streamline their processes and eliminate waste, resulting in increased efficiency and cost savings.
- Better customer satisfaction: Six Sigma's customer-centric approach ensures that products and services meet or exceed customer expectations, leading to higher levels of customer satisfaction and loyalty.
- Competitive advantage: By adopting Six Sigma, Indian companies can differentiate themselves from their competitors by offering high-quality products and services at lower costs.
- Cultural fit: Six Sigma's emphasis on teamwork and continuous improvement aligns well with India's collectivistic culture, where group harmony and collaboration are highly valued.
- Global applicability: Six Sigma is a globally recognized methodology, and its adoption in the Indian manufacturing industry can help Indian companies compete on a global scale.
- Skilled workforce: The implementation of Six Sigma requires a skilled workforce, and the training and certification programs associated with Six Sigma can help Indian workers develop new skills and increase their employability.

In summary, the prospects of Six Sigma in the Indian manufacturing industry are promising. By implementing Six Sigma, Indian companies can improve quality, increase efficiency, enhance customer satisfaction, gain a competitive advantage, and develop a skilled workforce, among other benefits.

3.7 THE SEVEN STEPS OF SIX SIGMA IN MANUFACTURING INDUSTRY:

1. Start with the customer– With a goal of delivering goods that satisfy the customer, six sigma sets out to optimize the value to the customer-generated through the production process.
2. Delineate the manufacturing process – Manufacturers need to clearly comprehend how products are currently being produced and identify inefficiencies before determining how to improve. Like the lean manufacturing approach, six sigma uses process maps and workflow charts in this effort.

3. Develop a plan – Any inefficiencies identified in step 2 can be subjected to processes like the 5 Whys [\[link to glossary page\]](#) to understand the nature of the problem and come up with a plan that addresses it.
4. Cut waste to optimize value – Implementing the plans developed in step 3 involves waste reduction.
5. Minimize variation – Consistency in manufacturing processes helps to reduce defects by reducing the amount of variation that occurs.
6. Collaborate – Working with all stakeholders helps a manufacturer to identify variations that might otherwise have been overlooked.
7. Be systematic – Applying a scientific and data-driven approach to process improvement, six sigma in manufacturing is founded on data to define the problem, calculation to determine the best course of action, and measurement to gauge progress.

3.8 SIX SIGMA SOFTWARE AND ITS BENEFITS:

A manufacturing operations management system (MOM) [\[link to glossary page\]](#) incorporates six sigma software and/or the Six Sigma methodology. Six Sigma software may employ the steps outlined above or what has become known as the DMAIC method: define, measure, analyze, improve, and control. By ferreting out inefficiencies and improving manufacturing productivity and outcomes, six sigma software provides a well-defined means to closed-loop continuous process improvement.

Additional benefits:

- Reduced scrap
- Shorter cycle times
- Improved on-time delivery
- Reduced operating costs
- Greater customer satisfaction

3.9 EXAMPLES OF SIX SIGMA IN MANUFACTURING SECTORS:

Adidas has reduced its manufacturing time by over 30% by implementing Six Sigma techniques into its production line. It means less time spent on production, which means

more research and development for new products and faster delivery times for customers who want their products faster.

Many companies are trying to reduce their production time and cost. One of the most successful methods for doing this is Six Sigma. Lean Six Sigma project examples of manufacturing include using the method to promote manufacturing well-being. In this article, we will discuss Six Sigma and how it can help your company in the manufacturing sector. Six Sigma is a methodology that Motorola developed in 1986 to improve quality and eliminate defects from manufacturing processes.

CHAPTER-4

DATA ANALYSIS AND

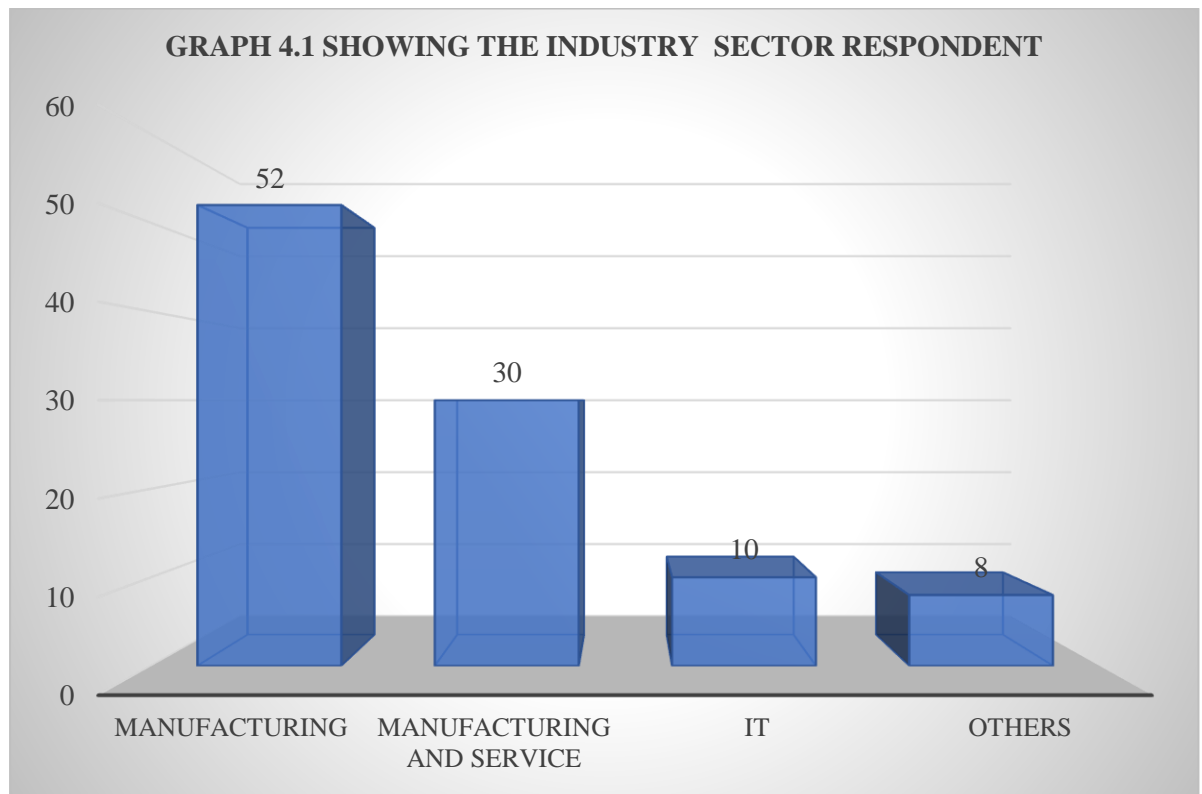
INTERPRETATION

PROFILE OF RESPONDENTS

TABLE 4.1 TABLE SHOWING THE INDUSTRY SECTOR

Particulars	No of respondents	Percentage of respondents (%)
Manufacturing	31	52
Manufacturing and Service	18	30
IT	6	10
Others	5	8
Total	60	100

Source: primary data



SOURCE: 4.1

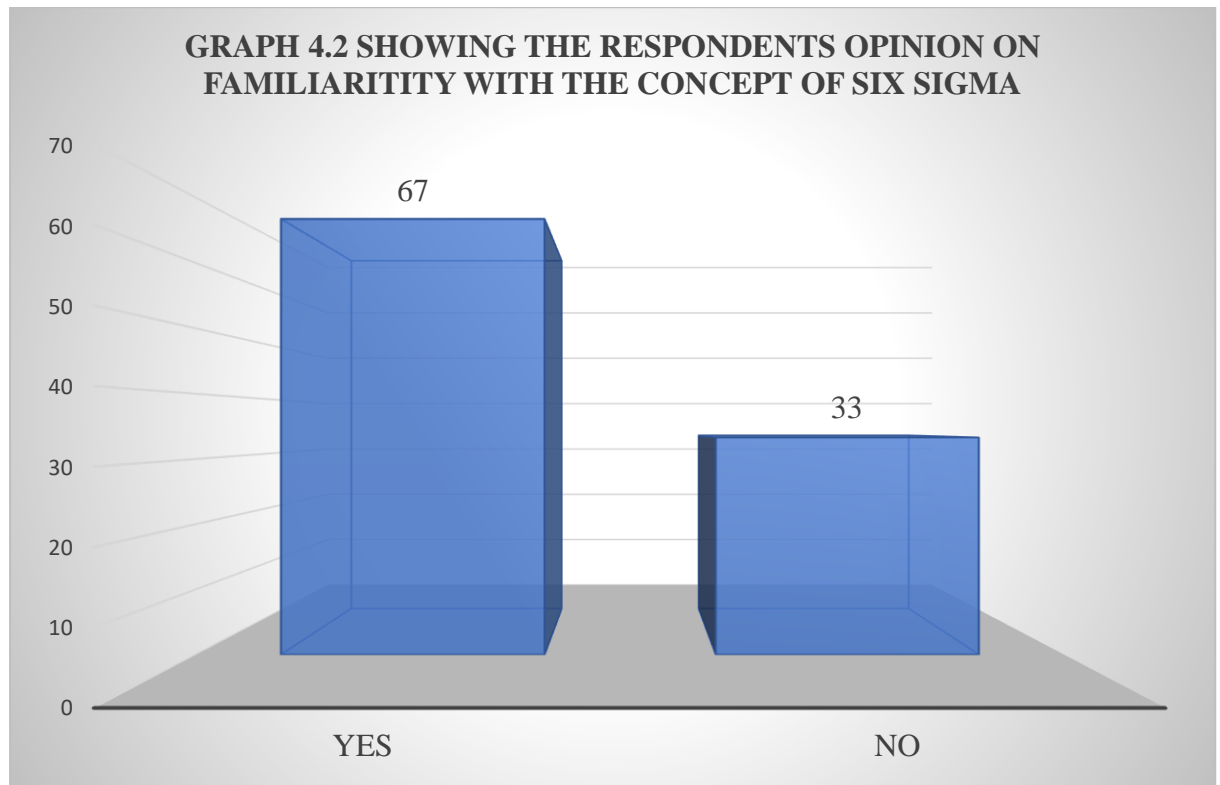
Analysis: Here, 18 percent of respondents work in the manufacturing industry, 30 percent in the manufacturing and service sector, 10 percent in the information technology sector, and 42 percent in other industries.

Inference: The majority of respondents work in the manufacturing industries.

TABLE 4.2 TABLE SHOWING THE RESPONDENTS OPINION ON FAMILIARITY WITH THE CONCEPT OF SIX SIGMA

Particulars	No of respondents	Percentage of respondents (%)
Yes	40	67
No	20	33
Total	60	100

Source: primary data



SOURCE: 4.2

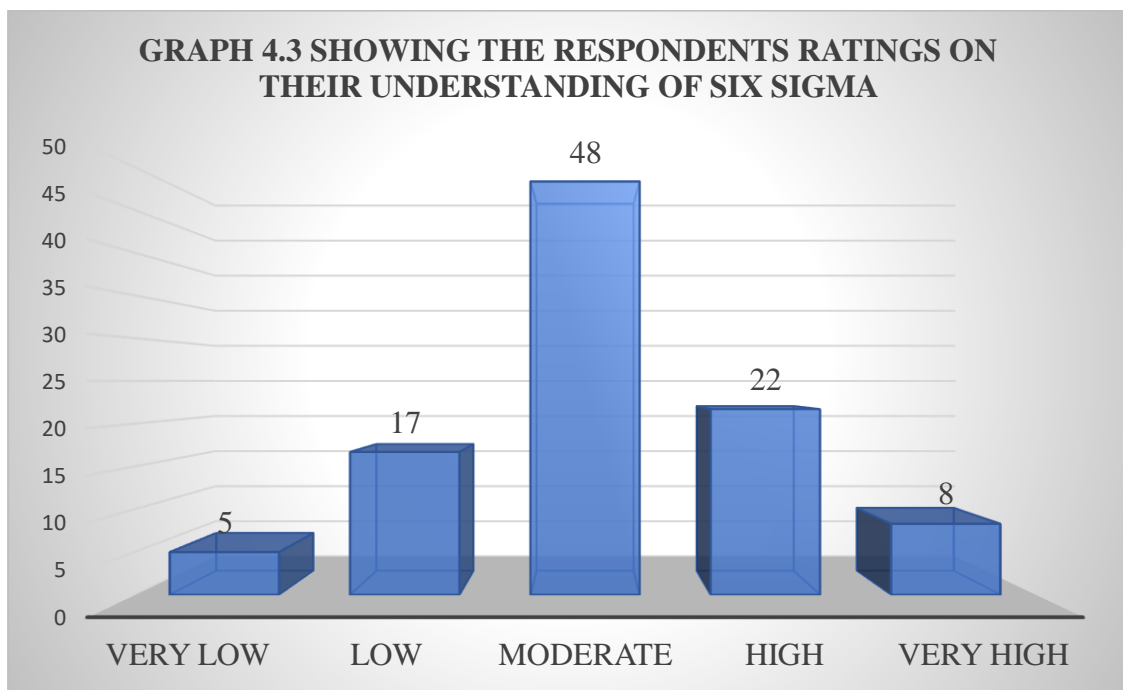
Analysis: In this study, 67 percent of respondents are familiar with the six-sigma idea, whereas 33 percent of respondents are not.

Inference: The majority of respondents are familiar with the six-sigma idea.

TABLE 4.3 TABLE SHOWING THE RESPONDENTS RATINGS ON THEIR UNDERSTANDING OF SIX SIGMA

Particulars	No of respondents	Percentage of respondents (%)
Very low	3	5
Low	10	17
Moderate	29	48
High	13	22
Very high	5	8
Total	60	100

Source: primary data



Source: Table 4.3

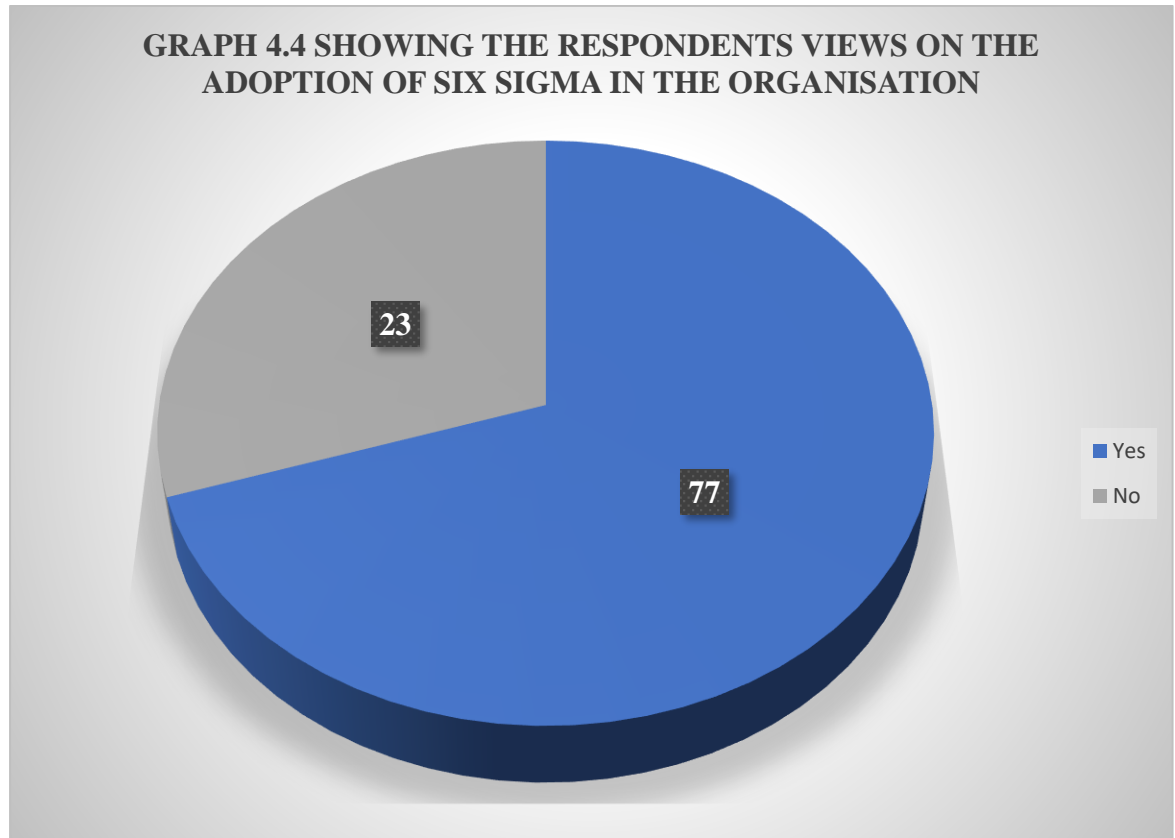
Analysis: According to the above graph, 5 percent of respondents have a very low understanding of six sigma, 17 percent have a low understanding, 48 percent have a moderate understanding, 22 percent have a high understanding, and 8 percent have a very high level of understanding.

Inference: The majority of respondents had a medium degree of understanding of Six Sigma.

TABLE 4.4 TABLE SHOWING THE RESPONDENTS VIEWS ON THE ADOPTION OF SIX SIGMA IN THE ORGANISATION

Particulars	No of respondents	Percentage of respondents (%)
Yes	46	77
No	14	23
Total	60	100

Source: primary data



SOURCE: 4.4

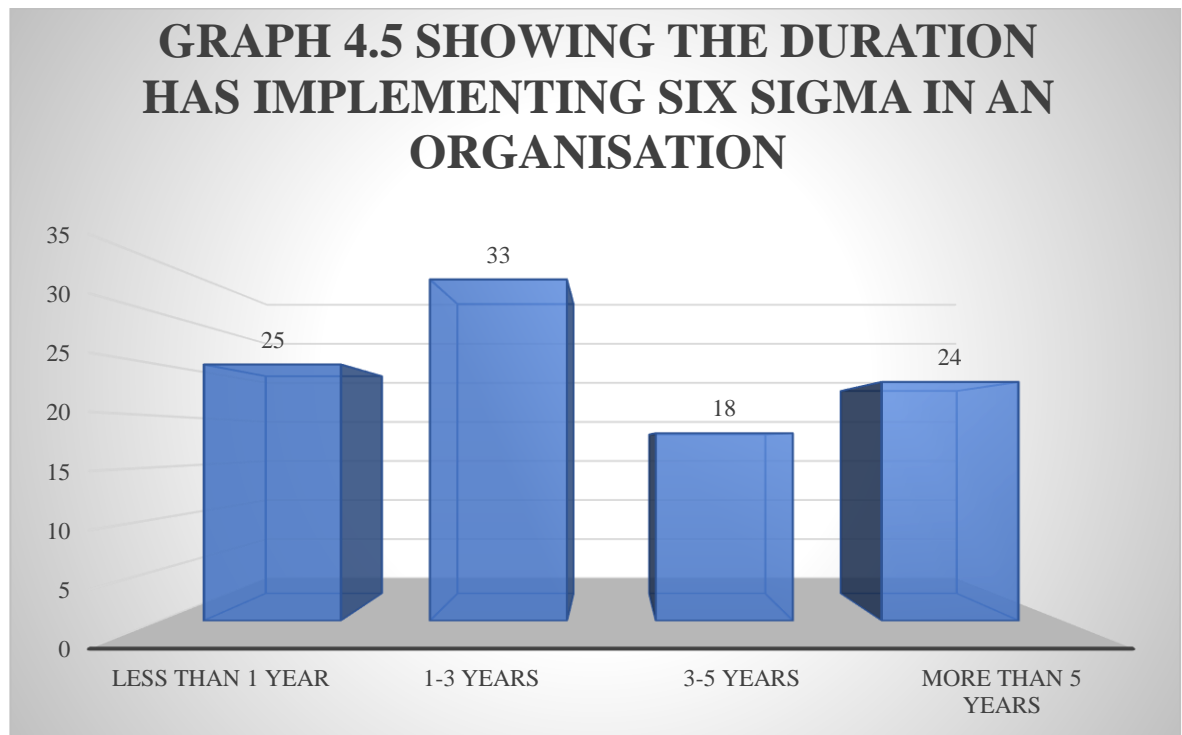
Analysis: It is evident that 77 percent of the organization has adopted six sigma, whereas 23 percent has not.

Inference: The majority of the organization has implemented six sigma.

TABLE 4.5 TABLE SHOWING THE DURATION HAS IMPLEMENTING SIX SIGMA IN AN ORGANISATION

Particulars	No of respondents	Percentage of respondents (%)
Less than 1 year	15	25
1-3 years	20	33
3-5 years	11	18
More than 5 years	14	24
Total	60	100

Source: primary data



SOURCE: 4.5

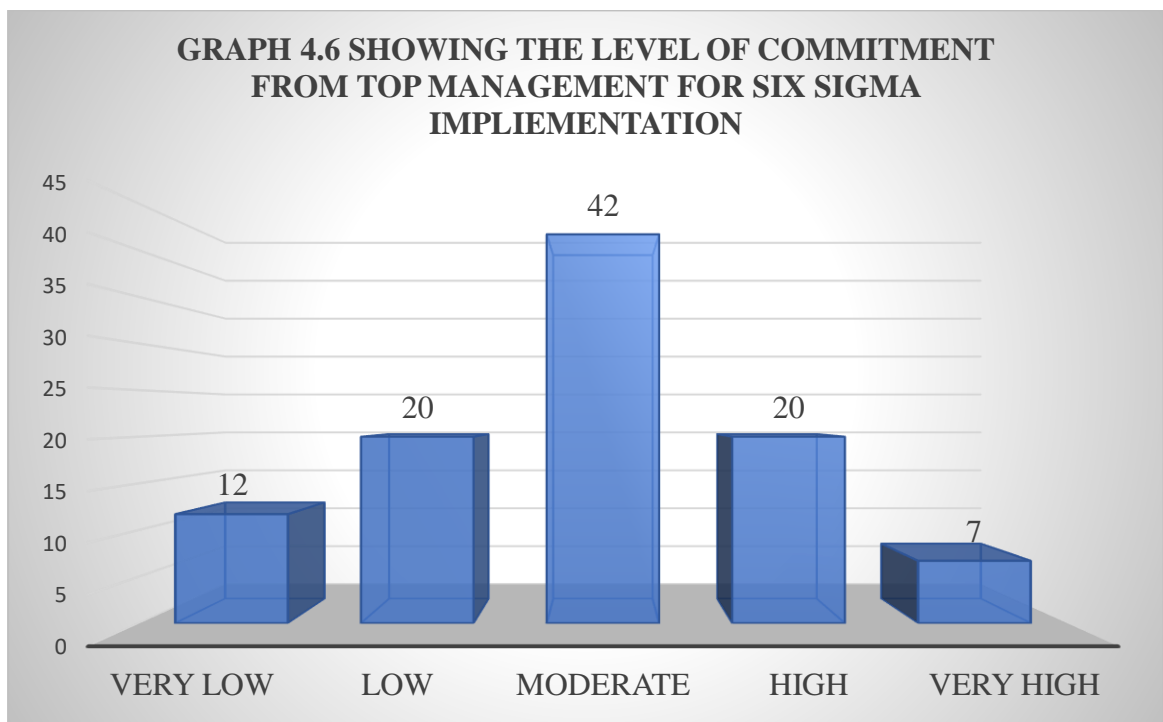
Analysis: Here, 25 percent of respondents indicate their business has only recently introduced six sigma, 33 percent say it has been in place for one to three years, 18 percent say it has been in place for three to five years, and 24 percent say it has been in place for at least one year.

Inference: According to the majority of responses, a business has been using six sigma for 1 to 3 years.

TABLE 4.6 TABLE SHOWING THE LEVEL OF COMMITMENT FROM TOP MANAGEMENT FOR SIX SIGMA IMPLEMENTATION

Particulars	No of respondents	Percentage of respondents (%)
Very low	7	12
Low	12	20
Moderate	25	42
High	12	20
Very high	4	7
Total	60	100

Source: primary data



Source: Table 4.6

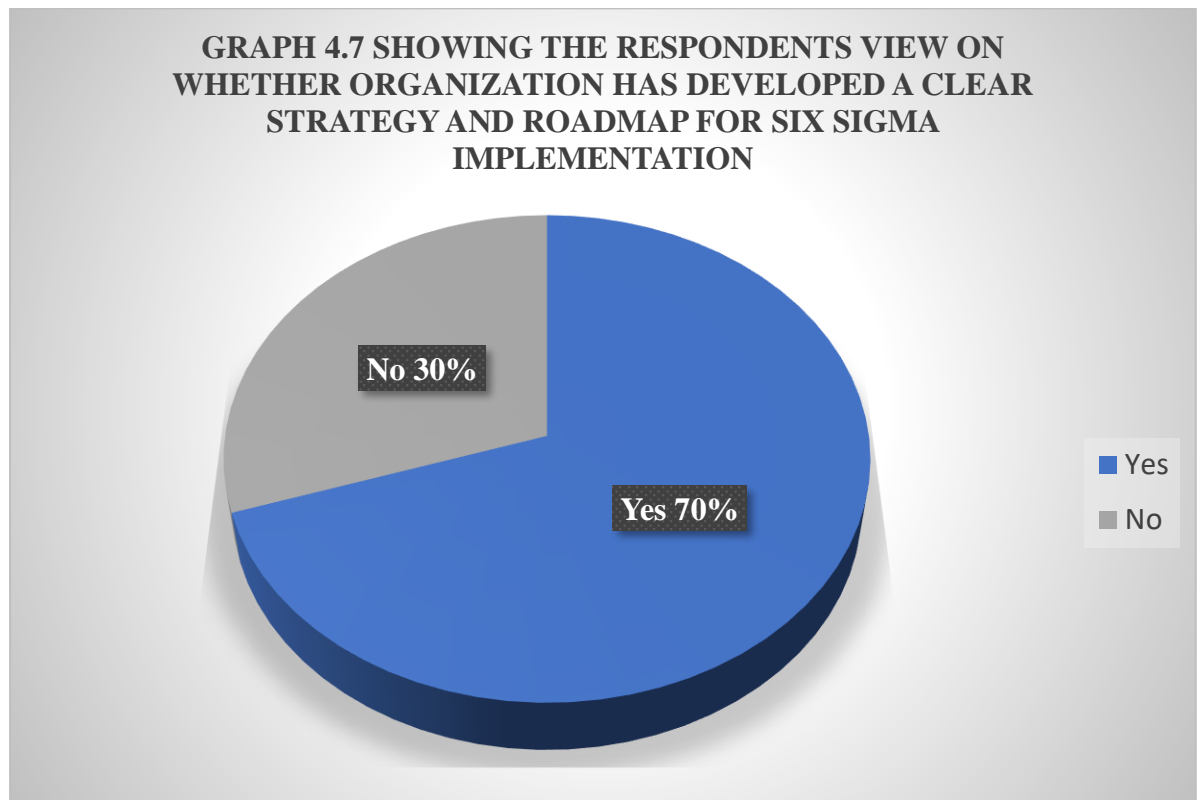
Analysis: According to the above chart, 12 percent of respondents report very low levels of commitment from top management, compared to 20 percent who report low levels, 42 percent who report moderate levels, 20 percent who report high levels, and 7 percent who report a very high level of commitment from top management for six sigma implementations in an organization.

Inference: The majority of respondents indicate that senior management has a modest level of dedication.

TABLE 4.7 TABLE SHOWING THE RESPONDENTS VIEWS ON WHETHER THE ORGANIZATION HAS DEVELOPED A CLEAR STRATEGY AND ROADMAP FOR SIX SIGMA IMPLEMENTATION

Particulars	No of respondents	Percentage of respondents (%)
Yes	42	70
No	18	30
Total	60	100

Source: primary data



SOURCE: 4.7

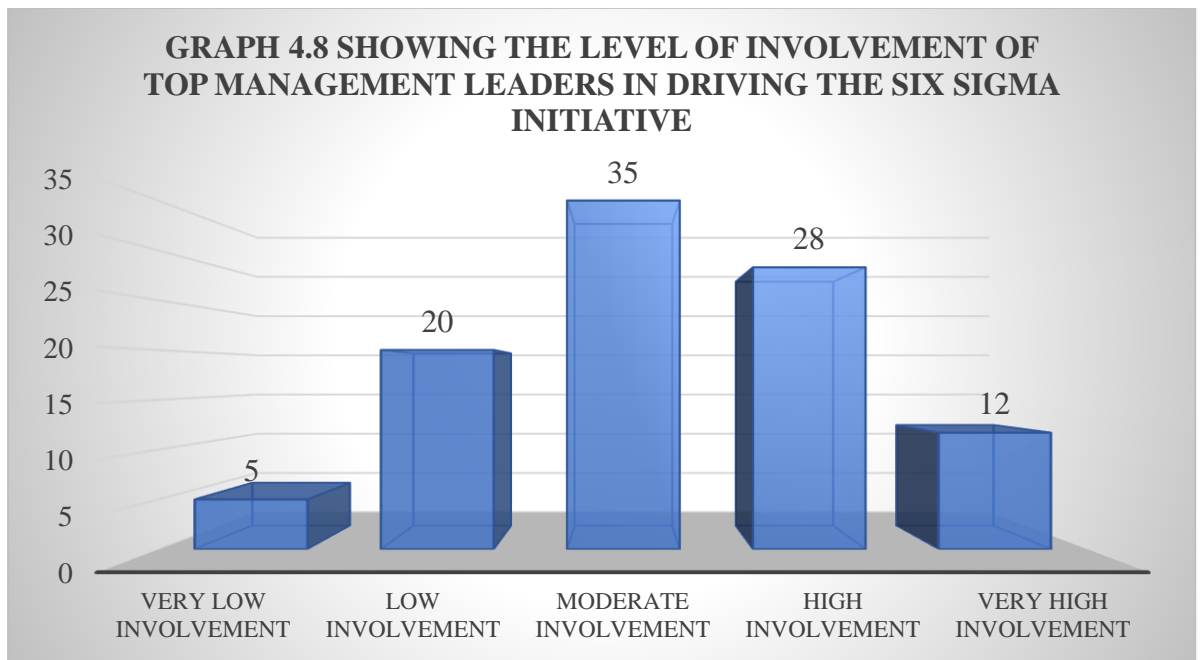
Analyses: In the above graph, 70 percent of the organizations have produced a clear plan and roadmap for Six Sigma, and 30 percent of the organizations have not.

Inference: The majority of the organization has produced a clear plan and roadmap for Six Sigma.

TABLE 4.8 TABLE SHOWING THE LEVEL OF INVOLVEMENT OF TOP MANAGEMENT LEADERS IN DRIVING THE SIX SIGMA INITIATIVE

Particulars	No of respondents	Percentage of respondents (%)
Very low involvement	3	5
Low involvement	12	20
Moderate involvement	21	35
High involvement	17	28
Very high involvement	7	12
Total	60	100

Source: primary data



Source: Table 4.8

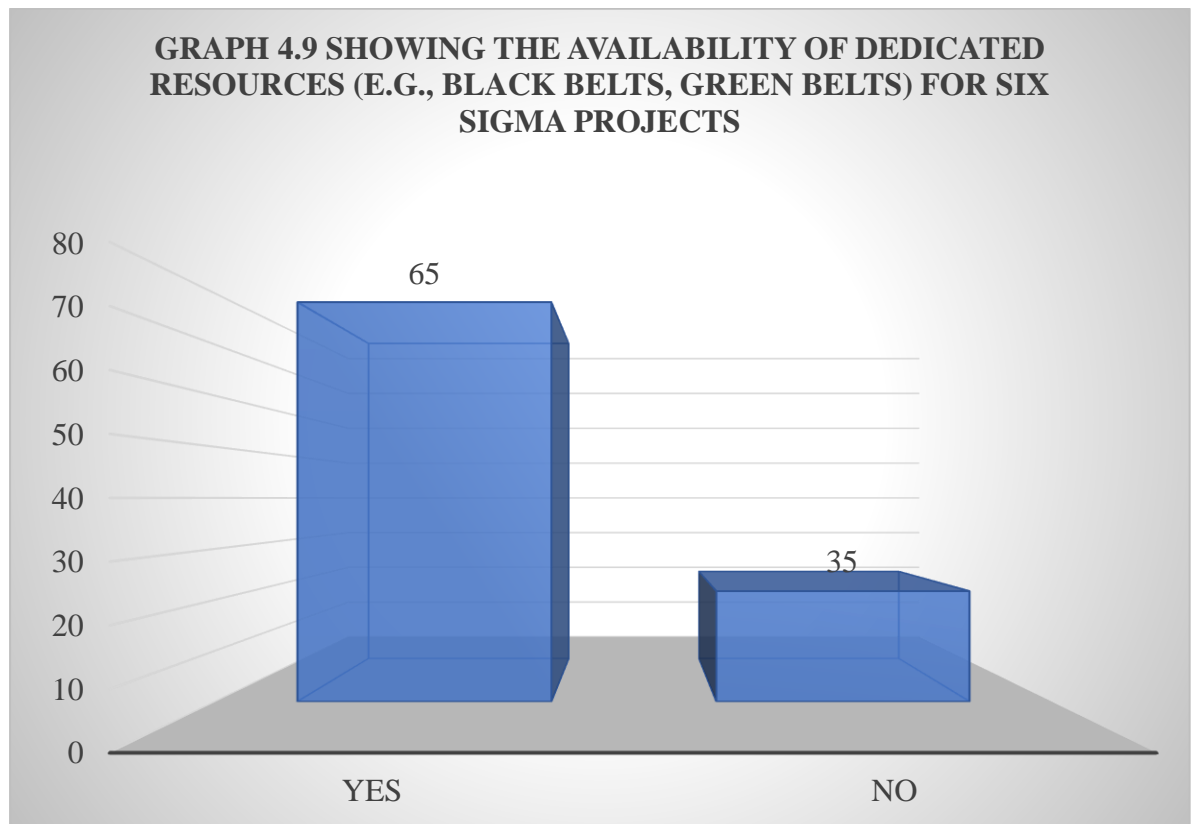
Analysis: According to the above chart, 5 percent of respondents have very low levels of top management leaders' involvement in driving the six-sigma initiative, 20 percent of respondents have low involvement, 35 percent of respondents are moderately involved, 28 percent of respondents are highly involved, and 12 percent of respondents have very high levels of involvement of top management leaders in driving the six-sigma initiative in an organization.

Inference: The majority of respondents had a moderate level of top management leaders' involvement in the Six Sigma project.

TABLE 4.9 TABLE SHOWING THE AVAILABILITY OF DEDICATED RESOURCES (E.G., BLACK BELTS, GREEN BELTS) FOR SIX SIGMA PROJECTS

Particulars	No of respondents	Percentage of respondents (%)
Yes	39	65
No	21	35
Total	60	100

Source: primary data



SOURCE: 4.9

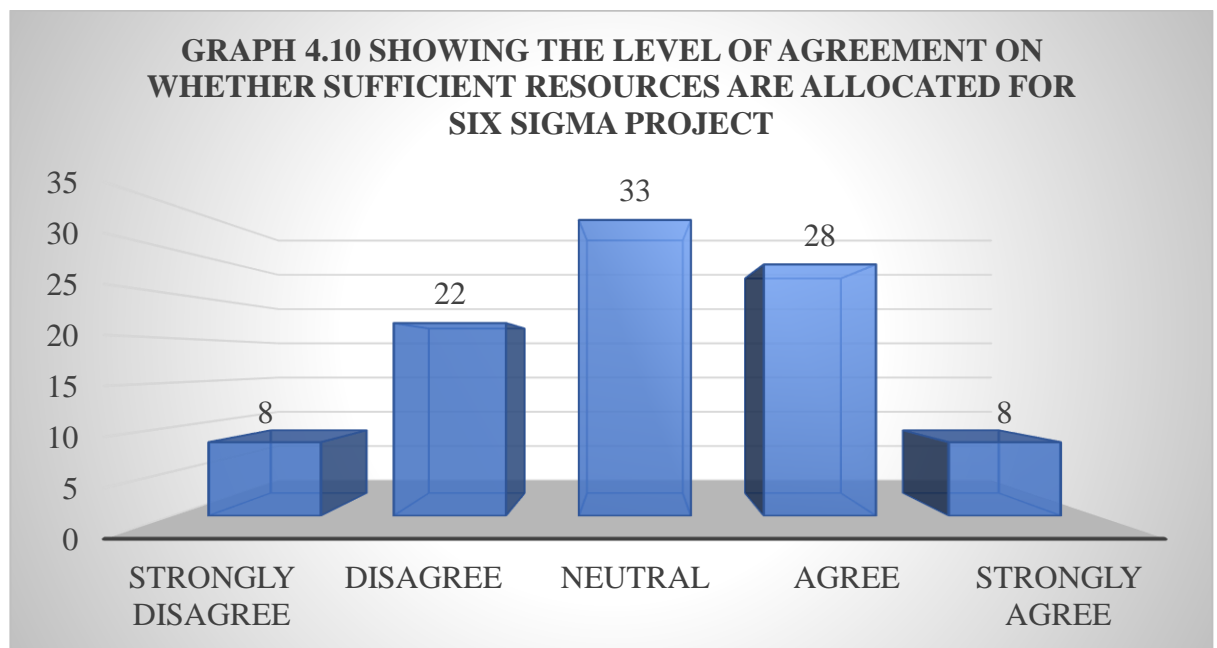
Analysis: The above graph shows that 65 percent of the organizations in this situation have resources (such as Black Belts and Green Belts) devoted to Six Sigma initiatives, while 35 percent of the organizations do not.

Inference: The majority of the respondents say that the organization has dedicated resources (such as Black Belts and Green Belts) set aside for Six Sigma projects.

TABLE 4.10 TABLE SHOWING THE LEVEL OF AGREEMENT ON WHETHER SUFFICIENT RESOURCES ARE ALLOCATED FOR SIX SIGMA PROJECT

Particulars	No of respondents	Percentage of respondents (%)
Strongly Disagree	5	8
Disagree	13	22
Neutral	20	33
Agree	17	28
Strongly Agree	5	8
Total	60	100

Source: primary data



Source: Table 4.10

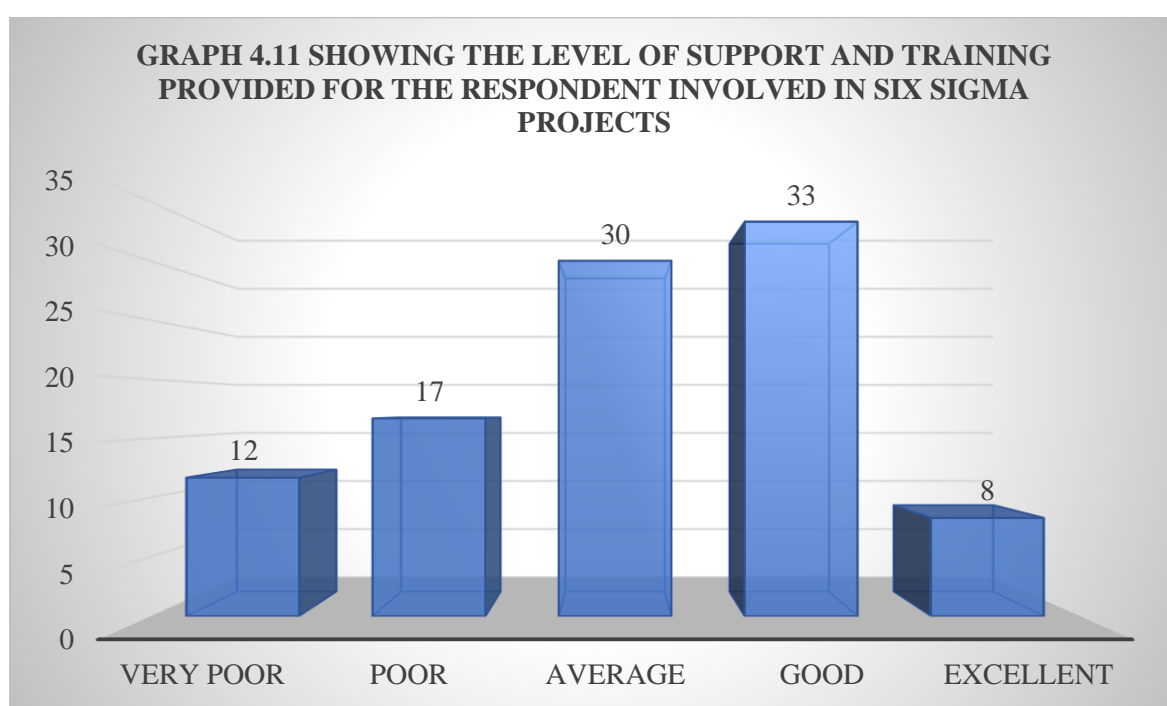
Analysis: The graph above shows the respondent's belief that a business allocates enough resources (financial, human, and technological) for six sigma projects. According to the specifics, 8 percent of respondents strongly disagreed with the statement, 22 percent of respondents agreed with the statement, and 33 percent of respondents had a neutral opinion on it. 8 percent of respondents strongly agreed with the statement, while 28 percent of respondents agreed with it.

Inference: The majority of respondents have a neutral opinion on the allocation of resources for the six sigma project.

TABLE 4.11 TABLE SHOWING THE LEVEL OF SUPPORT AND TRAINING PROVIDED FOR THE RESPONDENT INVOLVED IN SIX SIGMA PROJECTS

Particulars	No of respondents	Percentage of respondents (%)
Very poor	7	12
Poor	10	17
Average	18	30
Good	20	33
Excellent	5	8
Total	60	100

Source: primary data



Source: Table 4.11

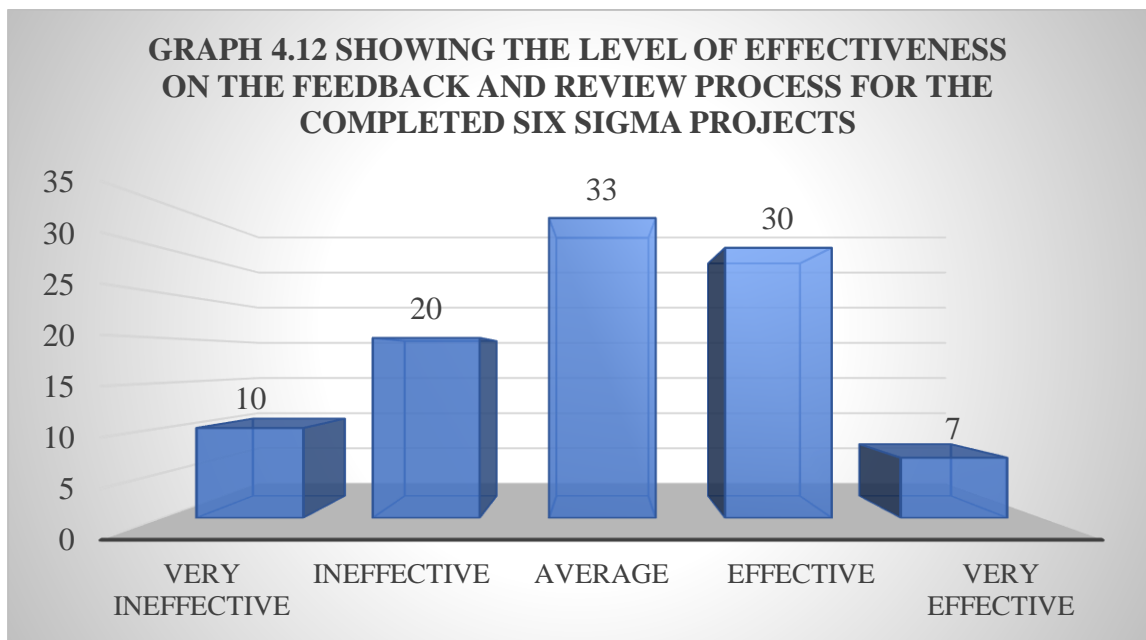
Analysis: The training and assistance provided to staff members working on six sigma initiatives are shown in the above graph. 12 percent of respondents indicated they were very poor. Poor rating by 17 percent of respondents. A 30 percent response rate indicates an average. When asked how well staff is supported and provided training, 33 percent of respondents said "good," while 8 percent said "excellent."

Inference: The majority of respondents believe that employees receive good training and support from the Six Sigma project.

TABLE 4.12 TABLE SHOWING THE LEVEL OF EFFECTIVENESS OF THE FEEDBACK AND REVIEW PROCESS FOR THE COMPLETED SIX SIGMA PROJECTS

Particulars	No of respondents	Percentage of respondents (%)
Very ineffective	6	10
Ineffective	12	20
Average	20	33
Effective	18	30
Very effective	4	7
Total	60	100

Source: primary data



Source: Table 4.12

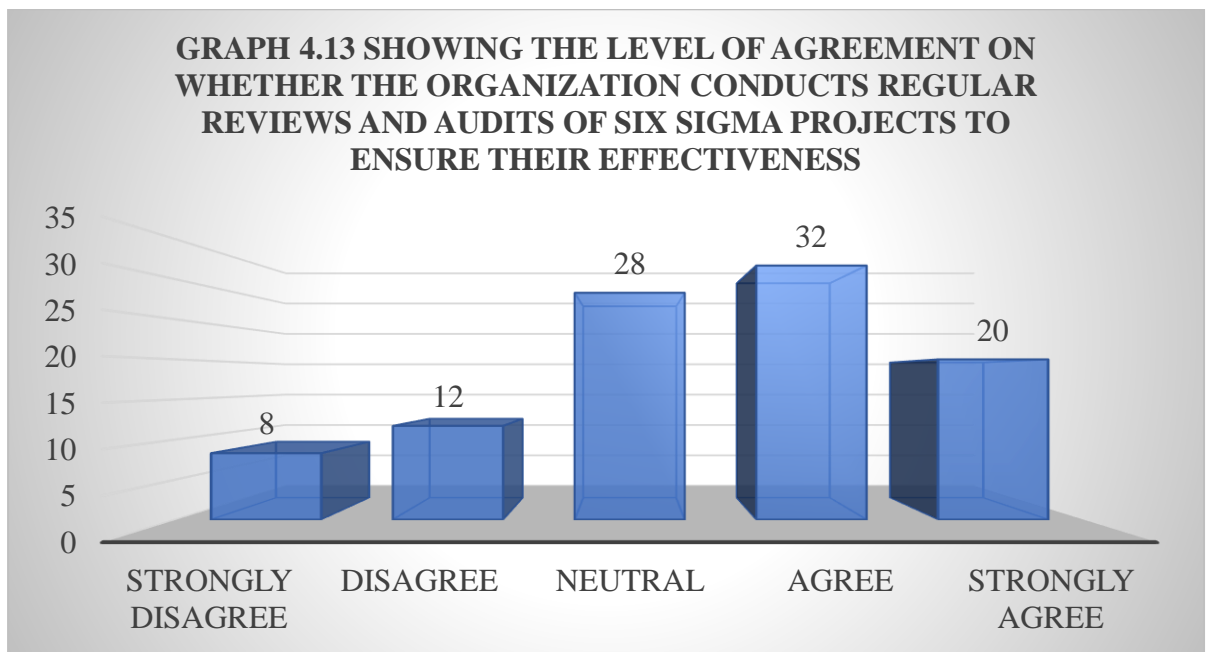
Analysis: The feedback and review procedure for finished Six Sigma initiatives is shown in the above diagram. 10 percent of respondents said it was very ineffective. Ineffective is a response given by 20 percent of respondents. A 33 percent response rate indicates an average. The feedback and evaluation procedure for finished Six Sigma projects is rated as Effective by 30 percent of respondents and Very Effective by 7 percent of respondents.

Inference: The majority of respondents believe that the feedback and project reviews for finished Six Sigma initiatives are average.

TABLE 4.13 TABLE SHOWING THE LEVEL OF AGREEMENT ON WHETHER THE ORGANIZATION CONDUCTS REGULAR REVIEWS AND AUDITS OF SIX SIGMA PROJECTS TO ENSURE THEIR EFFECTIVENESS

Particulars	No of respondents	Percentage of respondents (%)
Strongly Disagree	5	8
Disagree	7	12
Neutral	17	28
Agree	19	32
Strongly Agree	12	20
Total	60	100

Source: primary data



Source: Table 4.13

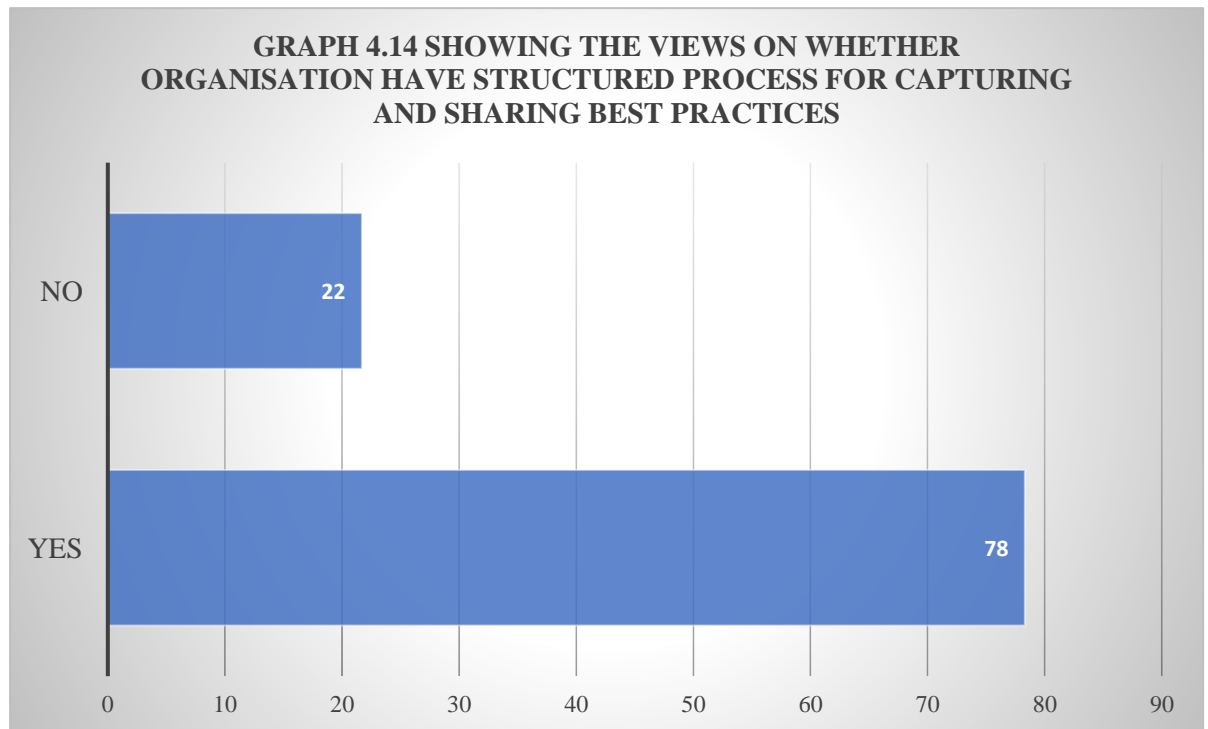
Analysis: The graph above shows the respondent's claim that the firm regularly audits and analyses Six Sigma projects to ensure their efficacy. According to the specifics, 8 percent of respondents strongly disagreed with the statement, 12 percent had a disagreement with the statement, and 28 percent had a neutral opinion of it. 20 percent of respondents strongly agreed with the statement, while 32 percent of respondents agreed with it.

Inference: The majority of respondents agreed with the claim that the firm regularly audits and analyses Six Sigma projects to ensure their effectiveness.

TABLE 4.14 TABLE SHOWING THE VIEWS ON WHETHER ORGANISATIONS HAVE STRUCTURED PROCESSES FOR CAPTURING AND SHARING BEST PRACTICES

Particulars	No of respondents	Percentage of respondents (%)
Yes	47	78
No	13	22
Total	60	100

Source: primary data



SOURCE: 4.14

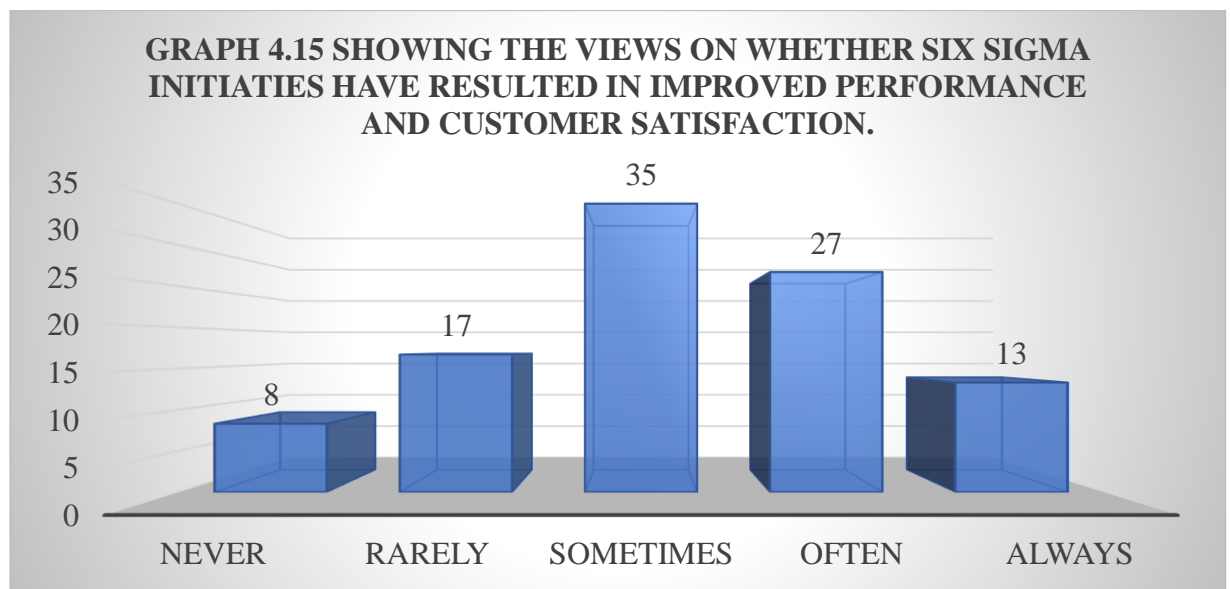
Analysis: In this situation, 78 percent of the organizations have a structured process for documenting and disseminating best practices and lessons learned from Six Sigma projects, while 22 percent of the organizations don't have such a process.

Inference: The majority of the organization has a formal procedure in place for documenting and disseminating the best practices and lessons discovered through Six Sigma projects.

TABLE 4.15 TABLE SHOWING THE VIEWS ON WHETHER SIX SIGMA INITIATIVES HAVE RESULTED IN IMPROVED PERFORMANCE AND CUSTOMER SATISFACTION.

Particulars	No of respondents	Percentage of respondents (%)
Never	5	8
Rarely	10	17
Sometimes	21	35
Often	16	27
Always	8	13
Total	60	100

Source: primary data



SOURCE: 4.15

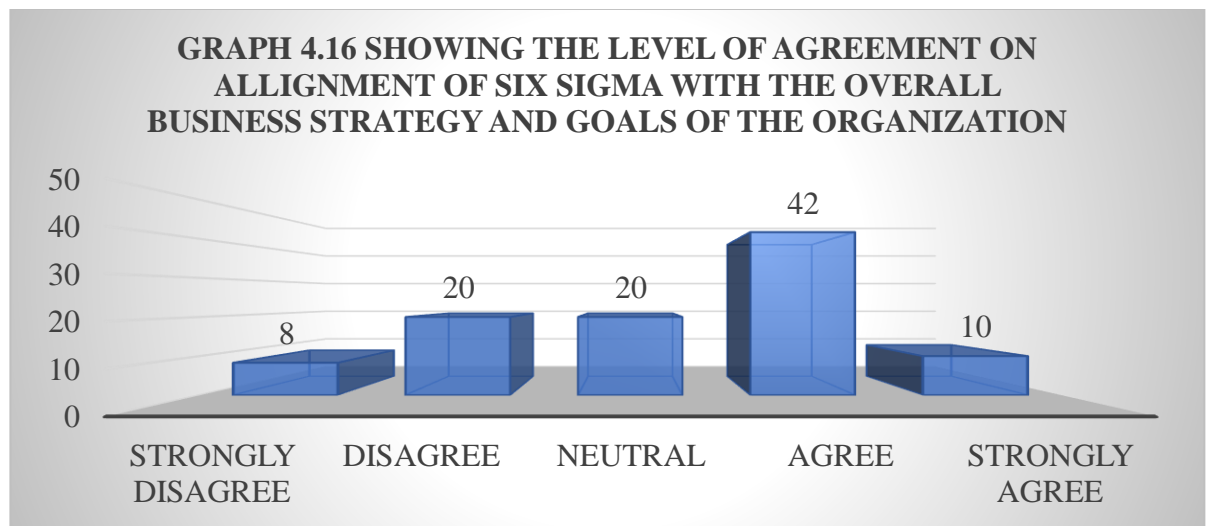
Analysis: The graph mentioned above displays the changes in respondents' process performance and customer satisfaction. 8 percent of respondents said they have never noticed increases in process effectiveness or customer satisfaction. 17 percent of those surveyed reported having few feelings. 35 percent of respondents said they occasionally felt. Improvements in process performance and customer satisfaction were frequently felt by 27 percent of respondents and always by 13 percent of respondents.

Inference: The majority of respondents occasionally notice gains in process efficiency and customer satisfaction.

TABLE 4.16 TABLE SHOWING THE LEVEL OF AGREEMENT ON THE ALIGNMENT OF SIX SIGMA WITH THE OVERALL BUSINESS STRATEGY AND GOALS OF THE ORGANIZATION

Particulars	No of respondents	Percentage of respondents (%)
Strongly Disagree	5	8
Disagree	12	20
Neutral	12	20
Agree	25	42
Strongly Agree	6	10
Total	60	100

Source: primary data



Source: Table 4.16

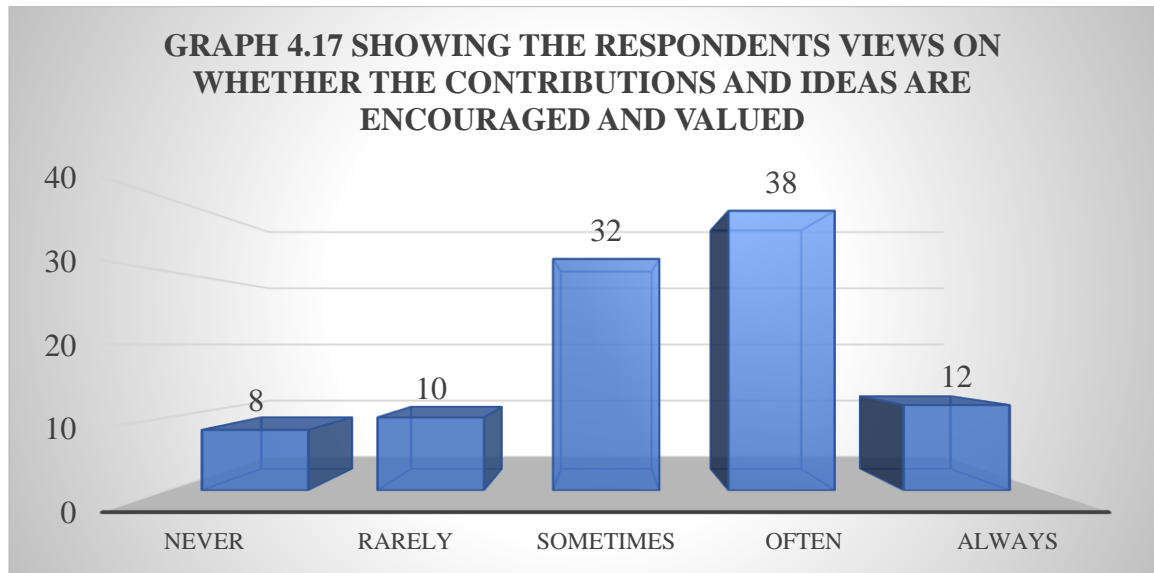
Analysis: The respondent's remark regarding Six Sigma is connected with the preceding chart, which shows. According to the details, 42 percent of respondents agreed with the statement, 20 percent disagreed with it, and 20 percent had no opinion. This leaves 8 percent of respondents who responded who strongly disagreed with the statement. 10 percent of respondents strongly agreed that the alignment of six sigma is connected with the organization's overall business strategy and goals of the organization.

Inference: The majority of respondents agreed that six sigma aligned with the overall business strategy and goals of the organization.

TABLE 4.17 TABLE SHOWING THE RESPONDENTS VIEWS ON WHETHER THE CONTRIBUTIONS AND IDEAS ARE ENCOURAGED AND VALUED.

Particulars	No of respondents	Percentage of respondents (%)
Never	5	8
Rarely	6	10
Sometimes	19	32
Often	23	38
Always	7	12
Total	60	100

Source: primary data



Source: Table 4.17

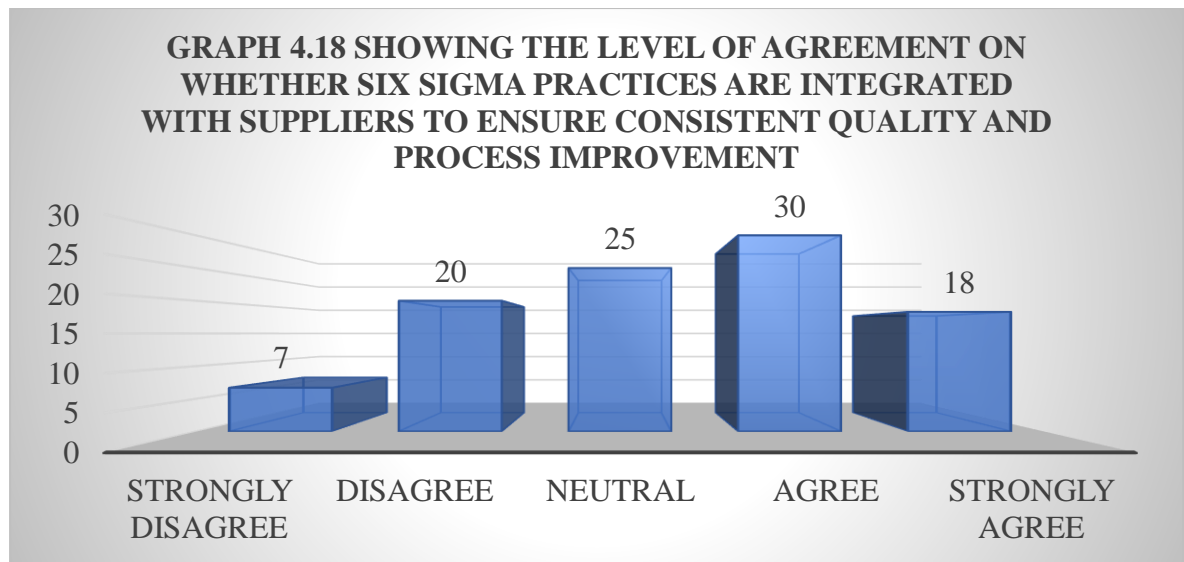
Analysis: The following graph indicates that contributions and ideas from employees are valued and promoted in organizations, since 8 percent of respondents indicated that this is never the case. 10 percent of the respondents said they rarely felt. 32 percent of respondents reported having occasional feelings. 38 percent of respondents said they frequently feel like their efforts and thoughts are respected, while 12 percent said they always do.

Inference: A majority of respondents believe that their contributions and thoughts are valued and encouraged.

TABLE 4.18 TABLE SHOWING THE LEVEL OF AGREEMENT ON WHETHER SIX SIGMA PRACTICES ARE INTEGRATED WITH SUPPLIERS TO ENSURE CONSISTENT QUALITY AND PROCESS IMPROVEMENT

Particulars	No of respondents	Percentage of respondents (%)
Strongly Disagree	4	7
Disagree	12	20
Neutral	15	25
Agree	18	30
Strongly Agree	11	18
Total	60	100

Source: primary data



Source: Table 4.18

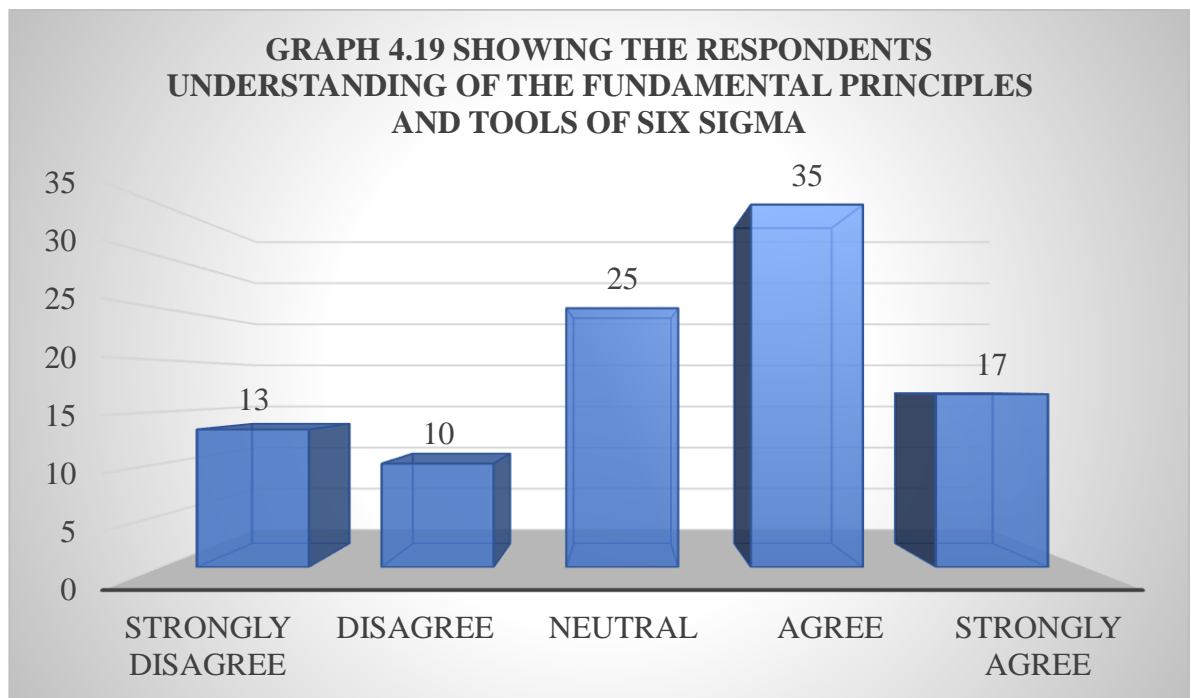
Analysis: The respondent's claim that Six Sigma procedures are integrated with suppliers to provide consistent quality and process improvement throughout the supply chain is shown in the above chart. According to the specifics, 7 percent of respondents strongly disagreed with the statement, 20 percent disagreed with the statement, and 25 had a neutral opinion on it. 18 percent of respondents strongly agreed with the statement, and 30 percent of respondents agreed that Six Sigma procedures are integrated with suppliers to provide consistent quality and process improvement throughout the supply chain.

Inference: The majority of respondents agreed that Six Sigma procedures are integrated with suppliers to provide consistent quality and process improvement throughout the supply chain.

TABLE 4.19 TABLE SHOWING THE RESPONDENT'S UNDERSTANDING OF THE FUNDAMENTAL PRINCIPLES AND TOOLS OF SIX SIGMA.

Particulars	No of respondents	Percentage of respondents (%)
Strongly Disagree	8	13
Disagree	6	10
Neutral	15	25
Agree	21	35
Strongly Agree	10	17
Total	60	100

Source: primary data



Source: Table 4.19

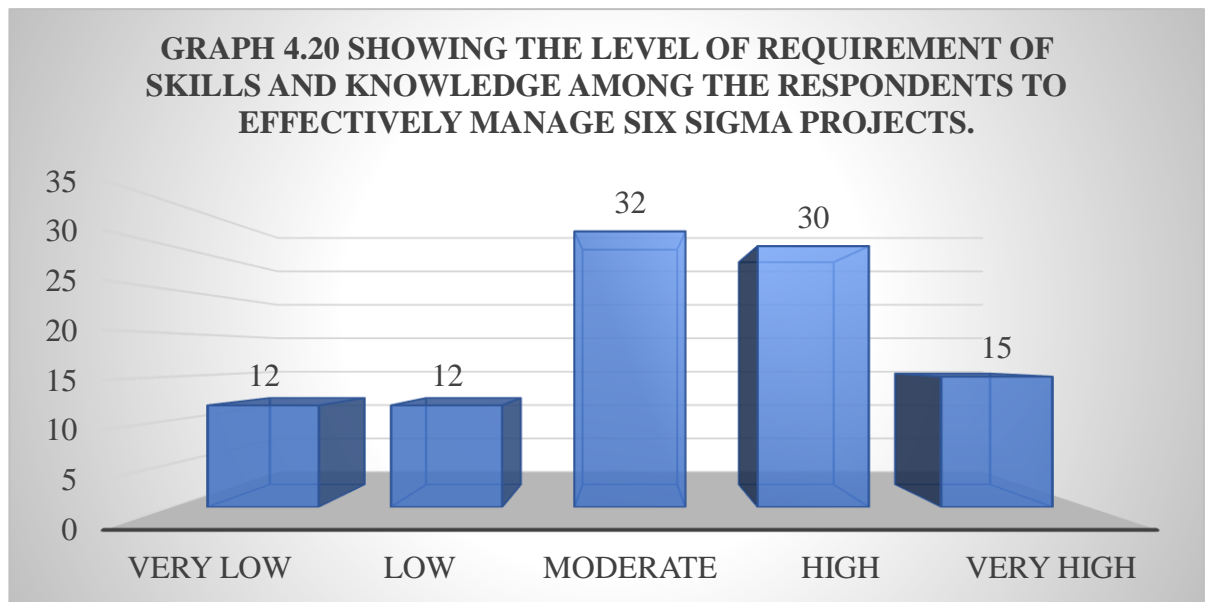
Analysis: The graph above shows the respondent's claim that employees clearly understand the core ideas and methods of Six Sigma. According to the specifics, 13 percent of respondents strongly disagreed with the statement, 10 percent disagreed with the statement, and 25 percent had a neutral opinion on it. 17 percent of respondents strongly agreed with the statement, while 35 percent of respondents agreed with it.

Inference: The majority of respondents agreed with the claim that employees clearly understand the core ideas and methods of Six Sigma.

TABLE 4.20 TABLE SHOWING THE LEVEL OF REQUIREMENT OF SKILLS AND KNOWLEDGE AMONG THE RESPONDENTS TO EFFECTIVELY MANAGE SIX SIGMA PROJECTS.

Particulars	No of respondents	Percentage of respondents (%)
Very low	7	12
Low	7	12
Moderate	19	32
High	18	30
Very high	9	15
Total	60	100

Source: primary data



Source: Table 4.20

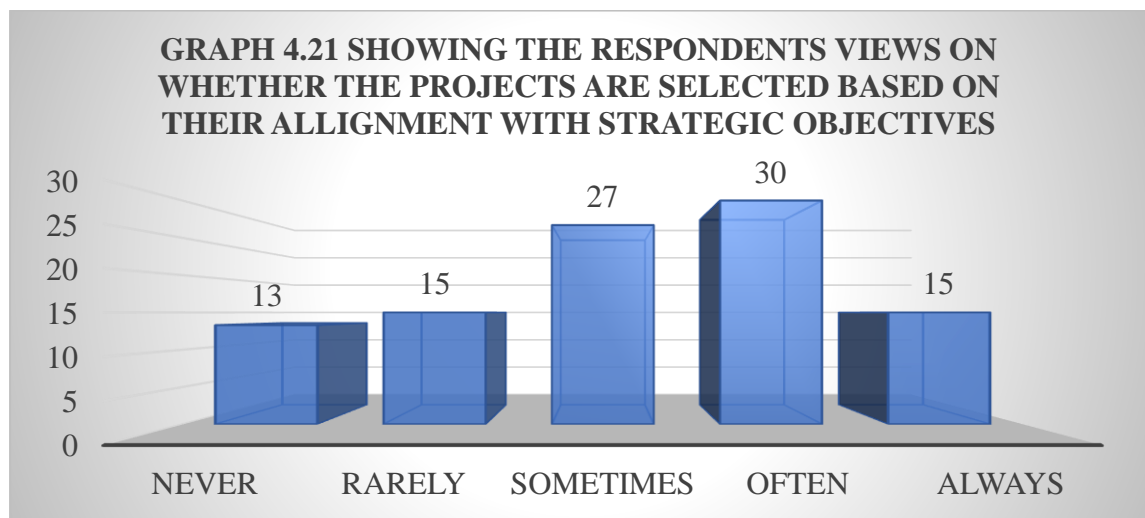
Analysis: The graph above shows that the project team has the abilities and expertise required to successfully manage Six Sigma projects. 12 percent of respondents indicated that it was very low. 12 percent of respondents gave the response of low. 32 percent response rate indicates modest. 30 percent of respondents rate the project team's expertise and knowledge for managing Six Sigma projects as high, and 15 percent rate it as very high.

Inference: The majority of respondents indicate that the project team has the skills and expertise required to manage Six Sigma projects.

TABLE 4.21 TABLE SHOWING THE RESPONDENTS VIEWS ON WHETHER THE PROJECTS ARE SELECTED BASED ON THEIR ALIGNMENT WITH STRATEGIC OBJECTIVES

Particulars	No of respondents	Percentage of respondents (%)
Never	8	13
Rarely	9	15
Sometimes	16	27
Often	18	30
Always	9	15
Total	60	100

Source: primary data



Source: Table 4.21

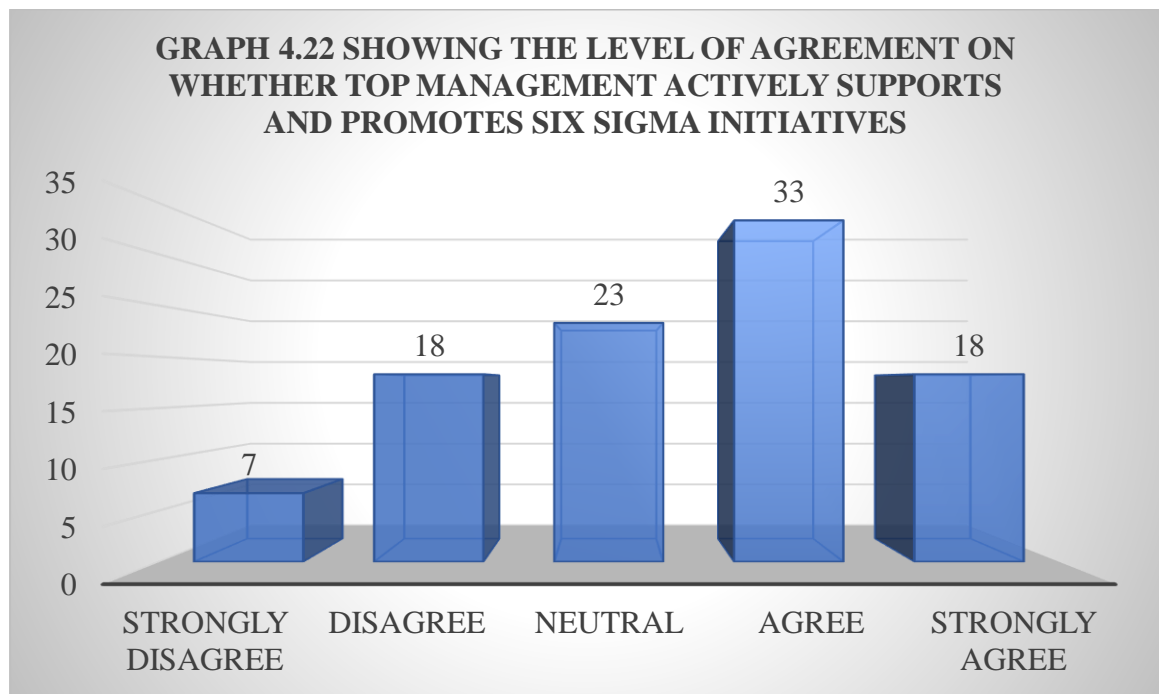
Analysis: Based on the data in the above chart, it can be concluded that projects are chosen based on how well they align with strategic objectives and the potential impact they may have on business performance. According to 13 percent of respondents, this is never the case. 15 percent of the respondents said they felt rarely. 27 percent of those respondents said they sometimes felt. 30 percent of respondents often feel and 15 percent of the respondent always feels that Projects are selected based on their alignment with strategic objectives and potential impact on business performance.

Inference: The majority of respondents believe that projects are frequently chosen based on how well they connect with strategic objectives and the possible effects they may have on business performance.

TABLE 4.22 TABLE SHOWING THE LEVEL OF AGREEMENT ON WHETHER TOP MANAGEMENT ACTIVELY SUPPORTS AND PROMOTES SIX SIGMA INITIATIVES

Particulars	No of respondents	Percentage of respondents (%)
Strongly Disagree	4	7
Disagree	11	18
Neutral	14	23
Agree	20	33
Strongly Agree	11	18
Total	60	100

Source: primary data



Source: Table 4.22

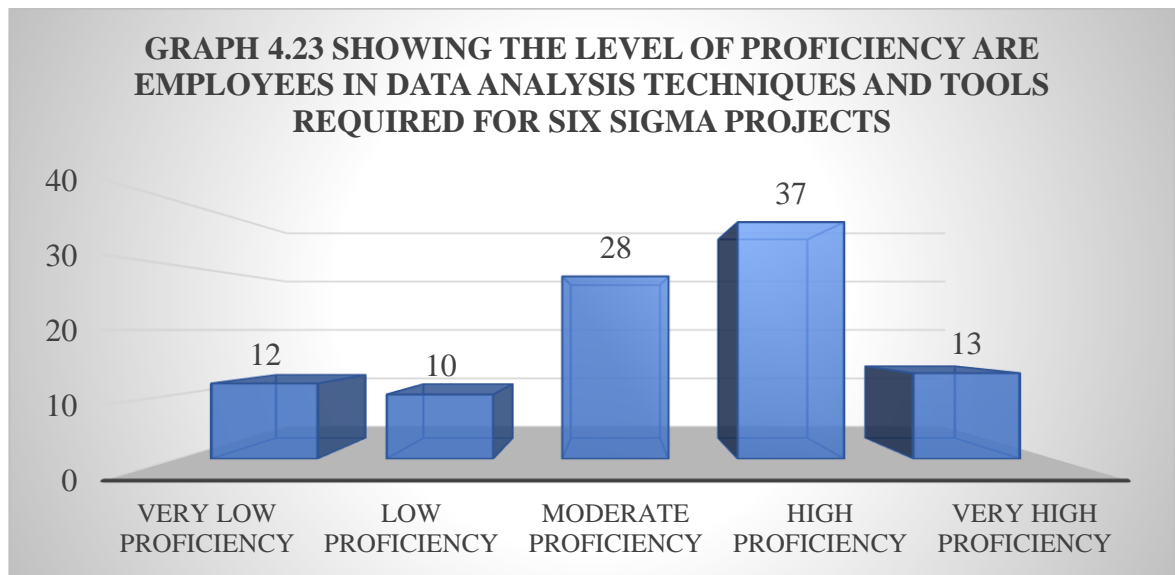
Analysis: The above chart shows the respondent's belief that senior management actively promotes and supports Six Sigma projects within the company. According to the specifics, 7 percent of respondents strongly disagreed with the statement, 18 percent of respondents agreed with the statement, and 23 percent of respondents had a neutral opinion on it. 18 percent of respondents strongly agreed with the statement, and 33 percent of respondents agreed with it.

Inference: The majority of respondents agreed that senior management actively promotes and supports Six Sigma projects within the company.

TABLE 4.23 TABLE SHOWING THE LEVEL OF PROFICIENCY ARE EMPLOYEES IN DATA ANALYSIS TECHNIQUES AND TOOLS REQUIRED FOR SIX SIGMA PROJECTS

Particulars	No of respondents	Percentage of respondents (%)
Very low proficiency	7	12
Low proficiency	6	10
Moderate proficiency	17	28
High proficiency	22	37
Very high proficiency	8	13
Total	60	100

Source: primary data



Source: Table 4.23

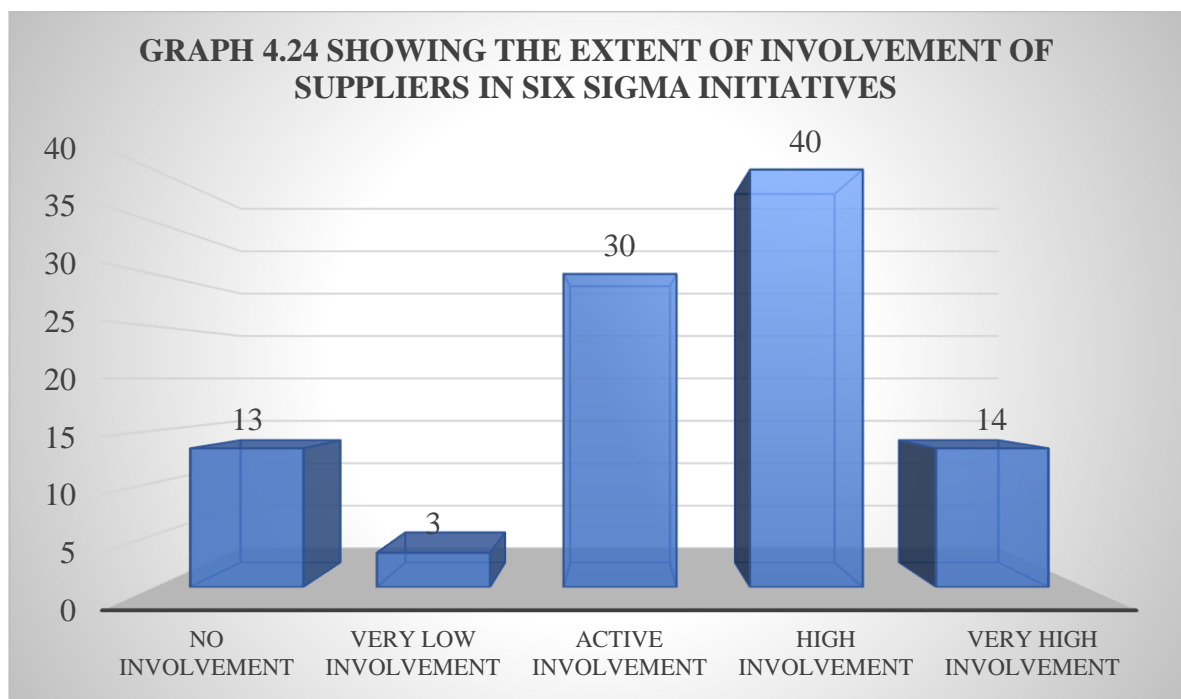
Analysis: The above chart shows the proficient employees in data analysis techniques and tools required for Six Sigma projects. In that 12 percent of the respondents says very low proficiency. 10 percent of respondents say low proficiency. 28 percent of respondents say moderate proficiency. 37 percent of respondents say high proficiency and 13 percent of respondents say very high proficiency that the proficient are employees in data analysis techniques and tools required for Six Sigma projects.

Inference: Highest number of respondents say high proficiency and that the proficient are employees in data analysis techniques and tools required for Six Sigma projects.

TABLE 4.24 TABLE SHOWING THE EXTENT OF THE INVOLVEMENT OF SUPPLIERS IN SIX SIGMA INITIATIVES

Particulars	No of respondents	Percentage of respondents (%)
No involvement	8	13
Very low involvement	2	3
Active involvement	18	30
High involvement	24	40
Very high involvement	8	14
Total	60	100

Source: primary data



Source: Table 4.24

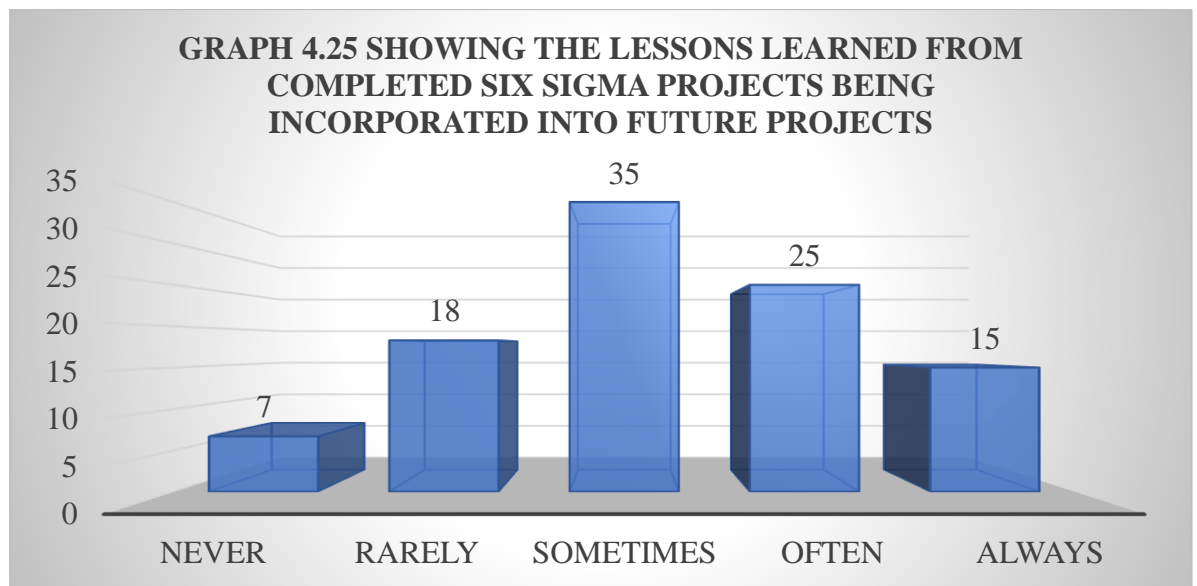
Analysis: According to the mentioned graph, 3 percent of respondents believe that suppliers have very low involvement of suppliers in Six Sigma initiatives, 30 percent of respondents are actively involved, 40 percent of respondents have high involvement, and 14 percent of respondents have very high involvement and 13 percent have no involvement at all.

Inference: The majority of respondents are heavily involving their suppliers in Six Sigma projects.

TABLE 4.25 TABLE SHOWING THE LESSONS LEARNED FROM COMPLETED SIX SIGMA PROJECTS BEING INCORPORATED INTO FUTURE PROJECTS

Particulars	No of respondents	Percentage of respondents (%)
Never	4	7
Rarely	11	18
Sometimes	21	35
Often	15	25
Always	9	15
Total	60	100

Source: primary data



Source: Table 4.25

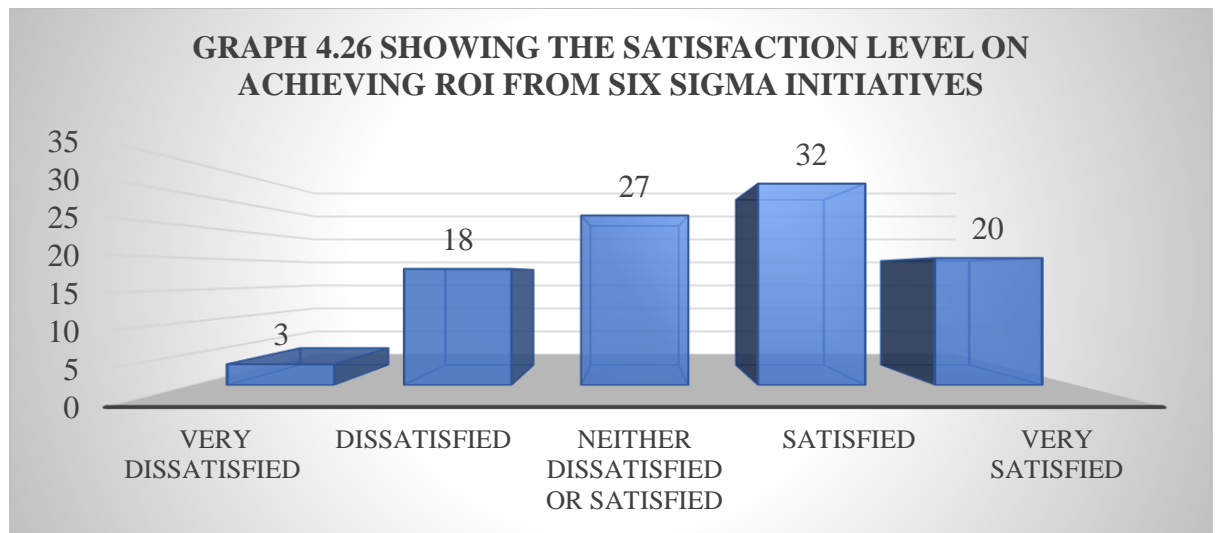
Analysis: The graph above shows how lessons learned from finished Six Sigma programs are applied to new projects. 7 percent of those respondents claim that lessons learned from previous Six Sigma projects were never applied to new projects. 18 percent of the respondents said they felt rarely. 35 percent of respondents said they occasionally felt. 25 percent of respondents said they frequently feel and 15 percent said they always feel that the lessons learned from finished Six Sigma projects are applied to new projects.

Inference: The majority of respondents believe that lessons learned from finished Six Sigma projects are occasionally applied to new projects.

TABLE 4.26 TABLE SHOWING THE SATISFACTION LEVEL ON ACHIEVING ROI FROM SIX SIGMA INITIATIVES

Particulars	No of respondents	Percentage of respondents (%)
Very dissatisfied	2	3
Dissatisfied	11	18
Neither dissatisfied nor satisfied	16	27
Satisfied	19	32
Very satisfied	12	20
Total	60	100

Source: primary data



Source: Table 4.26

Analysis: The above graph shows the respondent's assessment of the organization together with the ROI achieved through Six Sigma efforts. According to the details, 3 percent of respondents were extremely dissatisfied with the statement, 18 percent of respondents were dissatisfied with the statement, and 27 percent of respondents expressed no opinion on the matter. 20 percent of respondents expressed very high levels of satisfaction with the statement, bringing the overall satisfaction rate to 32 percent.

Inference: The majority of respondents were satisfied with achieving ROI from six sigma initiatives.

CHAPTER-5

CONCLUSION

5.1 FINDINGS:

- The majority of respondents work in the manufacturing industries.
- The majority of respondents are familiar with the six-sigma idea.
- The majority of responders had a medium degree of understanding.
- The majority of the company implemented six sigma.
- The majority of responses, a business has been using six sigma for 1 to 3 years.
- The majority of respondents indicate that senior management has a modest level of dedication.
- The majority of the organization created a precise Six Sigma strategy and roadmap.
- The majority of respondents had a moderate level of top management leaders' involvement in the six-sigma project.
- The majority of the organization has resources (such as Black Belts and Green Belts) set aside for Six Sigma projects.
- The majority of respondents were neutral to the statement that a company allocates enough resources (financial, human, and technological) for a Six Sigma project.
- The majority of respondents believe that employees receive good training and support.
- The majority of respondents believe that the feedback and project reviews for finished Six Sigma initiatives are average.
- The majority of respondents agreed with the statement that organization conducts regular reviews and audits of Six Sigma projects to ensure their effectiveness.
- The majority of the organization has a formal procedure in place for documenting and disseminating the best practices and lessons discovered through Six Sigma projects.
- The majority of respondents occasionally notice gains in process efficiency and client satisfaction.
- The majority of respondents agreed with the statement that Six Sigma is aligned with the overall business strategy and goals of the organization.

- A majority of respondents believe that their contributions and thoughts are valued and encouraged.
- The majority of respondents agreed with the statement that Six Sigma practices are integrated with suppliers to ensure consistent quality and process improvement throughout the supply chain.
- The majority of respondents agreed with the statement that Employees have a clear understanding of the fundamental principles and tools of Six Sigma.
- The majority of respondents indicate that the project team has the skills and expertise required to manage Six Sigma projects.
- The majority of respondents believe that projects are frequently chosen based on how well they connect with strategic objectives and the possible effects they may have on business performance.
- The majority of respondents agreed with the statement that the top management actively supports and promotes Six Sigma initiatives within the organization.
- Highest number of respondents says high proficiency that the proficient are employees in data analysis techniques and tools required for Six Sigma projects.
- The majority of respondents are heavily involving their suppliers in Six Sigma projects.
- The majority of respondents believe that lessons learnt from finished Six Sigma projects are occasionally applied to new projects.
- The majority of the respondents agreed with the statement that organizations were satisfied with the ROI they had received from Six Sigma projects.

5.2 SUGGESTIONS:

1. Evaluate the organizational culture and its readiness for Six Sigma implementation in the Indian industry.
2. Assess the level of top management support and their commitment to driving the Six Sigma initiative.
3. Review the process for project selection, ensuring alignment with strategic goals and data-driven decision-making.

4. Evaluate the effectiveness of Six Sigma training programs and the level of employee understanding.
5. Assess the organization's ability to collect, analyze, and utilize data for data-driven decision-making.
6. Evaluate employee engagement and the presence of a culture that encourages continuous improvement.
7. Review communication channels and change management processes to ensure effective implementation.
8. Assess the organization's ability to sustain Six Sigma practices and drive continuous improvement.
9. Evaluate the integration of suppliers and customers into the Six Sigma initiative.
10. Define key performance indicators (KPIs) to measure the success of Six Sigma implementation and track progress regularly.

5.3 CONCLUSION:

Assessing critical success factors for Six Sigma implementation in the Indian industry is crucial for ensuring its effectiveness and long-term success. By evaluating the organizational culture, top management support, project selection process, training programs, data-driven decision-making, employee engagement, communication, change management, sustainability, and stakeholder integration, organizations can identify strengths and areas for improvement. This assessment provides a foundation for driving continuous improvement, fostering a culture of quality, and achieving significant business outcomes. Implementing Six Sigma successfully requires a comprehensive and holistic approach that addresses these critical factors, enabling organizations in the Indian industry to optimize their processes, enhance customer satisfaction, and drive overall excellence.

APPENDIX-1

Questionnaire

1. Are you familiar with the concept of Six Sigma?
 - a) Yes
 - b) No

2. How would you rate your understanding of Six Sigma?
 - a) Very low
 - b) Low
 - c) Moderate
 - d) High
 - e) Very high

3. Has your organization adopted Six Sigma?
 - a) Yes
 - b) No

4. If yes, how long has your organization been implementing Six Sigma?
 - a) Less than 1 year
 - b) 1-3 years
 - c) 3-5 years
 - d) More than 5 years

5. How would you rate the level of commitment from top management for Six Sigma implementation?
 - a) Very low
 - b) Low
 - c) Moderate
 - d) High
 - e) Very high

6. Has your organization developed a clear strategy and roadmap for Six Sigma implementation?
 - a) Yes
 - b) No

7. How actively involved are the top management leaders in driving the Six Sigma initiative?
 - a) Very low involvement
 - b) Low involvement
 - c) Moderate involvement
 - d) High involvement
 - e) Very high involvement
8. Does your organization have dedicated resources (e.g., Black Belts, Green Belts) for Six Sigma projects?
 - a) Yes
 - b) No
9. Does Sufficient resources (financial, human, and technological) are allocated for Six Sigma project in an organization?
 - a) Strongly Disagree
 - b) Disagree
 - c) Neutral
 - d) Agree
 - e) Strongly Agree
10. How well does your organization provide training and support for employees involved in Six Sigma projects?
 - a) Very poor
 - b) Poor
 - c) Average
 - d) Good
 - e) Excellent
11. How effective is the feedback and review process for completed Six Sigma projects?
 - a) Very ineffective
 - b) Ineffective
 - c) Average
 - d) Effective
 - e) Very effective

12. The organization conducts regular reviews and audits of Six Sigma projects to ensure their effectiveness.
- a) Strongly Disagree
 - b) Disagree
 - c) Neutral
 - d) Agree
 - e) Strongly Agree
13. Does your organization have a structured process for capturing and sharing best practices and lessons learned from Six Sigma projects?
- a) Yes
 - b) No
14. Six Sigma initiatives have resulted in measurable improvements in process performance and customer satisfaction.
- a) Never
 - b) Rarely
 - c) Sometimes
 - d) Often
 - e) Always
15. Six Sigma is aligned with the overall business strategy and goals of the organization.
- a) Strongly Disagree
 - b) Disagree
 - c) Neutral
 - d) Agree
 - e) Strongly Agree
16. Employees are actively involved in Six Sigma initiatives, and their contributions and ideas are encouraged and valued.
- a) Never
 - b) Rarely
 - c) Sometimes
 - d) Often
 - e) Always

17. Six Sigma practices are integrated with suppliers to ensure consistent quality and process improvement throughout the supply chain.
- a) Strongly Disagree
 - b) Disagree
 - c) Neutral
 - d) Agree
 - e) Strongly Agree
18. Employees have a clear understanding of the fundamental principles and tools of Six Sigma.
- a) Strongly Disagree
 - b) Disagree
 - c) Neutral
 - d) Agree
 - e) Strongly Agree
19. The project team possesses the necessary skills and knowledge to effectively manage Six Sigma projects.
- a) Very low
 - b) Low
 - c) Moderate
 - d) High
 - e) Very high
20. Projects are selected based on their alignment with strategic objectives and potential impact on business performance.
- a) Never
 - b) Rarely
 - c) Sometimes
 - d) Often
 - e) Always
21. The top management actively supports and promotes Six Sigma initiatives within the organization.
- a) Strongly Disagree
 - b) Disagree
 - c) Neutral
 - d) Agree
 - e) Strongly Agree

22. How proficient are employees in data analysis techniques and tools required for Six Sigma projects?
- a) Very low proficiency
 - b) Low proficiency
 - c) Moderate proficiency
 - d) High proficiency
 - e) Very high proficiency
23. To what extent does your organization involve suppliers in Six Sigma initiatives?
- a. No involvement
 - b. Very low involvement
 - c. Active involvement
 - d. High involvement
 - e. Very high involvement
24. Are lessons learned from completed Six Sigma projects incorporated into future projects?
- a. Never
 - b. Rarely
 - c. Sometimes
 - d. Often
 - e. Always
25. How satisfied is your organization with the ROI achieved from Six Sigma initiatives?
- a) Very dissatisfied
 - b) Dissatisfied
 - c) Neither dissatisfied or satisfied
 - d) Satisfied
 - e) Very satisfied

APPENDIX-2

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