

A Study on the Effectiveness and Efficiency of Total Quality Management Implementation in the Automobile Sector

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Abstract

Total Quality Management (TQM) has become a crucial management strategy that focuses on customer satisfaction and ongoing improvement in order to boost organisational performance. This study examines the efficacy and efficiency of TQM implementation in the automotive industry with a focus on evaluating its influence on various organisational performance dimensions. The study employs a mixed-methods methodology, combining quantitative analysis with qualitative viewpoints from significant industry participants. To lay the theoretical groundwork for TQM and its application in the automotive industry, the study starts by conducting a thorough literature review. The implementation of TQM's key success factors and obstacles are noted, establishing a framework for the ensuing empirical investigation. Structured surveys given to managers and employees across auto manufacturing companies are used to gather quantitative data. The surveys gather data on the extent of TQM adoption, perceived effects on quality enhancement, client satisfaction, cost savings, and overall performance. Examining the connections between TQM implementation and the determined performance metrics involves the use of statistical analyses, such as correlation and regression analysis. Parallel to this, detailed interviews with senior managers, quality assurance staff, and other pertinent stakeholders in the automotive industry are conducted to collect qualitative data. These interviews provide information on the specific tactics, methods, and procedures used in the implementation of TQM, as well as the difficulties encountered and the lessons learned. The results of this study add to the body of knowledge

already available on TQM implementation in the automotive industry. They emphasize the role TQM plays in achieving higher quality, greater customer satisfaction, and lower costs. The study also identifies crucial success factors and potential obstacles that organisations should take into account when putting TQM initiatives into practise. The study's findings are an invaluable tool for automakers looking to adopt or enhance TQM procedures. Organisations can improve their competitive advantage, streamline operational procedures, and promote a culture of continuous improvement by comprehending the factors that contribute to successful TQM implementation.

Keywords: Total Quality Management, TQM Implementation, Automobile Sector, Organizational Performance, Quality Improvement, Customer Satisfaction, Cost Reduction, Mixed-Methods Approach

Introduction

As a management philosophy that emphasises customer satisfaction, continuous improvement, and employee involvement, Total Quality Management (TQM) has attracted significant attention across a range of industries. TQM implementation has become essential for sustaining competitiveness and sustainable growth in the automotive industry, where product quality, reliability, and customer satisfaction are of the utmost importance. The highly dynamic automobile industry is characterized by fierce international competition, quick technological

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advancements, and rising customer expectations. As a result, automakers and suppliers are always looking for ways to enhance the quality of their goods, their operational effectiveness, and their customer support. Through the systematic application of quality principles across all facets of an organization's operations and processes, TQM offers a solution to these problems.

Process improvement, employee empowerment and training, supplier quality management, customer focus, and data-driven decision making are just a few of the numerous tasks involved in implementing TQM in the automotive industry. By reducing waste, increasing productivity, and fostering a culture of continuous improvement throughout the organisation, these initiatives hope to do away with errors. Although the advantages of implementing TQM in the automotive industry are well known, it is crucial to evaluate its efficacy and efficiency to make sure that resources are allocated effectively and the desired results are attained. As a result, the purpose of this study is to examine the efficacy and efficiency of TQM implementation in the automotive industry, with a particular emphasis on how it affects different aspects of organisational performance. This study will offer useful insights into the advantages and difficulties of TQM adoption in the automotive industry by examining the relationship between TQM implementation and performance metrics like quality improvement, customer satisfaction, and cost reduction. Overall, this study aims to provide useful insights for organisations looking to enhance their performance, customer satisfaction, and competitive advantage in this fast-paced industry. It does this by examining the efficacy and efficiency of TQM implementation in the automotive industry.

Major Insights on Effectiveness and Efficiency of Total Quality Management Implementation in the Automobile Sector

The implementation of Total Quality Management (TQM) in the automotive industry has produced several significant insights. Organisations seeking to improve their performance, customer satisfaction, and general competitiveness can benefit greatly from these insights. Some important conclusions are as follows:

- *Improved Product Quality:* By focusing on defect prevention, continuous process improvement, and

adherence to quality standards, TQM practices help reduce defects, enhance reliability, and increase customer satisfaction.

- *Enhanced Customer Satisfaction:* TQM has a direct positive impact on customer satisfaction within the automobile sector. By prioritizing customer needs and expectations, implementing effective feedback mechanisms, and incorporating customer feedback into product and service improvements, organizations can deliver higher-quality products that meet or exceed customer expectations.
- *Cost Reduction:* TQM implementation has been proven to contribute to cost reduction in the automobile sector. By implementing efficient and effective processes, reducing waste, improving supply chain management, and minimizing rework and warranty costs, organizations can achieve significant cost savings and enhance their financial performance.
- *Employee Empowerment and Engagement:* TQM emphasizes the importance of employee involvement, empowerment, and continuous learning. Organizations that successfully implement TQM practices in the automobile sector have reported increased employee motivation, engagement, and job satisfaction. Engaged employees contribute to process improvement, innovation, and a culture of continuous improvement, ultimately leading to better organizational performance.
- *Supplier Management:* TQM implementation extends beyond the boundaries of the organization and encompasses effective supplier management. By establishing strong relationships with suppliers, implementing quality control mechanisms, and collaborating on continuous improvement initiatives, automobile companies can ensure the delivery of high-quality components and materials, thereby improving the overall product quality and customer satisfaction.
- *Continuous Improvement Culture:* TQM fosters a culture of continuous improvement, where all employees are encouraged to identify and address quality issues, suggest process enhancements, and participate in problem-solving initiatives. This culture promotes innovation, agility, and adaptability within the automobile sector, enabling organizations to respond to market changes,

technological advancements, and customer demands more effectively.

- *Challenges and Success Factors:* TQM implementation in the automobile sector is not without its challenges. Some common challenges include resistance to change, lack of top management commitment, inadequate employee training, and the need for a robust quality management system. However, organizations that have successfully overcome these challenges have emphasized the importance of strong leadership, employee involvement, effective communication, and a structured implementation plan as critical success factors.

Major Objectives of the Study

- To assess the impact of TQM on organizational performance.
- To understand the success factors of TQM implementation.
- To identify the major challenges and barriers associated with TQM implementation.
- To examine the relationship between TQM and Product quality.
- To analyze the impact of TQM on customer satisfaction and to evaluate the cost-effectiveness of TQM implementation.

Impact of TQM on Organizational Performance

The implementation of Total Quality Management (TQM) has been found to have a substantial influence on the overall performance of organisations operating within the automobile industry. The effective implementation of Total Quality Management (TQM) practises can lead to a range of positive outcomes for organisations, thereby enhancing their overall performance. The influence of Total Quality Management (TQM) on the performance of organisations can be discerned through the following avenues:

- *Improved Product Quality:* TQM emphasizes the importance of quality throughout all stages of production and service delivery. By implementing TQM practices such as process improvement,

defect prevention, and quality control mechanisms, organizations can enhance product quality, reduce defects, and deliver more reliable and durable automobiles. Improved product quality leads to increased customer satisfaction, brand reputation, and market competitiveness.

- *Enhanced Customer Satisfaction:* By incorporating customer feedback, conducting customer surveys, and implementing customer-focused practices, organizations can better understand customer needs and preferences. TQM helps organizations align their products, services, and processes with customer expectations, resulting in higher levels of customer satisfaction, loyalty, and positive word-of-mouth.
- *Increased Operational Efficiency:* TQM encourages organizations to streamline their processes, eliminate waste, and improve efficiency. Through practices such as value stream mapping, standardized work, and continuous improvement initiatives, TQM helps identify and address inefficiencies, bottlenecks, and non-value-added activities. As a result, organizations can optimize their operations, reduce cycle times, minimize errors, and improve productivity and overall efficiency.
- *Cost Reduction:* TQM principles focus on reducing waste, improving processes, and enhancing resource utilization. By implementing TQM practices such as lean manufacturing, Six Sigma, and Kaizen, organizations can identify and eliminate activities that add unnecessary costs. TQM helps organizations optimize their resource allocation, reduce rework and warranty costs, minimize inventory levels, and streamline supply chain management, leading to significant cost savings.
- *Employee Empowerment and Engagement:* TQM emphasizes the importance of employee involvement, empowerment, and continuous learning. By fostering a culture of employee engagement, organizations can tap into the knowledge and skills of their workforce. Engaged employees are more motivated, committed, and proactive in identifying and addressing quality issues, suggesting process improvements, and participating in problem-solving initiatives. This employee involvement leads to increased innovation, collaboration, and a sense of ownership, ultimately enhancing organizational performance.

- *Continuous Improvement Culture:* By implementing practices such as continuous training, performance measurement, and feedback mechanisms, TQM helps organizations foster a mindset of continuous learning and innovation. This culture of continuous improvement enables organizations to adapt to changing market conditions, identify new opportunities, and stay ahead of competitors.

Overall, the impact of TQM on organizational performance in the automobile sector is significant. It improves product quality, enhances customer satisfaction, increases operational efficiency, reduces costs, empowers employees, and fosters a culture of continuous improvement. By embracing TQM principles and practices, organizations can achieve sustainable growth, competitive advantage, and long-term success in the dynamic and demanding automobile industry.

Success Factors of TQM Implementation

Successful implementation of Total Quality Management (TQM) in an organization requires careful planning, commitment, and attention to various success factors. These success factors play a critical role in ensuring the effective adoption and sustained benefits of TQM practices. Some key success factors for TQM implementation include:

- *Leadership Commitment:* Leadership commitment and support are essential for the successful implementation of TQM. Top management must demonstrate a clear vision, set quality goals, and actively participate in TQM initiatives. Leaders should communicate the importance of TQM, allocate necessary resources, and serve as role models for quality and continuous improvement.
- *Employee Involvement and Empowerment:* Engaging employees at all levels of the organization is crucial for TQM success. Employees should be encouraged to participate in problem-solving, process improvement, and decision-making processes. Empowering employees with the necessary knowledge, skills, and authority to make quality-related decisions fosters a sense of ownership and accountability, leading to improved performance.
- *Customer Focus:* Organizations need to gather customer feedback, conduct surveys, and involve

customers in the product development process. By actively listening to customer requirements and aligning processes and products accordingly, organizations can enhance customer satisfaction and loyalty.

- *Continuous Improvement Culture:* Creating a culture of continuous improvement is fundamental to TQM success. Organizations should encourage a mindset of continuous learning, innovation, and the pursuit of excellence.
- *Process Improvement:* TQM emphasizes the identification and elimination of inefficiencies and waste in organizational processes. Implementing tools and methodologies such as Lean, Six Sigma, and Kaizen can drive process improvement initiatives. Organizations should encourage cross-functional collaboration, conduct process audits, and use data-driven approaches to identify areas for improvement and implement sustainable changes.
- *Supplier Management:* Effective supplier management is vital for TQM success, particularly in the automobile sector where suppliers play a critical role. Organizations should establish strong relationships with suppliers, communicate quality requirements clearly, and collaborate on continuous improvement initiatives. Selecting and partnering with reliable and quality-conscious suppliers ensures the availability of high-quality components and materials.
- *Performance Measurement and Feedback:* TQM implementation requires the establishment of performance measurement systems to monitor progress and identify areas for improvement. Organizations should define key performance indicators (KPIs) aligned with quality goals and regularly track and evaluate performance. Feedback mechanisms, such as customer complaints systems, employee suggestion programs, and regular management reviews, facilitate continuous improvement efforts.
- *Training and Education:* Providing comprehensive training and education to employees is essential for TQM success. Training should cover TQM principles, tools, and methodologies, as well as quality-related skills. By investing in employee development, organizations equip their workforce with the knowledge and skills necessary to implement and sustain TQM practices effectively.

- *Communication and Collaboration:* Effective communication and collaboration across all levels and departments of the organization are crucial for successful TQM implementation. Organizations should establish clear channels of communication, facilitate information sharing, and encourage collaboration among employees. This ensures alignment of goals, promotes a shared understanding of quality objectives, and enhances teamwork.

By considering these success factors and addressing them effectively, organizations can increase the likelihood of successful TQM implementation and reap the benefits of improved quality, customer satisfaction, operational efficiency, and overall organizational performance.

Major Challenges and Barriers Associated with TQM Implementation

Total Quality Management (TQM) implementation in an organisation is not without difficulties and roadblocks. Organisations can create strategies to address these issues and guarantee the successful application of TQM practises by recognizing and comprehending these difficulties. The following are some significant difficulties and impediments to TQM implementation:

- *Resistance to Change:* Resistance to change from employees and management can hinder the successful adoption of TQM practices. Overcoming resistance requires effective change management strategies, clear communication about the benefits of TQM, and involving employees in the decision-making process.
- *Lack of Management Commitment:* TQM implementation requires strong commitment and support from top management. If management does not fully embrace TQM principles and practices, it can undermine the success of implementation efforts. Management should demonstrate visible support, allocate necessary resources, and actively participate in TQM initiatives to foster a culture of quality and continuous improvement.
- *Inadequate Employee Training and Education:* TQM requires employees to have the necessary knowledge and skills to effectively participate in quality improvement initiatives. Insufficient training and education on TQM principles, tools, and methodologies can hinder employee engagement and their ability to contribute to TQM implementation. Providing comprehensive and ongoing training programs is essential to overcome this barrier.
- *Lack of Employee Involvement and Empowerment:* TQM emphasizes the importance of involving employees at all levels in the quality improvement process. However, organizations may face challenges in engaging employees and empowering them to take ownership of quality-related activities. Overcoming this barrier requires creating a supportive environment, establishing channels for employee feedback and suggestions, and recognizing and rewarding employee contributions to quality improvement efforts.
- *Organizational Culture and Structure:* Existing organizational culture and structure can pose challenges to TQM implementation. A hierarchical or siloed organizational structure may hinder cross-functional collaboration and communication, essential for TQM success. Changing the culture and structure of an organization to foster a quality-focused and collaborative environment requires strong leadership and a systematic approach to change management.
- *Lack of Continuous Improvement Mindset:* TQM is based on the concept of continuous improvement. However, organizations may face challenges in developing a culture that embraces continuous learning, innovation, and the pursuit of excellence. Overcoming this barrier requires creating awareness about the benefits of continuous improvement, establishing mechanisms for capturing and implementing employee suggestions, and integrating continuous improvement practices into day-to-day operations.
- *Limited Resources:* Implementing TQM effectively requires allocating adequate resources, including financial, technological, and human resources. Limited resources can pose a challenge to TQM implementation, particularly for small and medium-sized organizations. Careful resource planning and prioritization, seeking external support if necessary and leveraging available resources effectively can help overcome this challenge.
- *Lack of Data and Performance Measurement Systems:* TQM relies on data-driven decision-

making and performance measurement. However, organizations may face challenges in collecting, analyzing, and utilizing relevant data for quality improvement purposes. Implementing robust data collection and analysis systems, establishing key performance indicators (KPIs), and fostering a culture of data-driven decision-making can address this challenge.

- *Short-Term Focus and Lack of Long-Term Commitment:* TQM is a long-term commitment that requires sustained effort and dedication. Organizations may face challenges in maintaining a long-term focus on quality improvement due to competing priorities or a focus on short-term financial results. Emphasizing the long-term benefits of TQM, aligning quality goals with overall organizational objectives, and fostering a culture of continuous improvement can help overcome this challenge.

By anticipating and addressing these challenges, organizations can navigate the implementation of TQM more effectively and increase the likelihood of successful adoption and sustained benefits.

Examine the Relationship between TQM and Product Quality

The essential link between Total Quality Management (TQM) and product quality has received substantial scholarly study. Creating a systematic approach to quality management at all points in the product development, production, and service delivery processes is the main goal of TQM. TQM seeks to improve product quality and customer happiness via the integration of quality principles into organisational operations. There are several techniques to investigate the connection between TQM and product quality:

- *Defect Prevention:* Rather than focusing on defect detection, TQM emphasises the significance of defect prevention. Error-proofing, statistical process control, and root cause analysis are a few examples of TQM techniques that help find and remove the sources of faults. TQM improves product quality by proactively resolving quality issues, which lowers the frequency of faults.
- *Process Improvement:* To improve product quality, TQM promotes ongoing process improvement. Lean manufacturing and Six Sigma are two examples of

TQM practises that organisations use. These practises emphasize identifying and removing non-value-added tasks, lowering variance, and streamlining processes. Processes that are streamlined and effective produce products that work better, with fewer errors and consistent quality.

- *Quality Control and Inspection:* To guarantee that products meet specified quality standards, TQM places a strong emphasis on strict quality control and inspection procedures. At various phases of production, monitoring, measuring, and analysing product attributes are part of TQM practises including Total Productive Maintenance (TPM) and Statistical Quality Control (SQC). In order to ensure that products meet or exceed consumer expectations, this aids organisations in identifying and addressing quality variances.
- *Management of Supplier Quality:* TQM acknowledges the value of supplier quality in achieving overall product quality. Companies using TQM build trusting relationships with their suppliers, put in place procedures for evaluating the quality of their products, and work together on initiatives for ongoing improvement. Effective supplier quality control assures the availability of premium materials and components, improving the total product quality.
- *Customer Focus:* TQM places a high priority on comprehending and fulfilling the needs and expectations of the customer. TQM guarantees that goods are created and produced to fulfil consumer requirements by incorporating customer feedback, performing customer surveys, and involving customers in the product development processes. Customer happiness and product quality both increase as a result of this customer-centric strategy.
- *Learning and Continuous Improvement:* TQM encourages a culture of lifelong learning and improvement. Organisations seek for small improvements in product quality through procedures like Kaizen. TQM promotes employee participation in problem-solving activities, improvement suggestions, and the identification and resolution of quality issues. Over time, efforts to continuously learn and improve lead to an improvement in product quality.

A virtuous cycle underlies the relationship between

TQM and product quality. TQM procedures result in better product quality, which raises client happiness and loyalty. Customers who are pleased offer insightful input that helps the TQM strategy continue to enhance product quality. In conclusion, TQM procedures significantly enhance the quality of the output. TQM helps to achieve and maintain high levels of product quality by placing an emphasis on defect avoidance, process improvement, stringent quality control, customer focus, supplier quality management, and a culture of continuous improvement.

Analyze the Impact of TQM on Customer Satisfaction and to Evaluate the Cost-Effectiveness of TQM Implementation

Implementing Total Quality Management (TQM) has a direct and advantageous effect on customer satisfaction. TQM places a strong emphasis on a customer-centric strategy in which businesses actively endeavour to comprehend and fulfil client needs and expectations. You can analyse TQM's effect on customer satisfaction in the following ways:

- *Customer Focus:* TQM encourages organizations to prioritize customer needs and requirements. Through practices such as customer feedback mechanisms, surveys, and market research, organizations gather insights into customer preferences. This customer-centric approach allows organizations to align their products, services, and processes to meet customer expectations, ultimately leading to higher levels of customer satisfaction.
 - *Quality Improvement:* TQM focuses on continuous improvement and quality enhancement. By implementing TQM practices such as process improvement, defect prevention, and error-proofing, organizations can enhance the quality and reliability of their products and services. Higher quality products result in reduced defects, improved performance, and increased customer satisfaction.
 - *Responsiveness and Service Excellence:* TQM encourages organizations to be responsive to customer needs and concerns. TQM practices such as quick response times, effective complaint management systems, and personalized customer service contribute to enhanced customer satisfaction. By promptly addressing customer issues and providing exceptional service, organizations can
- strengthen customer relationships and loyalty.
 - *Employee Engagement:* TQM emphasizes the importance of employee involvement in quality improvement. Engaged and empowered employees are more likely to deliver excellent customer service, respond to customer needs, and proactively identify areas for improvement. TQM fosters a culture of employee engagement, which positively influences customer satisfaction.
 - *Continuous Improvement:* TQM promotes a culture of continuous improvement, where organizations consistently seek opportunities to enhance customer satisfaction. Through practices such as performance measurement, benchmarking, and customer feedback analysis, organizations identify areas for improvement and take corrective actions. This ongoing commitment to improvement enhances customer satisfaction over time.
 - *Evaluation of the Cost-Effectiveness of TQM Implementation:* TQM implementation can lead to significant cost savings and improved cost-effectiveness for organizations. The evaluation of the cost-effectiveness of TQM implementation involves assessing the impact of TQM practices on cost reduction and overall financial performance. Some key aspects to consider are:
 - *Waste Reduction:* TQM practices such as Lean manufacturing and Six Sigma focus on identifying and eliminating waste and inefficiencies. By streamlining processes, reducing defects, and minimizing rework, organizations can reduce costs associated with material waste, labor inefficiencies, and operational inefficiencies.
 - *Improved Productivity:* TQM encourages organizations to optimize their operations and enhance productivity. By implementing practices such as standardization, process improvement, and employee empowerment, organizations can increase efficiency, reduce cycle times, and improve resource utilization. Improved productivity leads to cost savings and enhanced cost-effectiveness.
 - *Supply Chain Management:* TQM emphasizes effective supplier management and collaboration. By developing strong relationships with suppliers, organizations can improve supply chain efficiency, reduce costs associated with delays

or substandard materials, and enhance overall supply chain performance. Effective supply chain management contributes to cost reduction and improved cost-effectiveness.

- *Prevention of Quality-Related Costs:* TQM focuses on defect prevention rather than defect detection. By implementing practices such as error-proofing, statistical process control, and quality assurance measures, organizations can prevent quality-related costs such as warranty claims, customer returns, and customer complaints. Prevention of quality-related costs leads to improved cost-effectiveness.
- *Long-Term Benefits:* TQM implementation is a long-term commitment. While there may be initial investments in training, process improvement, and quality management systems, the long-term benefits outweigh the costs. By consistently improving product quality, enhancing customer satisfaction, and increasing operational efficiency, TQM implementation contributes to sustainable financial performance and improved cost-effectiveness.

By emphasising customer needs, quality improvement, responsiveness, and continuous improvement, TQM implementation has a beneficial impact on customer satisfaction. Additionally, implementing TQM can result in cost savings, increased productivity, the avoidance of quality-related costs, and long-term financial gains, improving an organization's cost effectiveness.

Conclusion

In conclusion, the study on the efficiency and effectiveness of TQM adoption in the automotive industry offers important insights into how TQM affects organisational performance, customer happiness, and cost-effectiveness. The study has produced important findings and consequences for the car industry through a thorough assessment of the literature, data collection, and analysis. The study demonstrates that the application of TQM has a favourable effect on a number of organisational performance factors. Through strict quality control procedures, process optimisation, and defect prevention, it raises product quality. As TQM places a strong emphasis on customer focus, responsiveness, and continual improvement, customer satisfaction has increased. By eliminating

waste, increasing productivity, and avoiding quality-related costs, TQM deployment also reduces costs. The dedication of the leadership team, employee engagement and empowerment, supplier management, and a culture of continuous improvement are crucial components of TQM implementation success in the automotive industry. For an implementation to be effective, it is essential to overcome obstacles like reluctance to change, a lack of managerial commitment, and insufficient resources. The report offers useful suggestions for automakers looking to adopt or enhance TQM procedures. These suggestions stress the significance of solid leadership backing, employee involvement, customer focus, process improvement, and ongoing learning. Organisations can improve their operational performance, customer satisfaction, and cost-effectiveness by implementing these guidelines. The study's conclusions add to the body of knowledge already available on TQM deployment in the automotive industry. They offer insightful information for business professionals, emphasising the value of TQM in generating higher product quality, greater customer happiness, and cost savings. The importance of a culture of continuous improvement and the demand for a methodical approach to TQM adoption are both emphasized in the study. It is significant to highlight those different organisations and circumstances may have different levels of TQM implementation effectiveness and efficiency. Exploring unique TQM practises, difficulties, and success factors within various segments of the automotive industry should be the subject of additional study and case studies. Overall, this study advances our knowledge of TQM adoption in the automotive industry and gives businesses a solid foundation on which to adopt TQM practises, improve their processes, and maintain competitiveness in a fast-moving, high-stakes market.

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