

Weaving Quality into Performance: A Deep Dive into TQM Practices among Tamil Nadu's Manufacturing MSMEs

T. Priyanga¹[0000-0001-6711-8319] *

ABSTRACT

Total Quality Management has emerged as critical strategy for organizational performance improvement, especially for the manufacturing industry. This research analyzes the impact of TQM practices on organizational performance dimensions and the critical challenges in the implementation of TQM among Manufacturing MSMEs (Pump & Motor Industry) in Tamil Nadu. The research is grounded on fundamental TQM dimensions: Leadership, Training, Process Management, Knowledge Management, Strategic Quality Planning, Customer Focus and Supplier Quality Management and their impacts on four measures of performance: Operational Performance, Customer Results, Employee Performance and Financial Performance. Structured questionnaire of Quality Managers and Production Managers was conducted among 144 responses from MSMEs in Tamil Nadu. Descriptive statistics, reliability test and regression analysis were performed using Jamovi software. The research findings highlight that Process Management significantly boost Operational Performance, but Training is the negative predictor of Employee Performance. Supplier Quality Management is a prime driver for Financial Performance, but Customer Focus does not have a strong relation-ship with Customer Results, indicating that there might be a stronger role played by external market drivers in customer satisfaction and retention. Despite its contributions, this study has certain limitations including lack of perspectives of other key stakeholders like executives and customers.

Keywords: Manufacturing, MSMEs, Organizational Performance, Total Quality Management (TQM), Quality Management

^{*1} Assistant Professor, PSG Institute of Management, Coimbatore, Tamil Nadu, India – 641 004 priyanga@psgim.ac.in

1. Introduction

Total Quality Management (TQM) has emerged as core management philosophy that seeks to improve performance in an organization through continuous improvement, process improvement and customer satisfaction. Although TQM has been extensively used in large-scale industries, its use in Micro, Small and Medium Enterprises (MSMEs) is affected by limited resources, technical incapability and leadership commitment (Talib et al., 2011). In the manufacturing sector, the use of TQM is essential to guarantee competitiveness, product reliability and operational efficiency (Sadikoglu & Olcay, 2014). MSMEs are the backbone of the Indian economy and play an important role in employment and industrial production generation (Yadav et al., 2019). Despite being important, most MSMEs in India are unable to implement TQM due to resistance to change, finance limitations, ineffective training programs and diversified supplier quality control (Singh & Shrivastava, 2020). Leadership is very important in propelling quality initiatives, yet the majority of MSME owners are not approaching TQM implementation in a systematic manner. Knowledge management and process improvement are also areas of concern, as firms lack standard procedure and measurement system for performance (Juran, 1992). Implementation of TQM in MSMEs extends beyond operation improvement; it has a direct impact on financial performance, employee productivity and customer satisfaction (Kaynak, 2003). Effective TQM practice assists companies in reducing defects, enhancing supply chain effectiveness and fostering a culture of continuous learning (Flynn et al., 1995).

Poor strategic planning, poor supplier partnership and poor customer focus are, however, barriers to the full achievement of TQM benefits (Evans & Lindsay, 2017). As the contribution of TQM is significant in improving the performance of a company, the aim of this study is to analyze the impact of TQM practices on performance metrics like Operational Performance, Customer Results, Employee Performance and Financial Performance. The Total quality management focus on continuous improvement of the organizations operations and to meet or exceed customer expectations (Talha, 2004). TQM gives an iterated standard operating procedure (systematic approach) for getting operations excellence in an organization, by listing procedures, tools and techniques aimed to enhance the quality of the product and the service provided by the manufacturing company. In general, Quality means meeting customer's needs and requirements (Powell, 1995). For Total Quality management, there is no universally agreed definitions. According to Corsby, TQM is about "Conformance to requirements", according to Abbott, "Quality is value", quality is proportional to the value of the product or service provide by the organization (Sila, 2003). Definition of the TQM have explained like, "the extent to which a product or service meets or exceeds the customer's expectations 4 (customer satisfaction)" by (Reeves and Bednar, 1994).

To reduce the cost incurred due to the variations during the manufacturing the product, TQM tools and techniques have been used in the manufacturing industry, TQM also focuses on reducing waste (during the process) and increase the operational efficiency (Majumdar & Manohar, 2016). TQM also encompass the employee involvement (engagement), particularly frontline workers in the assembly line. Middle management (leadership commitment) and employee involvement plays a vital role in the TQM implementation in the MSMEs manufacturing companies, particularly in India, because after China's mass manufacturing infrastructure hub, India is the next in the manufacturing hub for the components manufacturing (Karia & Asaari, 2006). TQM will create a culture between the front-line employee and top management, by focusing on quality improvement process in the organization. TQM as an organizational strategy (by Quality management), which combines both technical and human aspects, which ensures to maintain the product quality that based on the customer needs and focusing on improving the productivity by continuous improvement in the work place and cost reduction (Psomas and Antony, 2017). Thus, the adaption of TQM practice is critical for Micro, Small and Medium Enterprises (MSMEs) to remain competitive in todays' dynamic business environment.

One essential element of Total Quality Management (TQM) that affects an organizational performance to successfully execute quality initiatives is leadership. A culture of employee involvement, continuous improvement and alignment of corporate goals with quality objectives are all facilitated by effective leadership (Ahire & O'Shaughnessy, 1998). Setting the vision, conveying quality goals and guaranteeing adherence to quality at all organizational levels are all critical tasks performed by leaders (Deming, 1986). Employee engagement, motivation and adherence to quality management standards are all improved by leadership commitment (Singh et al., 2018). Sadikoglu and Olcay's (2014) research, indicates that while leadership by itself might not have a direct effect on organizational performance, it does have a big impact on other TQM activities like customer focus and training. Higher employee performance is facilitated by strong leadership because motivated staff members are more inclined to embrace quality-driven practices. Furthermore, by fostering a customer-focused culture and guaranteeing excellent service quality, good leadership indirectly improves customer outcomes also, because quality initiatives result in lower costs and higher profitability, companies with dedicated leadership frequently see improvements in their financial performance.

H1: MSME's Firm performance is positively influenced by leadership commitment.

For quality-related information to be effectively shared within an organization, knowledge management is essential. Nonaka and Takeuchi (1995) study, organizations with strong knowledge-sharing systems are more creative and adaptable. Activities like documentation, process standardization, and continuous learning are all part of knowledge management, which helps maximize performance and improve quality (Jashapara, 2011). When employees have access to relevant and reliable information, they are better able to optimize processes and make decisions, identifying quality concerns early and taking corrective action (Zu et al., 2008). By documenting best practices and learning from previous experiences, knowledge management promotes continuous enhancement (Davenport & Prusak, 1998). Through the improvement of production processes and the reduction of inefficiencies, Sadikoglu and Olcay (2014) discovered that knowledge management has a major effect on operational performance. Additionally, by minimizing errors and maximizing resource use, a well-designed knowledge-sharing system improves financial performance.

H2: MSME's Firm performance is positively influenced by Knowledge Management. The objective of process management is to increase operational efficiency by reducing waste, monitoring performance, and creating controlled workflows. By reducing variations in production and service delivery, a clearly defined process management system provides consistency in quality (Flynn et al., 1995). To increase overall productivity and customer satisfaction, it involves identifying, documenting, and controlling critical business processes (Harrington, 1991). According to studies, firms that use efficient process management strategies see increases in production and cost savings as a result of cycle time reduction and defect prevention (Garvin, 1988). According to Sadikoglu and Olcay (2014), process management is essential for enhancing operational performance since more efficient and reliable processes result from streamlined processes. Additionally, by reducing manufacturing costs and boosting revenue generation, optimized processes.

H3: MSME's Firm performance is positively influenced by Process Management.

To improve employee skills and guarantee attention to quality standards, employee training is crucial for the TQM implementation. Employees who receive training are better equipped to complete jobs quickly and accurately, which lowers errors and produces higher-quality results (Kaynak, 2003). By encouraging a culture of ongoing learning, it helps businesses adjust to new technology and quality control procedures (Talib et al., 2011). In-depth training programs emphasize topics like customer relationship management, problem-solving strategies, and statistical process control, all of which improve employee productivity (Juran, 1992). Additionally, training improves job satisfaction and employee morale, which increases motivation and dedication to quality improvement (Evans & Lindsay, 2017). Sadikoglu and Olcay (2014) claim that by giving workers the skills they need to sustain production efficiency and quality assurance, training dramatically enhances operational performance.

H4: MSME's Firm performance is positively influenced by Training.

By assuring that components and raw materials fulfil quality standards, supplier quality management improves product dependability and reduces costs. A manufacturing company's total success is strongly impacted by the quality of its suppliers because inadequate supplies can result in production delays, higher expenses, and unsatisfied customers (Flynn & Schroeder, 1995). Reducing errors and increasing supply chain efficiency are made possible by stable supplier relationships and thorough supplier evaluation procedures (Kannan & Tan, 2005). Improved product innovation and consistency are attained by firms that work with suppliers on quality improvement projects (Liker & Choi, 2004). Programs for developing suppliers that involve collaborative problem-solving and common quality standards improve the supply chain's overall efficiency (Handfield et al., 1999). Sadikoglu and Olcay (2014) discovered that by maintaining efficient procurement and reducing rework costs, supplier quality management has a major impact on financial performance. Additionally, by increasing input reliability and decreasing production downtime, supplier quality management improves operational performance.

H5: MSME's Firm performance is positively influenced by Supplier Quality Management.

One of TQM's core principles is customer focus, which highlights the importance of understanding and satisfying customer demands. Businesses that put a high priority on customer satisfaction see increases in brand loyalty, retention rates, and competitive advantage (Evans & Lindsay, 2017). To promote continuous product and service improvement, a strong customer focus includes systematically collecting and evaluating consumer feedback (Parasuraman et al., 1988). Research indicates that companies with wellorganized customer engagement procedures are better equipped to predict shifting customer needs and modify their products effectively (Reed et al., 2000). Because businesses that continuously exceed customer expectations have higher profitability and market share, customer satisfaction is correlated with overall business performance (Anderson et al., 1994). According to Sadikoglu and Olcay (2014), firms that put their customers' needs first produce better goods and services, which greatly improves customer outcomes. Additionally, by boosting sales and revenue, a focus on customer satisfaction helps to improve firm's success.

H6: MSME's Firm performance is positively influenced by Customer Focus.

Integrating quality goals into an organization's long-term vision and operational plans is known as strategic quality planning. Effective strategic quality planning makes sure that quality is a major factor in organizational decision-making by coordinating quality improvement projects with business objectives (Prajogo & Sohal, 2006). Businesses that integrate quality planning into their strategic management systems see improvements in financial performance, operational effectiveness, and innovation (Oakland, 2003). Businesses can also proactively address quality-related issues and have preventive measures together through strategic planning (Goetsch & Davis, 2014). Sadikoglu and Olcay (2014) study shows strategic quality planning is essential for enhancing operational performance because it promotes efforts for continuous improvement and aligns procedures with long-term objectives.

H7: MSME's Firm performance is positively influenced by Strategic Quality Planning.

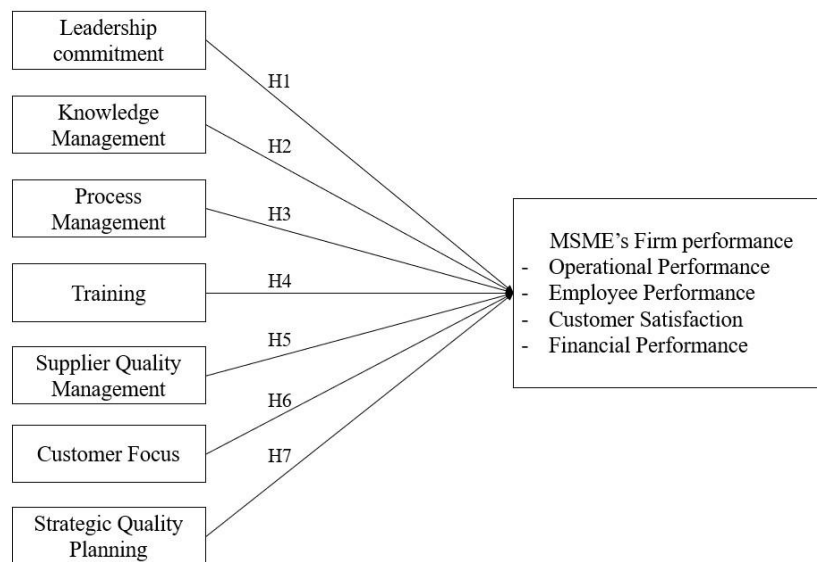


Fig. 1. Proposed conceptual framework of the study(adopted from Sadikoglu and Olcay (2014))

2. Research Methodology

This study employs a systematic survey questionnaire as the primary tool in data gathering to measure the impact of Total Quality Management (TQM) practices on organizational performance. The questionnaire has 42 items, categorized into seven independent variables (Leadership, Training, Process Management, Knowledge Management, Strategic Quality Planning, Customer Focus and Supplier Quality Management) and four dependent variables (Operational Performance, Customer Results, Employee Performance and Financial Performance). A 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree) is applied for each item to maintain response measurement consistency. The questionnaire is adopted from Sadikoglu and Olcay (2014), to maintain consistent measurement items with validated constructs from prior studies. The sample for this research is Manufacturing MSMEs (Pump & Motor Industry) in Tamil Nadu. According to the Tamil Nadu Government MSME website, Tamil Nadu has approximately 2.3 lakh MSMEs including manufacturing as well as services sector units. But in this research, only the Pump & Motor Manufacturing MSMEs are considered, a subset of this overall number.

This research primarily considers Production Managers and Quality Managers, as they are directly involved in quality control and manufacturing processes. To ensure relevant organizational representation, one or a maximum of two responses were obtained from each company. Where two responses were obtained, one was from the Quality Manager and the other from the Production Manager. The individual respondent was considered the unit of analysis, and each manager's response was analysed separately based on their individual perceptions and experiences. In sampling, Convenience Sampling was the initial method employed, but due to the challenge of finding a Pump & Motor Manufacturing MSMEs, Snowball Sampling became the prevalent method. The respondents would mention their suppliers, and hence it was simpler to gather more data from related companies in the sector.

The method helped in reaching related companies that were hard to find through direct access. The data is gathered through a printed paper format questionnaire (A4 size), which is distributed physically in industrial clusters of Tamil Nadu, such as CODISSIA (Coimbatore District Small Industries Association), BNI (Business Network International) and Coimbatore manufacturing clusters, especially Arasur location. The method provides face-to-face interaction with industry players, which enhances response reliability and accuracy. Data obtained are analysed with Jamovi software, which is a statistical software. Reliability Analysis (Cronbach's Alpha ≥ 0.70) is to establish the internal consistency of the questionnaire. Multiple Linear Regression is used to find the relationship between the TQM practices (independent variables) & MSME's Firm performance (dependent variables). Descriptive Statistics are employed to quantify the data distribution and find common trends. Such statistical findings establish the validity of the study's assumptions and mark the usability of TQM practices to enhance the organizational performance.

3. ANALYSIS & INTERPRETATION

Table 1. Descriptive Statistics of Survey Respondents.

	Category	Frequency (N)	Percentage (%)
TQM Awareness	Yes	84	58.3%
	No	60	41.7%
QMS Awareness	Yes	119	82.6%
	No	25	17.4%
Enterprise Type	Micro	67	63.2%
	Small	27	25.5%

	Medium	12	11.3%
Job Role	Quality Manager	73	50.7%
	Production Manager	71	49.3%

Note. N = 144. Source: Primary data compiled by the authors

The descriptive statistics provide an overview of the respondent's profile. 58.3% of the respondents are familiar with TQM, whereas 41.7% of the respondents have no knowledge about TQM, showing that certain organizations are unaware to a considerable extent. Similarly, 82.6% of the respondents are aware of Quality Management Systems (QMS), whereas 17.4% of the respondents are unaware of QMS, showing that despite most companies are aware of systemized quality systems.

With regard to enterprise size, 63.2% of the respondents are micro-enterprises, then small enterprises (25.5%), and medium enterprises (11.3%). This shows that the majority of the respondents are from small organizations, where fewer resources can affect the application of TQM. With regard to job title, the respondents are evenly split, with 50.7% being Production Managers and 49.3% being Quality Managers. This guarantees that both the views of the production and quality functions are represented equally in the study.

Table 2. Reliability Analysis.

Construct	Mean (M)	Standard Deviation (SD)	Cronbach's Alpha (α)
Leadership	3.86	0.601	0.921
Knowledge Management	3.80	0.596	0.924
Process Management	3.85	0.415	0.733
Training	3.90	0.428	0.750
Supplier Quality Management	3.79	0.429	0.742
Customer Focus	3.83	0.444	0.760
Strategic Quality Planning	3.84	0.444	0.717
Operational Performance	3.97	0.545	0.844
Employee Performance	3.98	0.438	0.632

The reliability analysis indicates that Leadership (0.921) and Knowledge Management (0.924) exhibit excellent reliability, confirming strong internal consistency among these constructs. Operational Performance (0.844) and Financial Performance (0.853) also show good reliability, ensuring consistent measurement. The constructs Process Management (0.733), Training (0.750), Supplier Quality Management (0.742), Customer Focus (0.760), Employee Performance (0.632) and Strategic Quality Planning (0.717) fall in the acceptable range, meaning they provide a moderate level of reliability. Reliability scores confirm that the questionnaire is statistically sound, with all constructs demonstrating acceptable to excellent reliability. Customer Results recorded a relatively high mean score of 4.69 (SD = 0.417), indicating that respondents generally perceived customer-related outcomes positively. However, the relatively low standard deviation suggests limited dispersion and a possible ceiling effect, so the findings were interpreted with caution.

Table 3. Regression analysis between TQM elements and Operational Performance

Predictor	Estimate (β)	SE	t	p-value
Intercept	0.00349	0.3897	0.00895	0.993
Leadership	-0.033	0.030	-1.093	0.276
Knowledge Management	0.030	0.030	1.002	0.318
Process Management	0.904	0.043	27.515	<0.001
Training	-0.169	0.041	-4.040	<0.001
Customer Focus	-0.012	0.049	-0.264	0.792
Supplier Quality Management	-0.015	0.042	-0.375	0.708
Strategic Quality Planning	0.029	0.046	0.643	0.521

Note. Significant at $p < 0.05$. Source: Authors' computation using Jamovi software.

Multiple Linear Regression analysis of Operational Performance explains a high percentage of variance ($R^2 = 0.854$, $p < 0.001$), which means that 85.4% of variance in Operational Performance is influenced by the independent variables. Among predictors, Process Management ($\beta = 0.904$, $p < 0.001$) is a high positive predictor of Operational Performance, which means that proper control of processes, standardization and statistical techniques greatly enhance product quality, reliability and on-time delivery. Training ($\beta = 0.16943$, $p < 0.001$) is a negative predictor of Operational Performance, which means that although training is provided, it may not be adequately utilized to operational improvement or there may be a gap between training and actual shop-floor implementation. The other variables, Leadership, Supplier Quality Management, Knowledge Management, Strategic Quality Planning and Customer Focus, do not have or have negligible effects on Operational Performance ($p > 0.05$). This means that although these variables are included in overall quality management, they may not have an immediate and direct effect on production efficiency, product quality or delivery performance. Leadership facilitates long-term quality objectives, but its effect may not be directly seen in day-to-day operations. Knowledge Management, although it facilitates the availability of quality data, may not be leveraged to the fullest to enhance operational efficiency. Supplier Quality Management is important, but operational efficiency is more under internal control than by supplier contribution. Customer Focus improves long-term product development, but short-term operational efficiency is more under internal control. Similarly, Strategic Quality Planning improves long-term success but has less direct control over day-to-day operational efficiency.

The findings emphasize Process Management as the superior predictor of Operational Performance, validating the worth of formal quality control procedures in manufacturing. The inverse relationship between Training and Operational Performance highlights the worth of linking training programs to realizable operational gains. The absence of significant effects from the other variables suggests that their impact is more strategic and long-term in nature and not on operational efficiency in itself.

Table 4. Regression analysis between TQM elements and Employee Performance

Predictor	Estimate (β)	SE	t	p-value	Significance
Intercept	-0.1201	0.3099	-0.387	0.699	Not Significant

Leadership	0.0135	0.0241	0.559	0.577	Not Significant
Knowledge Management	0.0276	0.0242	1.142	0.255	Not Significant
Process Management	0.0432	0.0348	1.240	0.217	Not Significant
Training	0.9446	0.0333	28.327	<0.001	Significant
Customer Focus	0.0139	0.0389	0.357	0.722	Not Significant
Supplier Quality Management	-0.0299	0.0336	-0.889	0.376	Not Significant
Strategic Quality Planning	0.0375	0.0366	1.025	0.307	Not Significant

Note. Significant at $p < 0.05$. Source: Authors' computation using Jamovi software.

The regression between TQM elements and Employee Performance explains most of the variance ($R^2 = 0.857$, $p < 0.001$), indicating that 85.7% of variance in Employee Performance is influenced by the independent variables. Among the predictor variables, only Training ($\beta = 0.9446$, $p < 0.001$) is a significant predictor, which confirms the contention that well-structured employee training programs contribute to increasing efficiency in the workforce, work satisfaction and commitment. The fact that employee participation programs, skill development and lifelong learning are responsible for raising job performance is evident. But Leadership, Process Management, Knowledge Management, Supplier Quality Management, Strategic Quality Planning and Customer Focus are not significant predictors of Employee Performance ($p > 0.05$). Employees may not be connecting the dots instantly between leadership activities and their performance, which could indicate a gap between management intent and workforce behaviour. Similarly, although knowledge management gives feedback about performance, employees may not be actively utilizing the information in a way that translates into job performance. Process standardization is closely associated with operation performance rather than employee motivation or retention and hence Process Management is not a significant predictor of Employee Performance. Relations with the suppliers are not directly influential in employee motivation or performance because they are external rather than internal work environment variables. Besides, Customer Focus is not a strongly influential factor on Employee Performance, customer contact is good for business performance but doesn't contribute to employee engagement, job satisfaction, or absence. Strategic Quality Planning also is not a strongly influential factor, most likely because long-term planning for quality doesn't necessarily influence employee action on a day-to-day basis. Employees may not necessarily be influenced straight away by organizational strategy, especially in the short term for performance measurement.

Table 5. Regression analysis between TQM elements and Customer Results

Predictor	Estimate (β)	SE	t	p-value	Significance
Leadership	0.0412	0.0601	0.685	0.494	Not Significant
Knowledge Management	-0.0645	0.0602	-1.072	0.286	Not Significant
Process Management	-0.0154	0.0868	-0.177	0.859	Not Significant
Training	0.0652	0.0831	0.784	0.434	Not Significant
Customer Focus	-0.0422	0.0971	-0.435	0.664	Not Significant
Supplier Quality Management	-0.0407	0.0838	-0.486	0.628	Not Significant
Strategic Quality Planning	0.0695	0.0912	0.763	0.447	Not Significant

Note. Significant at $p < 0.05$. Source: Authors' computation using Jamovi software

The Customer Results regression model explains a very small percentage of the variance ($R^2 = 0.0214$, $p = 0.885$), which means 2.14% of the Customer Results variance is influenced by the independent variables. It means, TQM practices do not have any measurable and direct influence on customer-related outcomes in the short term. The results show, none of the TQM practices have a significant predictive power for Customer Results ($p > 0.05$), although Customer Focus were hypothesized to play an important role in retention, customer satisfaction and complaints reduction. Leadership, Training, Process Management, Knowledge Management, Supplier Quality Management, Strategic Quality Planning and Customer Focus do not have a direct effect on Customer Results. Leadership actions may be more internally process improvement-focused than customer perception alteration. Knowledge management receives access to quality-related data, but the customers do not notice these internal data-driven outcomes directly. Similarly, process standardization improves internal efficiency and the customers may not be aware of these changes if they do not lead to obvious product/service improvement. Training is a key source of employee development, but the customers are more concerned about the end product and service and thus the effect of training may not be immediately visible in customer satisfaction and retention. Supplier Quality Management and Customer Focus were to have a greater influence on Customer Results, but the data points indicate that Customer Results may be influenced by external macro drivers, like price, competition, and brand image, more than by single quality management. Strategic Quality Planning, though critical to long-term business success, does not demonstrate an immediate influence on customer results, and it's payback could be long-term.

Table 6. Regression analysis between TQM elements and Financial Performance

Predictor	Estimate (β)	SE	t	p-value	Significance
Intercept	-0.2025	0.7118	-0.284	0.776	Not Significant
Leadership	-0.0573	0.0554	-1.033	0.303	Not Significant
Knowledge Management	-0.0180	0.0555	-0.324	0.747	Not Significant
Process Management	0.1031	0.0800	1.289	0.200	Not Significant
Training	0.1000	0.0766	1.305	0.194	Not Significant
Supplier Quality Management	0.9689	0.0772	15.131	<0.001	Significant
Customer Focus	-0.2458	0.0894	-2.748	0.007	Significant
Strategic Quality Planning	0.0216	0.0840	0.258	0.797	Not Significant

Note. Significant at $p < 0.05$. Source: Authors' computation using Jamovi software.

Financial Performance regression analysis explains a moderate degree of variance ($R^2 = 0.646$, $p < 0.001$), i.e., 64.6% of Financial Performance variance is influenced by the independent variables.

The results indicate that Supplier Quality Management ($\beta = 0.9689$, $p < 0.001$) has a positive impact on Financial Performance with a strong positive coefficient, suggesting that high-quality supplier relationships, supplier quality improvement, and supplier involvement in quality management activities have a direct impact on the financial growth of a company. Additionally, Customer Focus ($\beta = -0.2458$, $p = 0.007$) is related negatively to Financial Performance. Other factors, including Leadership, Knowledge Management, Process Management, Training, and Strategic Quality Planning, have insignificant effects on Financial Performance ($p > 0.05$). This implies that even though these factors play important roles in overall quality improvement, their effect on financial performance is either indirect or less direct.

Leadership maintains long-term strategic improvement, but its financial impact only materializes in the long term. Knowledge management supports good decision-making, but financial returns are affected by external market forces and prices. Process management maximizes operating efficiency, but cost savings do not necessarily translate into financial profits. Similarly, while training enhances employee competencies, its financial impact depends on employees' ability to utilize such competencies on revenue-generating activities. Strategic quality planning focuses on mission alignment and long-term sustainability, but its short-term effect on short-term financial performance is insignificant.

5. Discussion

The results of the study are helpful in giving insights regarding the relationship between TQM practices and organizational performance in the Pump and motor manufacturing MSME in Tamil Nadu location. The result of the study indicates that Process Management and Training are the most important drivers of improved Operational Performance and Training is the most significant driver of Employee Performance. The study, indicates that some of the TQM dimensions, such as Leadership, Strategic Quality Planning and Knowledge Management, do not have an immediate and direct impact on performance indicators, which suggests that their effects could be more strategic and long-term in nature. Supplier Quality Management is the most significant driver of Financial Performance, further emphasizing the significance of MSMEs maintaining strong supplier relationships. The lack of significant effects of Customer Focus on Customer Results suggests that customer satisfaction and retention could be dependent on external market factors and not entirely on internal quality efforts. The results indicate that Process Management significantly impacts Operational Performance, reinforcing the need for structured, efficient and well-defined processes in MSMEs. This finding aligns with the study by Sadikoglu and Olcay (2014), which emphasized that effective process management leads to enhanced productivity and quality improvements. Similarly, Psomas and Antony (2017) highlighted that well-structured processes help small and medium enterprises (SMEs) achieve better operational efficiencies. Contradicting this, Singh et al. (2018) found that in certain industries, rigid process control might hinder flexibility and responsiveness to market changes.

Training was found to be significantly related to Employee Performance, indicating that investing in workforce development, technical skill enhancement and quality awareness directly contributes to increased employee productivity and job satisfaction. Prajogo and Cooper (2010) found similar results, emphasizing that training enhances employee engagement and overall work performance. Karia and Asaari (2006) also highlighted that employee in TQM-oriented firms showed greater job satisfaction and commitment. Mellat-Parast (2013) argued that training alone is insufficient unless coupled with leadership support and a knowledge-sharing culture. Supplier Quality Management was positively associated with Financial Performance, suggesting that strong supplier relationships and high-quality supplier inputs contribute directly to cost savings, efficiency and profitability. This result is consistent with the findings of Kaynak (2003), who demonstrated that supplier quality management positively influences financial performance through improved resource utilization. Reed et al. (2000) also suggested that supplier collaboration and quality control reduce operational costs and enhance profitability.

Kumar et al. (2020) found that in resource-constrained environments, MSMEs often struggle to maintain strict supplier quality standards, reducing financial benefits. Leadership was not significantly related to any of the MSME's Firm performance, similar to findings by Singh and Shrivastava (2020), who noted that leadership's impact on performance is often indirect, through cultural and strategic changes. Knowledge Management did not significantly impact any of the performance indicators, which contradicts Davenport and Prusak (1998), who suggested that knowledge sharing leads to enhanced decision-making and competitive advantage, which leads to increase in operational efficiency. Customer Focus did not show a significant relationship with Customer Results, suggesting that customer satisfaction may be more influenced by external factors, as proposed by Anderson et al. (1994). Strategic Quality Planning was also

not significantly related to any of the MSME's Firm performance, aligning with findings by Prajogo and Sohal (2006), who stated that long-term planning effects are difficult to quantify in short-term studies.

6. Limitations and Directions for Future Research

This study has useful contributions; there are certain limitations. One such key limitation is industry-specific research of the Pump and Motor Manufacturing MSME sector in Tamil Nadu. Therefore, it might not be possible to extend the findings of this study to other industries or MSMEs in different geographical regions, as their issues and practices of quality management could be varied. Second, only the data of the Quality Managers and Production Managers were collected and not all the views of other key stakeholders such as the senior executives, shop floor personnel and the customers. It might have provided a limited picture of the manner in which the TQM practices influence overall organizational performance. Another limitation is that the study provides a cross-sectional analysis, capturing TQM's effects at a single point in time. A longitudinal study would offer deeper insights into how TQM practices influence performance over an extended period.

Future research has to examine the long-term impact of TQM practices through a longitudinal study design in order to examine the role of quality management in the performance of an organization in the long term. As the present research is concerned with Pump and Motor Manufacturing MSMEs of Tamil Nadu, future research can expand its scope of studies to other manufacturing sectors and locations to enhance generalizability, to check the impact of TQM. Additionally, incorporation of perceptions of shop floor employees, customers and top management executives would provide a better insight into the influence of TQM practices at varying levels of an organization. Lastly, research in the future can explore the barriers to the implementation of TQM among MSMEs, particularly in low-resource environments. Determining the most significant challenges and proposing means to overcome them can help firms implement TQM more effectively.

7. Conclusion

The study conducted here examined the impact of Total Quality Management (TQM) practices on Organizational Performance of Pump and motor Manufacturing MSMEs in Tamil Nadu. The findings show that Training and Process Management are the strongest drivers of Employee Performance and Operational Performance and that Supplier Quality Management is essential to Financial Performance. The study also shows, however, that Customer Focus is not a strong driver of Customer Results and that customer satisfaction and customer retention are based on external market forces and not on internal quality management in and of itself. The study contributes theoretical and practical knowledge, supporting the value of effective process management, employee training and supplier quality control for MSMEs. Based on the study limitations, future studies must investigate the application of TQM across different industries, employ the longitudinal design, and examine other variables such as innovation, technology acceptance, and competitors' market forces.

Declarations

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Data availability. The Data is available with the author

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