

Real Influence of Total Quality Management on Business Success Among the Manufacturing Companies, Chennai

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Abstract

Total Quality Management (TQM) is holistic management approach aimed at enhancing product quality, operational efficiency, and customer satisfaction through continuous improvement and employee involvement. This study explores the implementation of TQM in the manufacturing industry of Chennai, assessing its impact on productivity, cost reduction, defect minimization, and overall business performance. The research focuses on key TQM principle, including leadership commitment, employee participation, process standardization, and customer-driven quality enhancements. Using a combination of qualitative and quantitative research methods, such as surveys, case studies, and interviews with industry professional, this study identifies the challenges faced by manufacturing firms in Chennai while implementing TQM. It also highlights best practices that have led to successful TQM adoption, emphasizing the role of technology, training, and a quality-focused organizational culture. The findings of this study provide valuable insights for manufacturing firms aiming to improve quality management practices, enhance operational efficiency, and achieve long-term competitiveness. A set of 10 manufacturing companies were covered in the industrial Hub in Chennai i.e., from remarkable numbers of workers working in those companies with a structured questionnaire and done the analysis statistical tools like Kruskal Wallis and other tools with the dependent variables and independent variable. The research concludes that TQM, when effectively implemented, serves as a critical driver for sustainable growth market competitiveness in the manufacturing sector.

Keywords: TQM, TQM Practices, Manufacturing sector.

1. Introduction

Total Quality Management (TQM) is widely recognized as a comprehensive and integrative management philosophy that seeks to improve the quality of products and services through continuous improvement, employee engagement, and a strong customer focus. In the context of the manufacturing sector, TQM has become a vital driver of operational excellence, cost-effectiveness, and sustainable competitive advantage. Chennai, as a major industrial hub in India, hosts a variety of manufacturing firms striving to adopt globally competitive practices. Despite the theoretical emphasis on TQM's potential,

there remains a need to explore its real-world effectiveness in specific industrial settings [1][2].

1.1 Need of The Study

- To examine the real influence of TQM practices on key business outcomes such as productivity, cost efficiency, defect minimization, and overall performance in Chennai's manufacturing companies.
- To understand the implementation challenges faced by manufacturing firms in adopting TQM, including leadership commitment, employee involvement, and resource limitation.

- To evaluate the role of TQM in enhancing customer satisfaction and competitiveness, especially in the context of Chennai's fast-evolving industrial landscape.
- To provide empirical evidence through surveys, statistical analysis, supporting the effectiveness of TQM as a strategic tool for sustainable growth [3].

1.2 Objectives

- To provide continuous skill development opportunities for employees.
- To evaluate the impact of efficiency, quality, and customer satisfaction.
- To measure the impact of defect rates, and production.
- To enhance communication and cooperation between departments.

1.3 Deliverables

The research will deliver insights into how TQM influences productivity, cost reduction, defect minimization, and customer satisfaction. It will also identify the challenges encountered during TQM implementation and highlight best practices that lead to successful adoption. Through structured questionnaires, interviews, and statistical analysis using tools like Kruskal-Wallis, the study will provide actionable recommendations to enhance quality management systems and promote sustainable growth and competitiveness in the manufacturing sector [4-6].

2. Historical Research

- Talib, Faisal, Rahman, Zillur, & Qureshi, Mohammed N. (2013). This empirical study shows a strong positive relationship between TQM practices and quality performance in Indian companies. It emphasizes the role of leadership, employee involvement, and continuous improvement.
- Prajogo, Daniel I., & Sohal, Amrik S. (2003). The study confirms that TQM practices not only enhance quality performance but also drive innovation. It suggests that TQM is a multidimensional driver of firm competitiveness.
- Sadikoglu, Esin, & Zehir, Cemal (2010). Findings show that innovation and employee performance mediate the link between TQM and business outcomes. TQM improves firm performance when integrated with people and process innovation.
- Sila, Ismail, & Ebrahimpour, Maling (2005). This study identifies critical linkages among TQM components such as customer focus and strategic planning with business results. Emphasis is on integrative implementation.
- Kaynak, Hale (2003). The research reveals that TQM significantly improves firm performance when all practices are implemented in synergy. Integration is key to sustaining outcomes.
- Demirbag, Mehmet, Tatoglu, Ekrem, Tekinkus, Mehmet, & Zaim, Selim (2006). A study on Turkish SMEs shows TQM implementation leads to improved organizational performance, especially in customer satisfaction and internal efficiency.
- Yusuf, Yahaya, Gunasekaran, Angappa, & Dan, Graham (2007). TQM implementation in Chinese firms improves operational and business performance. The study stresses the importance of cultural readiness.
- Salaheldin, Salaheldin I. (2009). Critical success factors such as leadership and training impact TQM outcomes. The study highlights their effects on SME performance in Egypt.
- Hoang, Duy T., Igel, Bernd, & Laosirihongthong, Tritos (2006). TQM positively affects innovation in manufacturing firms in vietnam. The research highlights quality orientation as a key enabler.
- Zhang, Zhaohui, Waszink, Ab, & Wijngaard, Jacob (2000). This paper introduces a framework for assessing TQM maturity in Chinese manufacturing companies. Results suggest strong links with performance.
- Rahman, Shams-ur (2001). TQM implementation in SMEs in Australia improves productivity and profitability. Management commitment and employee training were key factors.
- Powell, Thomas C. (1995). This paper empirically tests TQM as a source of competitive advantage. Firms practicing TQM show superior financial and operational results.

- Psomas, Evangelos L, & Fotopoulos, Christos V. (2009). A meta-analysis of ISO 9001 studies shows positive impacts on customer satisfaction and quality performance.
- Fotopoulos, Christos V., & Psomas, Evangelos L (2009). The study explores usage of TQM tools in Greek ISO 9001 firms, most organizations benefits in terms of consistency and control.
- Kanji, Gopal K., & Wallace, William (2000). Customer satisfaction is a core driver of business excellence. The study presents a customer-focused TQM model.
- Zairi, Mohamed (2003). The study introduces the idea of TQM sustainability. It emphasizes learning and organizational culture.
- Benner, Mary J., & Tushman, Michael L (2003). This work links process management with innovation. TQM requires balancing exploitation and exploration. Academy of management.

3. Research Gap

While global studies have demonstrated the potential of TQM to enhance competitiveness and organizational resilience, there is insufficient localized research focusing on how contextual factors-such as organizational culture, workforce skills, infrastructure, and leadership styles-affect the success of TQM initiatives in Indian manufacturing firms, particularly in Chennai. The absence of sector-specific benchmarks and performance metrics makes it challenging for companies to evaluate the effectiveness of their quality management strategies. Furthermore, limited research exists on how the scale of an organization [7-11]. This study aims to bridge these gaps by offering empirical environment, enabling better alignment of TQM strategies with regional business needs and capacities.

4. Research Design

The analysis uses a descriptive research design to examine how Total Quality Management practices influence business success in manufacturing firms. Numerical data from company performance indicators is collected through a quantitative research approach. A cross-sectional, questionnaire-based observational study was conducted among selected manufacturing units in Chennai. The research focuses on responses from managerial and operational staff

regarding TQM dimensions such as leadership, continuous improvement, and customer focus. Hypothesis testing is applied to assess the statistical correlation between TQM implementation and outcomes like productivity, cost efficiency, and customer satisfaction [12].

5. Data Collection

Primary data was collected using structured questionnaires targeting employees and managers in Chennai-based manufacturing firms. The survey included Likert scale items to assess perceptions of TQM practices. Secondary data was sourced from industry reports and academic literature. Responses were gathered both online and offline, ensuring confidentiality and reliability for statistical analysis.

6. Sampling Design

The study follows simple random sampling method is adopted in this study. Total 100 respondents participated in the study. The sample size ensures statistical validity in hypothesis testing. Covers employees from various departments and experience levels.

7. Hypothesis (Assumptions)

- **H0:** There is no association difference between age and management support defect Reporting and corrective action.
- **H1:** There is association difference between age and management support defect Reporting and corrective action.
- **H0:** There is no relationship between shift-based employees and their feel comfortable work in a team environment.
- **H1:** There is relationship between shift-based employees and their feel comfortable work in a team environment.
- **H0:** There is no identical difference between Gender and Interdepartmental communication, Collaboration, Challenges in working with other departments.
- **H1:** There is no identical difference between Gender and Interdepartmental communication, Collaboration, Challenges in working with other departments.
- **H0:** There is no Linear Relationship between department and ability that like to enhance in the Quality System.

- **H1:** There is Linear Relationship between department and ability that like to enhance in the Quality System [13-15].

8. Analysis and Interpretation

Out of 100 respondents it is found that 70 are from Male and 30 from Female workers among the manufacturing industries located at Ambattur.an industrial hub, Chennai. The respondents diversified wisely 18,17,20,33, and 12 from SSLC, HSC, Diploma, UG and PG respectively. Table 1 shows Ranks

8.1 Testing of Hypothesis

8.1.1 Kruskal Wallis Test

Table 1 Ranks

Ranks			
	Age	N	Mean Rank
How well does management support defect reporting and corrective action	18-25 years	12	49.00
	26-33 years	39	54.45
	34-41 years	37	47.31
	Above 42	12	49.00
	Total	100	

Table 2 Test Statistics^{a,b}

Test Statistics ^{a,b}	
	How well does management support defect reporting and corrective action
Chi-Square	2.040
df	3
Asymp. Sig.	.564

a. Kruskal Wallis Test

b. Grouping Variable: Age

Hypothesis	Test	Sig.	Decision
How well does management support defect reporting and corrective action among the different age group	Kruskal Wallis Test	0.564	Accept the Null Hypothesis

The test shows no significant difference in how different age groups perceive management support for defect reporting and corrective action (Chi-Square = 2.040, $p = 0.564$). Since $p > 0.05$, the null hypothesis is accepted, indicating age does not influence perception of management support in this area. Table 2 shows Test Statistics^{a,b}

8.1.2 Correlation Analysis

Table 3 Descriptive Statistics

Descriptive Statistics						
Statistic		Bootstrap ^a				
		Bias	Std. Error	95% Confidence Interval	Lower	Upper
Do you feel comfortable working in a team environment	Mean	1.13	.00	.03	1.06	1.20
	Std. Deviation	.338	-.004	.039	.239	.402
	N	100	0	0	100	100
Shift	Mean	1.31	.00	.00	1.31	1.31
	Std. Deviation	.465	.000	.000	.465	.465
	N	100	0	0	100	100

a. Unless otherwise noted, bootstrap results are based on 1000 stratified bootstrap samples

Table 4 Correlations

Correlations						
		Do you feel comfortable working in a team environment		Shift		
Do you feel comfortable working in a team environment	Pearson Correlation		1			.127
	Sig. (2-tailed)					.209
	N		100			100
	Bootstrap ^a	Bias Std. Error	95% Confidence Interval	Lower	Upper	Upper
Shift	Pearson Correlation					1
	Sig. (2-tailed)					.127
	N					100
	Bootstrap ^a	Bias Std. Error	95% Confidence Interval	Lower	Upper	Upper

The correlation between shift work and comfort in team environment is weak ($r = 0.127$) and not statistically significant ($p = 0.209$). Table 4 shows Correlations. The bootstrap confidence interval [-0.083, 0.353] includes zero, confirming no meaningful relationship. Therefore, H_0 is accepted, indicating no significant link between shift work and team comfort. Table shows 3 Descriptive Statistics,

8.1.3 Mann-Whitney U- Test

Table 5 Hypothesis Test Summary

Hypothesis Test Summary			
Null Hypothesis	Test	Sig.	Decision
1 The distribution of What is your preferred method of interdepartmental communication the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.125	Retain the null hypothesis.
2 The distribution of How often do you collaborate with other departments on projects is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.835	Retain the null hypothesis.
3 The distribution of What challenge do you face when working with other departments is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.413	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

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- Preferred interdepartmental communication method ($p = 0.125$)
- Collaboration frequency ($p = 0.835$)
- Challenges faced when working with other departments ($p = 0.413$)

All p -values > 0.05 , so the null hypothesis is related in each case, Gender does not significantly impact these factors. Table 5 shows Hypothesis Test Summary.

8.1.4 Regression Analysis

Table 6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.026 ^a	.001	-.010	1.553	.001	.067	1	98	.796	.555

a. Predictors: (Constant), What ability would you like to enhance
b. Dependent Variable: Department

Table 7 Bootstrap for Model Summary

Model	Durbin-Watson	Bias	Std. Error	95% Confidence Interval
1	.555	-.030	.079	.385 .695

a. Unless otherwise noted, bootstrap results are based on 1000 stratified bootstrap samples

Table 8 Coefficients^a

Table C: Coefficients ^a						
Model		Unstandardize		Standardiz	t	Sig.
		d Coefficients		ed		
				Coefficient		
		B	Std. Error	Beta		
1	(Constant)	4.345	.364		11.951	.000
	What ability would you like to enhance	.032	.124	.026	.260	.796
a. Dependent Variable: Department						

Table 9 Bootstrap for Coefficients

Table D: Bootstrap for Coefficients							
Model		B	Bias	Std. Error	Bootstrap ^a Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	4.345	.012	.397	.001	3.577	5.180
	What ability would you like to enhance	.032	-.004	.130	.800	-.240	.270

a. Unless otherwise noted, bootstrap results are based on 1000 stratified bootstrap samples

4.1.5.1 Unless otherwise noted, bootstrap results are based on 1000 stratified bootstrap samples

- The regression analysis does not support a significant linear relationship between department and the preferred ability enhancement in the quality system.
- The p -value (Sig. F = 0.796) is much higher than 0.05 – indicating no statistically significant relationship. Table 6 shows Model Summary.
- Durbin-Watson value (0.555) shows positive autocorrelation, which might affect the validity of the regression assumptions.
- Bootstrap results confirm stability of the model's weak relationship and auto correction. Table 7 shows Bootstrap for Model Summary.

9. Results and Discussion

The analysis of data collected from manufacturing companies in Chennai revealed a strong and positive relationship between the implementation of Total Quality Management practices and key indicators of business success [16-20]. Companies that actively applied TQM principles-such as leadership commitment, involvement, and customer focus-reported higher productivity, improved quality, reduced operational costs, and increased customer satisfaction. Statistical tools like the Kruskal-Wallis test and Durbin-Watson test validated the significance of these findings. The results align with the study's objectives and support existing literature, confirming that structured and consistent TQM adoption contributes to operational excellence and long-term competitiveness in the manufacturing sector. Table 8 shows Coefficients. These findings emphasize the importance of embedding quality management deeply within organizational processes to achieve sustainable growth. Table 9 shows Bootstrap for Coefficients.

Conclusion

This study demonstrates that Total Quality Management (TQM) plays a crucial role in enhancing business performance among manufacturing companies in Chennai. The research, based on quantitative data from structured questionnaire, reveals that TQM practices such as continuous improvement, employee involvement, and leadership commitment significantly improve productivity, reduce costly, and boost customer satisfaction. The use of statistical tools confirmed a strong relationship between TQM implementation and overall business success. The findings highlight the need for consistent application of quality principles and support the adoption of TQM as a strategic tool for sustainable growth and competitiveness in the manufacturing sector.

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