

# Assessing the Moderating Role of Supervisor Support in Amplifying Total Quality Management Practices and Project Performance within Pakistan's Manufacturing Sector Post-Covid-19: An Empirical Study

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**Abstract.** This empirical research investigates the interplay between Total Quality Management (TQM), Project Performance (PP), and Supervisor Support (SS) within the context of post-Covid-19 pandemic manufacturing firms in Pakistan. The study involved the development and distribution of a questionnaire to manufacturing industries located in federal area of Pakistan, Khyber Pakhtunkhwa, Pakistan and northern Punjab, Pakistan. Upon scrutinizing the collected data, the research revealed a noteworthy and positive correlation between Total Quality Management and Project Performance. Out of 195 distributed questionnaires, 131 responses were received. Interestingly, while global literature commonly asserts that Supervisor Support serves as a beneficial moderator in the relationship between Total Quality Management and Project Performance, the study's findings in the Pakistani manufacturing sector suggested a different reality. Specifically, supervisors were perceived as providing insufficient support to their subordinates in matters of quality. Some employees also highlighted that their organizations struggled to implement TQM practices fully, occasionally breaching cost and time constraints in projects; nevertheless, these organizations remained highly profitable. Overall, it suggests that manufacturing industries in Pakistan may benefit from prioritizing Supervisor Support within the framework of Total Quality Management to enhance their overall performance and production efficiency.

**Key words:** Total Quality Management, Project Performance, Supervisor Support, Covid-19, Manufacturing Industries, Pakistan, Developing countries.

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## 1 Introduction

Amidst the swiftly evolving landscape of globalization, organizations are undergoing dynamic changes at the strategic level. There is a heightened focus on optimizing management practices for better performance. It's important to note that not all organizations can adopt the same set of management practices that have proven successful elsewhere. The capacity to recognize environmental changes and respond proactively through continuous improvement

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initiatives is considered a crucial element for achieving organizational performance and success. Aim of every firm is to maximize profit by adopting such strategies and practices that can put efficiency in their working so that they can maximize their output and can compete with rivals. Total Quality Management (TQM) represents a vital component of management philosophy, primarily focused on achieving excellence and perfection within work processes and among the individuals involved. This approach is harnessed to instill refinement and elegance both in the final product and throughout the entire workflow. TQM's fundamental objective is to minimize costs while maximizing efficiency (?). Renowned quality management figures such as Dr. Feigenbaum, Dr. Deming, Dr. Juran, Dr. H. James Harrington, and Dr. Taguchi have presented distinct approaches to elevate quality (Neyestani and Soleimanpour Omran, 2017). While their methodologies may vary to some extent, the core characteristics of the quality improvement process remain largely consistent (Ross and Neuteboom, 2021). Over the past two decades, TQM has emerged as a key management philosophy, aiding in enhancing an organization's performance and effectiveness, ultimately enabling it to attain a state of excellence (Alosani and Al-Dhaafri, 2023).

It stands as a pivotal catalyst for advancement in both the public and private sectors. As the global marketplace witnessed heightened competition during the mid-1990s, businesses found themselves operating on a global scale (Carvalho et al., 2022). This intensified rivalry prompted organizations to elevate the quality and excellence of their services and products. Many enterprises introduced quality management programs and integrated quality as a core strategic element. Implementing these practices has led to measurable improvements in company performance (McAdam et al., 2019). The implementation of TQM within a supportive organizational environment serves as a motivating force, encouraging personnel to work more intelligently and diligently to attain the organization's quality objectives (Krajcsák, 2019). However, it's important to note that evidence from other researches suggests that quality improvements don't always guarantee enhanced performance; at times, the results may even be negative (Faeq and Ismael, 2022; Grandzol and Gershon, 1997; Karimi et al., 2012). It's also crucial to acknowledge that these examples of failure may be attributable to implementation issues.

Supervisors hold a significant position within an organization, serving as the vital link between management and employees. Numerous studies have conducted extensive examinations into the significance and impact of supervisor support within an organizational context (Charoensukmongkol and Phungsoonthorn, 2021; Eisenberger et al., 2002; Tu et al., 2023). It can be stated that every product is a project and vice versa (Lovrekovic and Sukic, 2011). Achieving project success requires effective strategy formulation by management, with full support from staff, supervisors, and coworkers (Agus and Selvaraj, 2020). In many organizations, employees actively seek and anticipate a nurturing and supportive approach from their supervisors. The role that supervisors play not only directly influences employees but also extends to their interactions with colleagues (Kularathne et al., 2020). Prior researches underscore that supervisors effectively represent the organization, functioning as its agents. The attitude and behavior they exhibit toward employees serve as a reflection of how the organization perceives and values its workforce (Sanders and Yang, 2016; Umamaheswari and Krishnan, 2016).

Taking a proactive problem-solving approach, a supervisor sets the example at the group level, becoming a role model for other employees. They collaborate closely with their subordinates and co-workers to craft, execute, and oversee the organization's policies, procedures, and plans (Park et al., 2019). Rafferty et al. (2013) have identified supervisors and leaders as important figures in the context of organizational change. Within any organization, supervisors hold a crucial role in shaping the work environment by offering valuable information and feedback

to the personnel. Consequently, the supervisor's performance exerts a significant influence on the effectiveness of team members and colleagues (Briker et al., 2021). When leadership and supervisors commit to implementing and executing TQM strategies in employees' daily routines, the result is a quality service that exceeds customer expectations (Nguyen and Nagase, 2019). Projects inherently possess distinct characteristics, each unique in its nature, and their performance criteria may exhibit variations. Nevertheless, the key objective of all organizations, regardless of the project's specifics, is to achieve success. Realizing the desired project performance and attaining success necessitates effective strategic planning by management (Ibrahim et al., 2023). Simultaneously, it is now upon the staff, supervisors, and coworkers to wholeheartedly support these strategies and exert maximum effort to achieve the desired outcomes, ultimately lifting the project to a successful status. The proactive engagement of all involved parties becomes necessary in achieving project success. Effective leadership and supervision encompass a harmonious blend of teamwork, communication, and cohesion (Khan et al., 2020). The creativity and commitment of a workforce can significantly contribute to an organization's ability to secure a competitive edge, ensuring its survival, long-term prosperity, and positive performance (Rustiawan et al., 2023). It's also established that the selection of leadership plays an important role in influencing project performance (Razak et al., 2018). Effective supervision can initiate positive transformations within an organization's culture, fostering the development of quality values, beliefs, and standards. This, in turn, leads to notable improvements in an organization's output quality. Facilitating this effort are problem-solving techniques, learning and development initiatives, and fostering team cooperation (Hidayah Ibrahim et al., 2019).

In any nation, the manufacturing sector has a significant importance within the industrial framework. According to official statistics released by the government of Pakistan in the 2023 survey, it is shared that the manufacturing sector is contributing a noteworthy 12.01% to the overall Gross Domestic Product. Before Covid-19, this contribution was around 14%. This situation of performance and output is very alarming for the economy. Numerous researchers have conducted extensive investigations into TQM to encourage project performance and these studies consistently affirm the positive impact of TQM on performance (Agus and Selvaraj, 2020; Khalfallah et al., 2022). Notably, TQM has predominantly been explored within manufacturing sectors due to the significant potential for process enhancement and cost reduction in manufacturing industries compared to service sectors (Al-Ali and Abu-Rumman, 2019). Earlier researches underscore a deficiency in quality management practices in both the service and manufacturing sectors in Pakistan (Iqbal et al., 2021; Manzoor et al., 2019). Furthermore, research demonstrates that the moderating effect of Supervisor Support can be instrumental in enhancing performance (Charoensukmongkol and Pandey, 2023). However, a gap in the literature is evident, as prior studies have not delved into the moderating role of Supervisor Support within the context of the relationship between Total Quality Management and Project Performance, especially within Pakistan's manufacturing industry. The potential for improvement remains substantial, and the efficient implementation of quality management practices can augment production and quality within the manufacturing sector (Chopra et al., 2023), ultimately leading to improved performance (Vihari et al., 2022). This study seeks to comprehensively examine the causes and effects of Total Quality Management on Project Performance while identifying strategies to mitigate factors contributing to project lapses and reduced productivity. Crucially, it highlights the pivotal moderating role of Supervisor Support throughout this process.

During the research, it was noticed that no research has been made to investigate the moderating role of Supervisor Support in amplifying the TQM practices and Project Performance within Pakistan's Manufacturing Sector. The first primary research objective is to find out the

impact of TQM practices on project performance. The second primary research objective is to find out that moderation impact of Supervisor Support on the relationship of TQM practices and Project Performance. This research aims to examine the performance of manufacturing industries in Pakistan that have weakened after COVID-19 pandemic. The result of the current study will facilitate managerial implications.

1. Does Total Quality Management significantly impact the Project Performance of manufacturing industries in Pakistan?
2. Does Supervisor Support moderate the relationship between Total Quality Management and Project Performance in manufacturing industries in Pakistan?

## 2 Hypothesis Development

### 2.1 Supervisor Support

Supervisors hold a crucial role as the first level of management within an organization. They bear significant responsibilities and duties, primarily in the formation and leadership of working groups comprised of personnel (Park et al., 2019). Immediate supervisors play a crucial role by providing pertinent and vital information that strengthens the organization. Such engagement and information sharing by supervisors have a profound impact on the broader aspects of an organization. This dynamic can elevate work performance and enhance the efficiency of the firm (Malik et al., 2020).

Usman and Mat (2021) underscored that supervisors possess the ability to boost the productivity of personnel through their communication of signals regarding the value and significance of career training, development, and growth. These signals serve as motivational drivers for employees, encouraging them to work with effectiveness and efficiency. Ultimately, this approach contributes to the organization's success.

Within any organization, the feedback relayed by supervisors to top management is regarded as an essential and invaluable tool for enhancing organizational performance. This method holds immense significance and can scarcely be overstated. Feedback constitutes a pivotal element in the domain of performance management (Baloyi et al., 2014). Whether it takes the form of positive feedback, acknowledging commendable work efforts, or negative feedback, addressing subpar performance, the input provided by supervisors holds the potential to elevate employees' work performance (Lechermeier and Fassnacht, 2018). Numerous researchers have asserted that the impact of feedback exhibits a positive association with performance and its various factors /citepjiang2018; tagliabue2020. To explain the aspects related to Supervisor Support, it is a must to receive clear advice, messages, and guidance, as these factors enable the fulfillment of specific demands and the delivery of optimal output at work. Additionally, the extent to which a supervisor excels in listening and soliciting suggestions and advice plays a pivotal role in facilitating good performance at work (Chur-Hansen and McLean, 2006; Wiggins, 2012).

### 2.2 Project Performance

Each firm establishes its own set of criteria for project evaluation, and these criteria can indeed vary from one project to another (Mavi and Standing, 2018). Project performance involves

the ongoing assessment of progress, and the project's outcome is compared to predefined criteria. These evaluations determine whether the project is progressing toward success or failure (Jitpaiboon et al., 2019). Project performance can be measured by assessing the disparities and variations between projected or expected metrics and the actual measurements of factors such as cost, quality, or time scheduling (Jitpaiboon et al., 2019). Project performance is a critically important factor for the success of any project. Various studies suggest differing perspectives on what constitutes the primary factor for project performance and success. For some researchers, quality is the key element, while others emphasize the importance of time, and yet some claim that cost and budget are the foundation of project success (Kerzner, 2022). Project performance can be defined by meeting project objectives, completing the project within the allocated budget, and finishing it within the scheduled timeframe – all of which serve as indicators of project performance (Sirisomboonsuk et al., 2018). Indeed, some research suggests that project performance should be assessed based on the overall objectives of a particular project. The traditional measures of cost, quality, and time are deemed insufficient to fully evaluate project performance. These so-called "triple constraints" are considered too limited in scope (Hayyat et al., 2023).

### 2.3 Total Quality Management (TQM)

Total Quality Management (TQM) is widely acknowledged as a comprehensive management framework aimed at enhancing the performance and competitiveness of any organization. The adoption of quality management practices has gained global prominence and is highly regarded due to the positive results it produces (Aburayya et al., 2020). As articulated by Lepistö et al. (2022), the intensifying global competition among organizations necessitates the attainment of a high level of quality to meet customer satisfaction standards. Consequently, every project manager aspires to enhance project performance.

Aburayya et al. (2020), has highlighted that TQM often represents a viable solution for enhancing performance and elevating output quality. Through the implementation of theories and strategies, organizations can achieve customer satisfaction, enhance production and service efficiency, and ultimately attain success. Ali and Johl (2022) have characterized Quality Management as the revolution in the industrial sector. As for Total Quality Management, Lam described it as a fusion of three fundamental elements. Total Quality Management comprises three fundamental components. First, it entails satisfying customers by aligning products and services with their specific needs. Second, it involves improving existing organizational processes. Third, it encompasses motivating and engaging the workforce to achieve the desired quality outcomes. As outlined by Alawag et al. (2023), Total Quality Management is an approach aimed at enhancing an organization's competitiveness, efficiency, and cost-effectiveness. Total Quality Management practices encompass both soft and hard facets /citepalkhaldi2022. The soft side of Total Quality Management primarily centers on customer awareness, employee efficiency, and management's engagement within the organization to promote quality. The hard side, on the other hand, entails improvements and enhancements in production techniques, such as statistical process control, organizational design processes, organizational procedures, and just-in-time inventory control. According to Alawag et al. (2023), TQM is defined as a corporate environment and culture that systematically boosts customer satisfaction levels through continuous improvement, involving the entire workforce within the organization. The National Institute of Standards and Technology recognizes the significance of supervision in quality management. They have proposed that effective supervision assists organizations in centering their attention on the customer (Soltani and Wilkinson, 2020). H1: There is a significant relationship

that exists between Total Quality Management and Project Performance For the research purpose five features of Total Quality Management have been discussed which are mentioned by Jung and Wang (2006), and considered as the basic elements of TQM.

### 2.3.1 Leadership

Top management is regarded as one of the most influential elements in TQM (Chiarini et al., 2017). Quality gurus emphasize that the decision-making processes of top management play a pivotal role in TQM's successful implementation and outcomes (Kumar and Sharma, 2017).

*H<sub>1A</sub>: There is a significant relationship that exists between Total Quality Management (Leadership) and Project Performance*

### 2.3.2 Customer/Supplier Relations

Customer Relationship Management (CRM) primarily revolves around meeting customer satisfaction expectations. Effective CRM involves addressing customer complaints, obtaining feedback, and engaging in other activities that foster a strong and beneficial relationship between organizations and customers (Dehghanpouri et al., 2020). In Dr. Deming's fourteen points of quality management, one of his key points pertains to suppliers and emphasizes the establishment of long-term cooperative relationships with a select few suppliers, as this is a fundamental element of TQM (Adawiyah et al., 2020; Neave, 1987).

*H<sub>1B</sub>: There is a significant relationship that exists between Total Quality Management (Customer/Supplier Relations) and Project Performance*

### 2.3.3 Employee Relation

An Employee Relation are closely linked to empowering employees and engaging them in the decision-making process. The active involvement of employees is of utmost importance, as it ensures that the organization's work performance is sufficiently high to meet the expectations of clients associated with the output (Jung and Wang, 2006).

*H<sub>1C</sub>: There is a significant relationship that exists between Total Quality Management (Employee Relations) and Project Performance*

### 2.3.4 Product/process Management

Product/process Management entail advancements in product design that enable organizations to enhance quality. Improvements in process redesign can have a significant impact on overall performance (Stravinskiene and Serafinas, 2020).

*H<sub>1D</sub>: There is a significant relationship that exists between Total Quality Management (Product/Process Management) and Project Performance*

### 2.3.5 Continuous Improvement

Continuous Improvement is a crucial component of Total Quality Management (TQM). It encompasses various aspects such as waste reduction, process refinement, cost minimization, customer satisfaction, teamwork, and more. These elements are fundamentally essential for achieving and maintaining high-quality standards.

*H<sub>1E</sub>: There is a significant relationship that exists between Total Quality Management (Continuous Improvement) and Project Performance*

## 2.4 Supervisor Support

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## 2.5 Supervisor Support, Total Quality Management (TQM) and Project Performance

When introducing Total Quality Management (TQM) practices for the first time in any organization, having a supportive supervisor with the ability to facilitate the transformation of the system is crucial. Van Thuyet et al. (2019) conducted research to investigate the impact of Total Quality Management on the level of project management practices. They discovered a positive correlation between project performance and Total Quality Management. Previous research findings also indicate that the implementation of Quality Management practices in organizations has a positive impact on their performance and competitiveness (Damtew, 2017). Visionary leaders leverage quality management as a strategic tool to protect the organization from various harmful rivals, ensuring the well-being of the business (Prestiadi et al., 2019). Manufacturing organizations worldwide invest significant resources, both in terms of money and time, in their efforts to enhance product quality (Prestiadi et al., 2019). Ladewski and Al-Bayati (2019) suggests that supervisors and quality management share similar objectives, working towards improving output, enhancing performance, refining processes, and fostering employee satisfaction. When analyzing project performance, key features to consider include meeting project milestones, such as objectives, schedules, and budgets, as these serve as the foundation for project progress (Kerzner, 2022).

*H<sub>2</sub>: There is a moderator effect of Supervisor Support in Total Quality Management and Project Performance relationship.*

## 2.6 Theoretical Framework

Based on the literature, the figure below will explain that the Total Quality Management is an independent variable and Project Performance is a dependent variable whereas Supervisor Support is acting as a moderator.

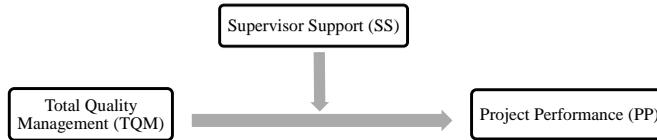


Figure 1: Theoretical Framework

### 2.6.1 Hypotheses

After reviewing the literature, the hypotheses which are constructed for this research are:

$H_1$ : There is a significant relationship that exists between Total Quality Management and Project Performance

$H_{1A}$ : There is a significant relationship that exists between Total Quality Management (Leadership) and Project Performance

$H_{1B}$ : There is a significant relationship that exists between Total Quality Management (Customer/Supplier Relations) and Project Performance

$H_{1C}$ : There is a significant relationship that exists between Total Quality Management (Employee Relations) and Project Performance

$H_{1D}$ : There is a significant relationship that exists between Total Quality Management (Product/Process Management) and Project Performance

$H_{1E}$ : There is a significant relationship that exists between Total Quality Management (Continuous Improvement) and Project Performance

$H_2$ : There is a moderator effect of Supervisor Support in Total Quality Management and Project Performance relationship

### 2.6.2 Hypothesis Model

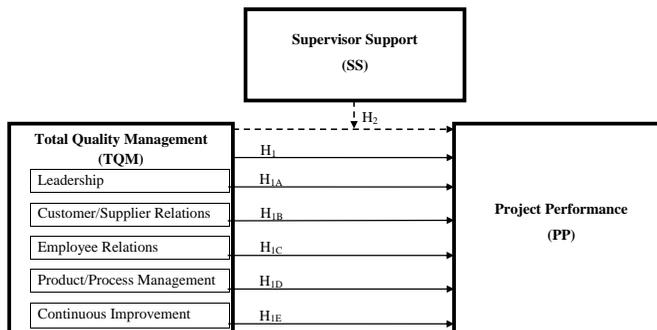


Figure 2: Hypothesis Model

### 3 Research Methodology

The main agenda behind this empirical research is to discover the relationship between Total Quality Management and Project Performance and how the Support of Supervisor moderates the relationship in the manufacturing industries of Pakistan.

#### 3.1 Population

Questionnaires were distributed to manufacturing firms located in Pakistan. To ensure more robust and constructive results, responses were collected at different points in time to minimize the potential impact of the respondent's mood on their responses. The unit of analysis for this research is individual employees working as project supervisor in the manufacturing industry. Following the sampling technique described by [Saunders and Rojon \(2011\)](#) a sample size of 120 was deemed necessary.

#### 3.2 Measures

A questionnaire with five points of likert chart scale is used for collection of the data in which one (1) represents the "Strongly disagree" whereas the value five (5) represents "Strongly agree" and three (3) is neutral. The whole questionnaire is divided into four sections. The first section is demographics of the respondent; second section is comprised on TQM variable from [Jung and Wang \(2006\)](#) which is adapted. Third section is comprised on Supervisor Support from [Osland \(1997\)](#) which is adapted. Fourth section which is comprised on the variable of Project Performance with adapted from two different researchers, one part is from [Wu and Fang \(2010\)](#) and the second part is from [Tari et al. \(2007\)](#) which is adapted.

#### 3.3 Organizations selected for Research

Project supervisor of "Engineering Solutions" firms were requested to share their valuable feedback for this research. These firms manufacture customized chips, circuits, boards, generators automation modules, programmable controllers, and gauges etc. The nature of projects can be complete unit manufacturing or few items of the unit both. Project supervisor of some well-known Concrete Products Manufacturers were part of this research too. Natures of the projects in these firms are mosaics artwork in shopping malls, cinemas, farmhouses, mosques, sports complex, and landscapes' path etc. Project Supervisor of Doors and Wardrobes manufacturing industry participated in this research. This business has got the attention of people from last five to six years. Project nature of this industry is to design and finish kitchens, custom cabinets and wardrobes. Clients usually hire these firms for kitchen finishing. They provide dimensions of their kitchen, and these firms finished it from start to end. Project supervisors of some well-known brands from the Interior Furniture Industry were also invited to give their valuable views in this research. Visualization and taste of clients have increased immensely. These days clients mostly demand customized designs for their houses and offices. Project supervisor of Tiles Manufacturing Industries was asked to give their valued feedback for this research. Production life span of designs is considered as the project for this industry. Usually designs remain in these tiles production for only three to six months and after that they dismiss old design projects and replace it with new ones. Project supervisors of some organizations which are manufacturing ammunition and defense equipment were also requested to participate in this

research. This equipment are manufactured specifically on the demand by the customers. Many projects have been completed recently and delivered to law enforcement agencies and international customers. Project supervisor of cement industry was also requested to put their valuable input for this research. Housing societies in Pakistan is expanding day by day due to growing demand from rising infrastructure activities, construction sector and housing societies. Recent development projects in the capital and adjacent territory increased the production capacity of these industries to fulfill the demand. To meet the demand of these projects demands, company owners have revised their output production sheets to fulfil this gap. Project supervisor of Glass Industry was also targeted for sample selection. Departments which are manufacturing cups, glass, plates, and cutlery stuff were primarily targeted. Designs and production span is considered as the project. The average duration of these projects is around six to eight months, but the production cycle can be increase or decrease on the demand of sales.

## 4 Data Analysis and Results

The sample technique used to gather data in this research was convenience sampling and the unit of analysis was project supervisors from manufacturing organizations. From 131 respondents, the contribution of male respondent was 82.44% whereas 17.56% respondents were females. More than 80% of respondents were less than 35 years and about 85% were highly educated having a professional degree in bachelor's or above. 70% of respondents' experience was 5 years or less.

Statistical tests like reliability test, correlation analysis and regression analysis have been applied by SPSS software to discover the relationship of TQM with Project Performance in the moderator effect of Supervisor Support.

The values of reliability test are mentioned below:

Table 4.1: Reliability Statistics

	Cronbach's Alpha	Number of Items
Overall reliability	.962	40
TQM avg	.934	16
SS avg	.888	12
PP avg	.903	12

*N=131*

The given table shows the reliability of questionnaire and variables. The overall outcome of the data is .962 which indicates that the questionnaire's reliability is good. It also indicates that the scale which is used for this questionnaire is strongly reliable with the sample.

The mean value, standard deviation, Skewness, and kurtosis of the gathered data are mentioned below:

Table 4.2: Descriptive Statistics: Mean, Std. Deviation, Skewness and Kurtosis

Variable	Items	Mean	Std.Dev	Skewness	Kurtosis
TQM Leadership	4	3.62	.938	-.635	.099
TQM Customer/Supplier Relation	3	3.67	.812	-.454	-.165
TQM Employee Relation	4	3.44	.923	-.544	-.121
TQM Product/Process Management	3	3.43	.973	-.494	-.162
TQM Continuous Improvement	2	3.27	.924	-.584	-.012
TQM (Collective)	16	3.51	.774	-.537	.029
Supervisor Support	12	3.56	.740	-.964	.654
Project Performance	12	2.47	.742	-.624	.109

N=131

The above table shows that the data is normal. It also indicates that the data is negatively skewed and platykurtic in nature.

Table 4.3: Correlations

Variables	I	II	III	IV	V	VI	VII	VIII
TQM Leadership	1							
TQM Customer/Supplier Relation	.648**	1						
TQM Employee Relation	.602**	.612**	1					
TQM Product/Process Management	.678**	.640**	.718**	1				
TQM Continuous Improvement	.578**	.578**	.607**	.677**	1			
TQM (Collective) Average	.856**	.813**	.861**	.882**	.779**	1		
Supervisor Support Average	.622**	.610**	.660**	.642**	.598**	.746**	1	
Project Performance Average	.677**	.573**	.631**	.683**	.593**	.755**	.754**	1

\*\**. Correlation is significant at the 0.01 level (2-tailed)*

N=131

The correlation of all variables i.e., Total Quality Management collectively and individually, Supervisor Support and Project Performance for 131 respondents is positive and shows that these all variables and elements can be a potential reason for good Performance if used wisely.

Regression analyses of Hypotheses:

Table 4.4: R-Square, F-value, B, T-value and Significance

Variable relations	R <sup>2</sup>	F-value	B	T-value	Sig
H <sub>1A</sub> :TQM Ldrshp→PP	.580	34.483	.315	3.636	0.000
H <sub>1B</sub> :TQM CSRel→PP			.042	.494	.622
H <sub>1C</sub> :TQM ERel→PP			.171	1.930	.056
H <sub>1D</sub> :TQM PMan→PP			.236	2.364	.020
H <sub>1E</sub> :TQM CImpr→PP			.123	1.478	.142
H <sub>1</sub> :TQM collective→PP	0.571	171.522	.755	13.097	.000
H <sub>2</sub> :TQM collective→SS (moderator)→PP	.657	81.238	TQM=.141SS=.195 int1 = .5	TQM=.626SS=1.051 int1=1.392	TQM=.533SS=.295 int1=.166

Whereas, int1 : TQM \* SS

The value of R-Square is .58 which means that total variation in Project Performance is due to Total Quality Management's all dimensions and other reasons cause 32.0% variation. F-statistics value of all dimensions of TQM for Project Performance is 34.83. T-value of TQM Leadership, TQM CSRel, TQM ERel, TQM PMan and TQM CImpr are 3.636, .492, 1.930, 2.364 and 1.478 respectively. The p-value of TQM Leadership, TQM ERel, TQM PMan are .000, .056 and .020 respectively which indicates that a significant relationship exists whereas TQM CSRel and TQM CImpr are .622 and .142 which indicates that there is no significant relationship. After having research analysis hypothesis H1A, H1C and H1D are accepted whereas H1B and H1E are rejected. The relation of Total Quality Management collectively and Project Performance is positive, and TQM is enhancing the performance of the project. To check the moderation, Baron and Kenny method has been applied by introducing the interaction term. All four steps were applied to analyze the moderating effect of Supervisor Support between the relationship of TQM practices and project success. But after applying the moderation effect of Supervisor Support, the R-square difference before and after the moderation is only .086. P-value shows that Supervisor Support is not moderating the relationship between Total Quality Management and Project Performance in manufacturing industries of Pakistan. Tabulated form of hypotheses results is mentioned below:

Table 4.5: Regression equations of Hypotheses

Hypotheses	Decision	Regression equation
H <sub>1A</sub> :TQM Ldrshp→PP	Accepted	PP = 1.008 + 3.15 (TQM Leadership) + .042 (TQM CSRel) + .171 (TQM Erel) + 2.36 (TQM PMan) + .123 (TQM CImpr)
H <sub>1B</sub> :TQM CSRel→PP	Rejected	
H <sub>1C</sub> :TQM ERel→PP	Accepted	
H <sub>1D</sub> :TQM PMan→PP	Accepted	
H <sub>1E</sub> :TQM CImpr→PP	Rejected	
H <sub>1</sub> : TQM collective →PP	Accepted	PP = 0.927 + .755 (TQM avg)
H <sub>2</sub> : TQM collective → SS (moderator) → PP	Rejected	PP = 1.276 + 0.141(TQM) + 0.195 S.S + 0.5(int1)

Whereas, int1 : TQM \* SS

In this context, the equation representing Supervisor Support in conjunction with Total Quality Management for each dimension will take the form of:

$$PP = 1.008 + 3.15 (TQM Leadership) + .042 (TQM CSRel) + .171 (TQM Erel) + 2.36 (TQM PMan) + .123 (TQM CImpr)$$

The equation for Project Performance in relation to Collective Total Quality Management can be expressed as follows:

$$PP = 0.927 + .755 (TQM avg)$$

And, The equation for Project Performance in relation to Total Quality Management (TQM) with Supervisor Support acting as a moderator can be represented as:

$$PP = 1.276 + 0.141(TQM) + 0.195 S.S + 0.5(int1)$$

## 5 Conclusions and Implications

Upon comprehensive analysis, it is evident that Total Quality Management plays a pivotal role in Project Performance. Both dimensions of Total Quality Management, namely Leadership and Continuous Improvement, exhibit a significant and positive influence on Project Performance. This conclusion is well-supported by both the data collected and existing literature. While global literature generally supports the positive impact of Supervisor Support as a moderator in the relationship between Total Quality Management and Project Performance, the research conducted in Pakistan's manufacturing sector revealed a different scenario. In this specific context, supervisors were found to be less supportive of their subordinates regarding quality. The reason could be internal politics or lack of trust to share complete knowledge. Therefore, it can be argued that if manufacturing industries in Pakistan place more emphasis on Supervisor Support within the framework of Total Quality Management, they can significantly improve their performance and achieve more effective results in their production. This becomes crucial for meeting project milestones within the given time and budget constraints, ultimately leading to better project performance.

### 5.1 Implications for Supervisors

Quality is an important parameter in every business. Significant improvements in business have been achieved through TQM. TQM practices' primary focus is to increase the quality of output. The result outcomes of this research can help the supervisor in the ways that:

- It is the responsibility of the supervisor to demand budgets for TQM practices at the beginning of financial year.
- The role of supervisor is very important as they lead by example. Supervisors should perform the tasks personally too which will boost the work performance of the subordinates.
- Supervisors should motivate employees to go to greater lengths to help organizations reach their objectives.
- Employees' satisfaction is necessary for project success. It will be a good symbol if the supervisor involves staff members in their meetings and discussions too as it can help to highlight the issues which employees are facing.
- Improvement in the system is very important for any organization. Supervisors should implement advanced technological machines into their system to reduce cost and waste reduction. They must refine operations and processes etc. to enhance quality.
- To improve performance, supervisors must use project management tools and techniques as they can save a great deal of time by automating operations. It can also manage data, assign tasks etc.

- Managers must use graphical reports as they can help them to understand how well the work is going and what is the current progress in short time.
- Project supervisors, organization owners and researchers should work together to investigate the causes of negative effect. These factors must be eliminated for a better outcome.

## 5.2 Other suggestions for Supervisors

Other suggestions for supervisors are:

- Supervisors must recognize that they need to tailor the critical success factors for each project based on its unique nature and the specific requirements of the client.
- Involving both project supervisors and their subordinates in workshops and training sessions aimed at enhancing their awareness of delivering quality outputs, meeting project deadlines, and overcoming delays will significantly contribute to the organization's ability to deliver high-quality projects.
- The research findings will provide valuable insights for project managers on ways to reduce project completion time and achieve quicker project delivery by effectively utilizing project management tools.

## 6 Limitations and Future Research

While every effort was made to comprehensively address the key aspects of the variables, several limitations were encountered during this research, which may be informative for future researchers. First, the limited timeframe restricted the ability to explore more extensive and substantive implementations, which in turn led to a smaller target population for this study. Additionally, the study's scope was constrained by resource limitations, resulting in data collection primarily from major cities. Expanding the sample size could potentially yield more robust outcomes. Future research could enhance this conceptual framework by incorporating other variables such as after-sales services, customer satisfaction, job performance, employee satisfaction, productivity, and turnover rates, among others. Furthermore, the study's geographical focus could be broadened to include multiple cities, government sectors, and comparisons with other nations, spanning developed, developing, and underdeveloped regions, as well as countries in Asia, Europe, and beyond.

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