Impact of TQM Practices on SMEs Performance in Pakistan: Information Technology Turbulence as a Moderator

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ABSTRACT
The purpose of this paper is to investigate the impact of Total Quality Management (TQM) practices on the performance of Small and Medium Enterprises (SMEs) in Pakistan. This study considered how Information Technology Turbulence (ITT) by acting as a moderating factor in the era of technological advancements influenced the firm's performance. The study compared the export performance of SMEs in the sports goods manufacturing sector over the last five years till 2021. About 361 questionnaires were chosen at random for study those were distributed and personally collected, the collected data analysed by using the Partial Least Squares Structural Equation Modelling (PLS-SEM). The research indicated that ITT moderated the association of practicing features of TQM as a major player with the SMEs' performance. These revelations provided a better understanding of how TQM practices together with ITT affected SME performance, which is beneficial for researchers and policymakers. The researcher used a quantitative approach based on cross-sectional data. The conceptual model in this study intends to propose TQM practices as exogenous and ITT as a moderating variable on the performance of SMEs. This study will be useful for people in strategic positions to make decisions by providing a working ground on factors significance to enhance the SMEs' performance.

KEYWORDS: Small and Medium Enterprises, Total Quality Management, Performance, Information Technological Turbulence, Sport goods

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1. INTRODUCTION

The globalization of economic activities in the twenty-first century has resulted in the free movement of tangible and intangible capital between countries in the Asian continent and the rest of the world (Kanaan et al., 2024). According to the Resource-Based View (RBV), a business with access to scarce, valuable, unique, and non-substitutable resources will perform better than businesses without such access (Tehseen et al., 2019). No one can deny the dynamic role of Small and Medium Enterprise (SMEs) in the competitive and challenging business world in the current scenario (Alkhuzaie et al., 2024). SMEs are one of the most important vehicles for achieving economic independence on a global scale (Hoque & Awang, 2019). In general, SMEs help to achieve long-term development goals by providing jobs and encouraging entrepreneurship and innovation (Asad et al., 2021; Amnha et al., 2023).

According to Pakistan's Small and Medium Enterprises Development Authority (SMEDA), the country has 5.2 million businesses registered as enterprises, the majority of which are SMEs with approximately 99 percent employment, service providers, manufacturing units, and start-ups are examples of these (among many others) (Asad, 2024). SMEs account for almost 30 to 40 percent of Pakistan's GDP and a quarter of its exports (Suleman et al., 2020; Hussain et al., 2020). Unlike large formal businesses, SMEs are constrained by financial and other resources. According to SMEDA, Punjab province has 65 percent of SMEs, Sindh province has 18 percent, Khyber Pakhtunkhwa has 14 percent, while Baluchistan province and Islamabad have 3 percent (SMEDA, 2022).

Among the various sectors of SMEs, the sports goods sector is a vital part of Pakistan's SME landscape, with strong connections to other areas of the economy. It contributes to the nation's economy by creating jobs, generating income, boosting foreign exchange, and supporting national trade. The industry is primarily concentrated in Sialkot, Punjab, which serves as the industrial hub, responsible for around 95% of the sector's total production (SMEDA, 2022). This concentration is

largely due to economies of scale, as Sialkot has been a centre of excellence for sports goods manufacturing for over a century.

Meanwhile, the sports goods sector in Sialkot, Pakistan, is internationally renowned, particularly for producing high-quality footballs along with other sports goods that meet global standards. This sector, comprising SMEs, plays a significant role in Pakistan's economy by creating jobs, generating income, boosting foreign exchange, and contributing to trade. According to the SMEDA annual report 2019-2020 (SMEDA, 2020), Sialkot alone meets 75% of the world's demand for hand-stitched footballs, producing 40 million balls annually. In the last decade, the performance of this sector has deteriorated specifically in the export area as reflected in **Figure 1**.

In **Figure 1**, this can easily be seen that the export performance of SMEs working in the sports goods manufacturing sector has deteriorated while at the overall global level, it has positive growth, and Pakistan has dropped to 138th place out of 189 countries in the global business index (Albassami et al., 2019; Alosani et al., 2020). This deterioration in performance gives motivation to study this sector in this paper. Among the numerous factors of declining export performance, Total Quality Management is considered as one of the major factors. It refers to maintaining quality at all levels to meet the demand and standing sustainably at the international level (Asad & Ahmed, 2024; Sulaiman & Asad, 2023). TQM is a management strategy that focuses on continuous improvement, customer satisfaction, and active employee participation to improve product and service quality (Asad et al., 2023). From the perspective of Resource-Based Theory (RBT), TQM practices including process improvement techniques, quality control tools, and employee expertise in quality management are seen as valuable and unique resources.

Hence, TQM is a management attitude that attempts to perpetually improve the quality of processes and products to improve customer happiness and performance (Anil & Satish, 2016). TQM practices are a valuable management tool for improving the process by emphasizing teamwork and cooperation (Anderson & Sohal, 1999; Farish et al., 2017; Imran et al., 2018; Asad et al., 2021; Asad., 2024). TQM is one of numerous influential variables, according to the research, which causes Pakistani SMEs' products to be unable to compete in both the domestic and international markets, hurting their overall performance (Anderson & Sohal, 1999; Farish et al., 2017; Aquilani et al., 2017; Rida, 2020; Satar et al., 2024). Furthermore, numerous studies have shown that using TQM methods can improve SMEs' flexible, efficient, and competitive behavior in meeting client needs for enhancing firm performance by continuously upgrading their conduct (Imran et al., 2018; Pambreni et al., 2019).

Moreover, TQM is critical in evaluating local and international growth and performance. Various studies performed on the relationship of TQM with SMEs performance and found results in mixed directions such as significant vs. insignificant, direct vs. indirect, positive vs. negative, U-Shaped as well, and sometimes TQM is considered a mediator and moderator (Imran et al., 2018; Mardani et al., 2018; Mahmud et al., 2019; Hussain et al., 2020; Anwar & Shah, 2020; Ta'Amnha et al. 2024). As per the literature so far reviewed by the researcher found various variables used as moderators in light of Baron and Kenny's theory, among those in reference to previous studies Information Technology Turbulence (ITT) taken as moderator in this paper (Chavez et al., 2015; Wardi et al., 2018; Pratono, 2018; Ullah et al., 2020).

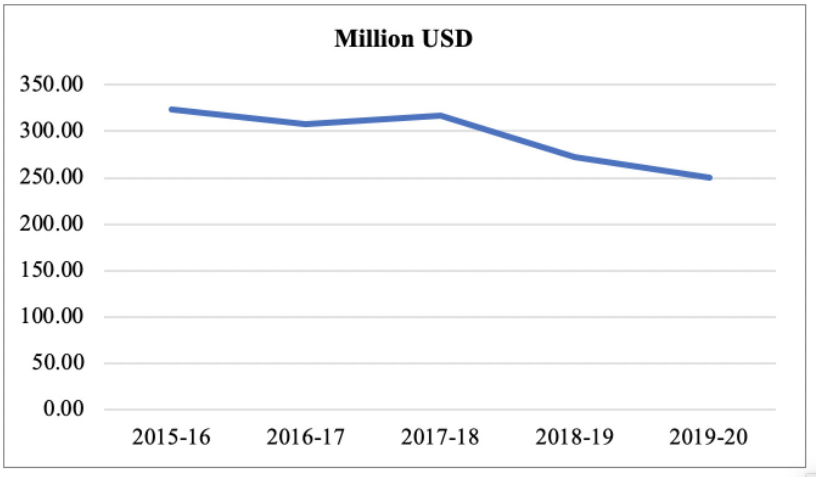


Figure 1: *Export trend in Pakistan's Sports goods manufacturing sector*

Information technology has a supporting role also recommended by some other authors (Rehman et al., 2020; Ferdowsi et al., 2022). Last but not least, ITT mitigated the association between sustainable leadership and sustainable performance (Iqbal et al., 2021). The association with innovative performance was also mitigated by ITT (Farrukh et al., 2021). According to the moderation study, ITT positively moderates the association between numerous constructs and firm success, implying that ITT significantly strengthens the relationship between the variables (Gyedu et al, 2021). Therefore, the goal of this research is to assess the moderating influence of ITT in conjunction with Contingency Theory (CT) in empirically evaluating and enhancing the RBV has link with TQM and SMEs' performance in Pakistan. As a result, combining TQM principles with the moderating effect of ITT was found to have a considerable impact on SMEs' performance.

2. LITERATURE REVIEW

2.1 Performance

Performance is defined in a variety of ways, just like its ideologies. Performance is the difference between an actual and expected output in relation to the accomplishment of goals and objectives (Alkhuzaie & Asad 2018). Furthermore, Small and Medium Enterprise (SME) performance is defined as the aggregate of all divisions' actions and accomplishments over a certain period and the successful transformation of tangible and intangible resources to meet the desired goals (Hafeez, 2018; Aftab et al., 2021; Gyedu et al., 2021; Asad et al., 2024). As a result, performance is defined as productivity as measured by sales, profitability, development, and growth. Pakistan is one of the developing countries, and for it to share its potential and worth with the rest of the world. Due to competition from multinational enterprises, SMEs in emerging nations attempt to gain an edge due to competition within the national market to remain profitable and improve their performance (Asad & Kashif, 2021). Nonetheless, only a few conclusions have been discovered regarding the characteristics and variables that influence the success of developing SMEs in rising economies (Bannour & Mtar, 2019; Damer et al., 2021).

2.2 Total Quality Management Practices

Quality improvements are used to create a competitive advantage, customer happiness, firm excellence, an acceptable initial attitude, efficient productivity, and a profit base (Anil & Satish, 2016; Khan et al., 2021). As a result, TQM techniques strive to improve a company's ability to effectively respond to consumer demand in terms of various product-associated features qualitative, creative designing, deliver promptly, valuable in use, and reasonable pricing over time. These methods also help businesses deal with market problems (Eniola et al., 2019; Saleem et al., 2024). To achieve client loyalty, many SME managers have recently implemented TQM principles. In an increasingly competitive world, TQM is a recommended technique for differentiating an SME's conduct from its competitors leading to achieving the best output.

Hence, research is undertaken in a variety of nations and industries. As previously stated, TQM necessitates ongoing participation from all individuals because of the need to enhance the quality of production and services necessitate their involvement in recognizing faults and improving production processes. Employees' feasible ideas must be implemented. As a result, TQM implementation will benefit personnel by contributing to their enrichment, development, and training (Patyal & Maddulety, 2015; Iqbal et al., 2018; Hafeez, 2018; Al-Ali & Abu-Rumman, 2019; Bannour & Mtar, 2019; Asif et al., 2021). It is important to note that entire staff involvement is impossible to attain without a strong strategic quality orientation that promotes TQM implementation. As a result, the current study hypothesized that Information Technology Turbulence (ITT) has a moderating function in establishing effective TQM methods and practices. In this respect, the literature so far reviewed does not find and study that used the moderating influence of ITT as an effective in implementing TQM practices in SMEs in developing countries, as a result, this study tried to fill this gap in the literature.

Therefore, the goal of this study is to determine whether ITT has a moderating effect on the relationship between TQM practice and SMEs' performance (Fadhel et al., 2022). In general, previous studies have built multiple models to assess the impact of several variables on SMEs' performance, among them TQM practices are one of the exogenous variables (Al-Dhaafri et al., 2016; Eniola et al., 2019). Literature evaluations have yielded mixed conclusions regarding the crucial functions of TQM procedures in directly improving the performance of SMEs (Asad et al., 2021). Furthermore, several authors have revealed no substantial impact of TQM practices on SMEs' performance in terms of employee involvement, customer focus, leadership, and continuous improvement components (Asad et al., 2023). Therefore, extended research needs to be conducted to assess the influence of TQM practices on SMEs' performance, rather than relying solely on findings from large-scale studies.

2.2.1 TQM Practices and SMEs Performance

Enterprises that applied TQM practices effectively performed better than non-TQM practicing firms in terms of gross revenues, operating expenses, profitability, capital expenditure, and total assets. According to the literature studied so far, several studies on TQM practices and SMEs' performance have been conducted (Anderson & Sohal, 1999; Farish et al., 2017; Hafeez, 2018; Imran et al., 2018; Mahmud et al., 2019; Rida, 2020).

The results of studies suggest that using TQM practices has a good impact (Hafeez, 2018; Imran et al., 2018; Pambreni et al., 2019; Hilman et al., 2019). Research has shown and demonstrated a strong correlation between TQM practices and performance (Hilman et al., 2019). To better understand the relationship between TQM practices and SMEs' performance, researchers conducted empirical investigations. SMEs could benefit from TQM practices implementation (Sahoo & Yadav, 2018; Asif et al. 2021). Quality is viewed as a criterion for achieving a competitive advantage, with the goal of improving firm performance while lowering costs (Anil & Satish, 2016; Farish et al., 2017; Imran et al., 2018; Hafeez, 2018; Imran, et al., 2018: Mahmud et al., 2019). TQM practices are concerned with the concept of continual improvement in business operations. It is a reliable and methodical method of involving everyone in the firm to achieve performance.

H1: There is a positive effect of TQM practices on the performance of SMEs.

2.3 Information Technological Turbulence (ITT)

Several variables have been employed as moderators in numerous studies all over the world with various sets of independent variables. Some research in Pakistan employed Information Technology Turbulence (ITT) as one of the reacting variables (Rehman et al., 2020). ITT tempered the relationship between sustainable leadership and sustainable performance (Iqbal et al., 2021). The association between political relationships and innovative performance has been tempered by technological volatility (Farrukh et al., 2021). The moderation study revealed that technical turbulence positively moderates the association between the various constructs and business performance, implying that technological turbulence significantly strengthens the relationship (Gyedu et al., 2021). However, the study found that technological turbulence had a negative impact on performance (Ullah et al., 2020).

2.3.1 Information Technology Turbulence as Moderator on SME Performance

A variable is set to be a moderator that could strengthen, diminish or other way to bring modifications in the connection between dependent and independent variables. The helping hand of the moderating variable in elaborating the relation of dependent and independent variables is the reason behind this phenomenon. The association between TQM practices and performance can be harmonized with studies that demonstrated the moderating influence of Information Technology Turbulence (ITT) based on Contingency Theory (CT) (Pratono, 2018; Wardi et al., 2018). Researchers also investigated the effect of ITT as a moderating element in performance as an external environment component (Chavez et al., 2015; Ndabako et al., 2019; Gomezel & Aleksić, 2020). ITT is also aligned with numerous factors that impact performance (Slim et al., 2021). It also uses blockchain technology to improve performance (Muslikh et al., 2024). Previous ideas, such as Frederick Winslow Taylor's scientific management theory (1909) and Max Weber's Bureaucracy theory (1905), focused on a firm's internal resources, particularly its culture and norms (Ndabako et al., 2019).

2.3.2 Role of Information Technology Turbulence as Moderator on Relationship of TQM Practices and SME Performance.

To have a better understanding of the numerous situations in which Total Quality Management (TQM) practices influence performance, a contingency factor emphasizing the various levels of Information Technology Turbulence (ITT) is required (Ndabako et al., 2019). ITT provides a platform for businesses to seek and gather information on how to give better service by utilizing social media as one of the technology tools (Ali & Johl, 2021; Shrivastav, 2023). The inclusion of ITT as a moderating variable elucidates the significance of information technology in ensuring quality (Ndabako et al., 2019; Ali & Johl, 2021). When additional components, like TQM practices are coupled, ITT leads to success (Ndabako et al., 2019). SMEs can boost their performance and gain a competitive advantage by improving the quality of their services, which is an internal resource, and correctly aligning their resources with the technological environment. So, the hypothesis is as follows.

H2: There is a moderating impact of ITT between TQM practices and SME performance.

A research framework has been developed based on the insights gained from the reviewed literature to enhance understanding of how to improve SME performance, particularly in Pakistan's sports goods manufacturing sector. The framework aims to explore the role of TQM as a predictor or independent variable for SME performance (Kwamega et al., 2015; Sinha et al., 2016; Semrau et al., 2016; Asad et al., 2018; Singh et al., 2018; Albassami et al., 2019; Fitriati et al., 2020). To the author's knowledge, this is the first time TQM has been studied with the moderating effect of ITT within a single research framework. **Figure 2** illustrates the research framework, highlighting two types of relationships: the direct impact of TQM on SME performance (Singh et al., 2018; Albassami et al., 2019; Fitriati et al., 2020) and the moderating role of ITT on the relationship between the independent and dependent variables (Pratono, 2018; Ndabako et al., 2019; Sahi et al., 2019; Jardim et al., 2021; Asad et al., 2024). Several researchers have debated the success or failure, positive or negative outcomes, and significant or insignificant effects of independent variables on SME performance. This study will test the proposed hypotheses based on the outlined research framework.

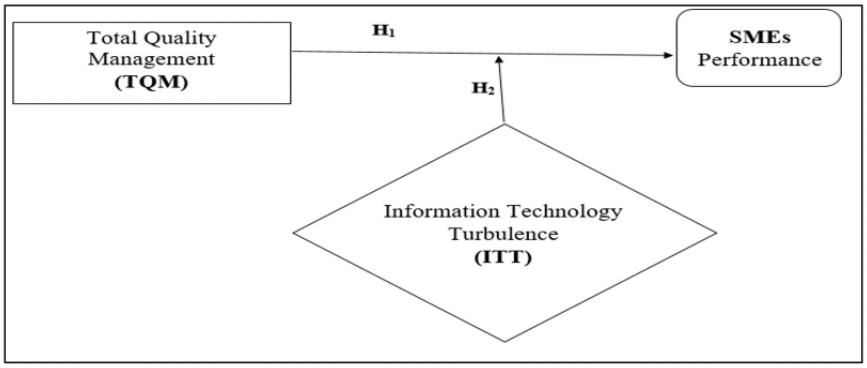


Figure 2: *Research framework*

3. METHODOLOGY

The data for Pakistani Small and Medium Enterprises (SMEs) was collected using a survey questionnaire designed in English to evaluate the conceptual model. The questionnaires were distributed to the respondents by personally administered emails and in person as well. The researchers utilized a seven-point Likert scale ranging from "strongly disagree" to "strongly agree" to collect the responses through a questionnaire. To provide clear questions and for respondents to answer depending on their viewpoints, the questionnaire was constructed using simple and straightforward words. The survey items were adapted from previous studies to ensure content validity, and minor modifications were made where necessary. This study developed a construct for measuring Total Quality Management (TQM) based on the main aspects of TQM as conceptualized and evaluated by previous TQM researchers to thoroughly capture the essential features of TQM (Anderson & Sohal, 1999; Imran et al., 2018). The construct of TQM was usually described based on numerous basic features of TQM, together with the moderating impact of Information Technology Turbulence (ITT) on the firm performance as discussed in the literature review. The performance measures were adapted from a 2011 study by Avci, Madanoglu, and Okumus. TQM was evaluated using 12 items based on Kaynak's 2003 research. ITT was assessed using 6 items, modified, and adapted for this study as information technological turbulence.

Moreover, one of the primary reasons for the firm's success is the manager's ability to strike a balance between many aspects to achieve success. As a result, there were three categories of factors in this study: independent, moderating, and dependent. Following that, the current study intends to provide a conceptual model that incorporates critical constructs of TQM practices and SME performance, with the goal of addressing the weakness of SME performance in developing nations, with Information Technology Turbulence (ITT) as a moderating element in this relationship. The structural model will be evaluated using PLS-SEM in this study, in line with a quantitative method. Using the PLS-SEM as perceived good for primary data analysis and support, in theory, building in line with RBV and CT to build the relationship of independent variable with a moderator.

In the context of the research work focuses on owners/managers as a representative of SMEs located in Sialkot, Punjab, Pakistan. Owner/managers are selected for this study because the owner/managers are the bedrock of the businesses, and the performance of a firm depends upon its owner/manager's decision. To examine the effect of independent variables on dependent variables this research used a 7-point Likert scale. The 2021 Sports Goods Sector Brief by SMEDA reported that Pakistan has 5.2 million SMEs. Data for this study was collected from owners and managers of SMEs in Sialkot, who play a crucial role in shaping business strategies. Sialkot was chosen as the sample location due to its prominence as a hub for sports goods manufacturing. Sampling techniques are divided into two main types: non-probability and probability sampling (Masocha, 2019). In sample-based studies, because the entire population is not observed, results may reflect general perceptions of the sample with an acceptable margin of variation, potentially introducing biases. This study used probability sampling, specifically cluster sampling, to collect data from SMEs in Punjab, Pakistan. A representative sample typically ranges from 30 to 500 observations (Roscoe, 1975). Other studies suggest a sample size of 150 to 200 (Udriyah et al., 2019; Ranatunga & Priyanath, 2023). Based on Krejcie and Morgan's (1970) guidelines, a sample size of 357 to 368 is appropriate for a population of 5,000 to 9,000. Consequently, selecting a sample of 361 SMEs from the 6,000 SMEs in Pakistan's sports goods manufacturing sector, as reported by SMEDA in 2021, was deemed sufficient for data collection.

4. RESULTS AND DISCUSSION

This section presents the research findings based on data collected from subject matter experts (SMEs) in Pakistan, focusing on both the reliability of the data and

the validation tests performed. The reliability of the data refers to how consistent and dependable the responses from SMEs were across various measurements. Reliability tests, such as Cronbach's Alpha and Composite Reliability, have been conducted to ensure that the data collected provided stable and accurate results over repeated measurements. Consistency in responses is crucial for validating that the data accurately reflects the views of the respondents and the context of the study. After establishing reliability, the next step involved conducting validation tests to ensure that the data gathered truly measures what it is intended to measure. These tests would involve evaluating the validity of the constructs used, such as Total Quality Management (TQM) and Information Technology Turbulence (ITT). Diverse types of validity tests. Each hypothesis formulated in the study was evaluated using statistical methods of Partial Least Square Structural Equation Modelling (PLS-SEM). The path coefficients measure the strength and direction of the relationships between the independent variable TQM and the dependent variable SME performance. For instance, a positive path coefficient indicates that improvements in TQM lead to better SME performance. These coefficients help assess whether the hypotheses hold true based on the collected data. Therefore, this section offers a thorough analysis of the research findings, supported by statistical evidence and validation procedures. It provides insights into the robustness of the data and model used, ensuring that the conclusions drawn are well-grounded in empirical analysis. The results of the hypothesis tests, combined with the reliability and validity checks, offer a comprehensive view of the study's outcomes. This part of the research confirms that the relationships between TQM, ITT, and SME performance are well-supported, providing actionable insights for businesses looking to improve productivity and competitiveness.

In **Table 1**, the outer loadings provided seem to indicate the strength of these relationships for each item within the specified categories (TQM, ITT, and FP). These values typically range between 0 and 1, where extreme loadings direct a convincing association between the observed variable and the latent construct it is intended to measure. In the TQM category, TQM 1 through TQM 12 represent different observed variables (indicators) related to the values provided (ranging from minimum 0.714 to maximum 0.932, ITT 1 through ITT 6 represent observed variables ranging from minimum 0.684 to maximum 0.862. Similarly, with reference to FP, these values lie in the range of 0.762 to 0.818 all these values are close to 1 which shows their strong association with the latent construct of variables.

Table 1: *Outer loadings*

Items	TQM	ITT	FP
TQM 1	0.739		
TQM 2	0.770		
TQM 3	0.794		
TQM 4	0.852		
TQM 5	0.741		
TQM 6	0.885		
TQM 7	0.851		
TQM 8	0.848		
TQM 9	0.714		
TQM 10	0.849		
TQM 11	0.932		
TQM 12	0.849		
ITT 1		0.743	
ITT 2		0.805	
ITT 3		0.806	
ITT 4		0.862	
ITT 5		0.684	
ITT 6		0.748	
FP 1			0.762
FP 2			0.778
FP 3			0.799
FP 4			0.818
FP 5			0.802
FP 6			0.781
FP 7			0.797

TQM = Total Quality Management, ITT = Information Technology Turbulence and FP = Firm (SME) Performance

These outer loading values are crucial in SEM as they help assess the validation and reliable acceptance of the dimensional model, indicating how well the observed variables capture the underlying constructs they are intended to measure.

The composite reliability coefficient and Cronbach's alpha coefficient are two methods for reliability assessment that are frequently employed in SMEs research. A Cronbach's alpha value of more than 0.5 is typically regarded as appropriate for instrument build dependability as per George and Mallery's approach (Demirel 2022). For research instrument reliability, values close to 0.8 are good, 0.9 are outstanding, and 0.7 is regarded as satisfactory. As per the result of the statistical analysis in **Table 2** for the current study, a composite reliability approach was used to assess the reliability of the instrument construct, following (Hair et al., 2021). The study employed both composite reliability and Cronbach's alpha during the testing to determine the internal consistency and variance of the measurement scale. Hence, the instrumental validity and acceptability of SMEs performance and TQM at an excellent level of acceptability. Whereas, as ITT level is considered acceptable as good which showed the authenticity and reliability of the data and gathered results from the instrument used in the study in terms of big data analytics to deal with turbulence (Asad et al., 2021).

According to Hilkenmeier in 2020, Fornell and Larcker suggested that achieving adequate discriminant validity ideally requires an average variance extracted (AVE) of at least 0.50 this approach was utilized to assess discriminant validity. The analysis involved comparing correlations between variables, as depicted in Table 3 AVE reflected in bold figures. The diagonal bold values in the table represent the square root of the AVE for each construct. According to Hair in 2021, whose criteria suggest that values should range from 0.20 to 0.90, the remaining items in the analysis met the required thresholds. A similar pattern is observed in **Table 3** within the variables of the current investigation, where values consistently fall within the acceptable range, ranging from a minimum of 0.777 for ITT to a maximum of 0.821 for TQM. This meticulous validation process ensures the suitability for evaluating the proposed hypotheses, thereby strengthening the robustness and reliability of the study's conclusions (Hair, et al., 2021).

Upon analysing **Table 4**, the study evaluated the significance of interaction terms between Total Quality Management (TQM) and performance ($t = 2.369$; $p < 0.01$), providing empirical support for Hypothesis 1 (H1). Employing PLS-SEM analytics, the research incorporated the moderating effects of Information Technology Transformation (ITT) in relation to TQM as an independent variable on SME performance, as depicted in **Table 4**. The analysis revealed that the interaction between TQM and ITT is statistically significant, as evidenced by the T-statistic ($t = 2.906$; $p < 0.01$) presented in the table. Consequently, based on these results, Hypothesis 2 (H2) is substantiated. This study examines the impact of Total Quality Management (TQM) on the performance of SMEs in Pakistan's sports goods manufacturing sector, focusing on the moderating role of Information Technology Turbulence (ITT). Findings reveal that TQM positively affects SME performance, with ITT further enhancing this relationship. IT plays a crucial role in supporting TQM by improving data collection, analysis, and real-time monitoring, boosting quality management. The study, based on survey data from SMEs, suggests that TQM practices, especially when moderated by ITT, can significantly improve SME performance and sustainability.

Table 2: *Content Reliability and Validity*

	Cronbach's Alpha	Composite Reliability	AVE
Form (SME) Performance	0.901	0.921	0.626
Total Quality Management	0.955	0.961	0.674
Information Technology Turbulence	0.875	0.901	0.603

TQM = Total Quality Management, ITT = Information Technology Turbulence, FP = Firm (SME) Performance and AVE = Average Variance Extract

Table 3: *Discriminant Validity*

	FP	ITT	TQM	AVE
Form (SME) Performance	**0.791**			0.626
Total Quality Management	0.458	**0.777**		0.674
Information Technology Turbulence	0.473	0.300	**0.821**	0.603

TQM = Total Quality Management, ITT = Information Technology Turbulence, FP = Firm (SME) Performance and AVE = Average Variance Extract

Table 4: *Path Coefficients*

	Original sample	Sample Mean	Standard deviation	T-Statistics	P-Values
ITT=>FP	0.407	0.469	0.156	2.609	0.009
TQM=.FP	0.284	0.300	0.120	2.369	0.018
ME1=>FP	0.369	0.154	0.186	2.906	0.015

ME = Moderating Effect, TQM = Total Quality Management, ITT = Information Technology Turbulence and FP = Firm (SME) Performance

The study explores the relationship between TQM practices and SMEs performance within Pakistan's sports goods manufacturing sector. The research confirms a positive correlation between TQM and SME performance, and the development of a comprehensive TQM construct was key to understanding this relationship. Expectedly this will may support in solving the problem of the sector's negative drastic performance in the last decade especially in 2021. Initially, TQM focused on product-level quality control, with an emphasis on inspection and corrective actions to address quality issues. This early approach to quality management was reactive, focusing on identifying defects after products were made. TQM evolved into a broader management philosophy that emphasizes maintaining quality across all organizational levels. This includes a customer-centric approach, where continuous improvement is applied not just to the product, but also to processes, services, and customer interactions. TQM now encompasses a comprehensive approach involving all employees and departments in the quality improvement process.

Therefore, to fully capture the impact of TQM on SME performance, the study developed a comprehensive TQM construct, incorporating key elements from previous research (Nair & Choudhary, 2016; Soesilo, 2024). This ensures products and services meet customer expectations with the aim of incremental improvements in processes and outputs. It also engages all employees in quality-related activities to understand the business's performance depends on the efficiency and effectiveness of its processes. This study confirms that implementing TQM practices has a positive impact on SME performance. By focusing on quality improvement at all levels, SMEs are better positioned to enhance customer satisfaction, reduce waste, and improve operational efficiency. These improvements lead to higher productivity, profitability, and market competitiveness. The findings support the hypothesis that TQM is crucial for improving the performance of SMEs. The study aligns with previous research, demonstrating that businesses adopting TQM practices are better able to compete in both local and global markets.

Additionally, the study highlights the significant role of ITT in shaping SME performance. ITT refers to the rapid pace of technological advancements and the disruptions caused by innovative technologies. In today's dynamic business environment, technology plays a critical role in enabling businesses to adapt to changing market conditions, customer needs, and competitive pressures. The findings emphasize that for SMEs to remain competitive in the ITT-driven global market, they must develop a culture of continuous improvement: TQM practices should be ingrained in the organizational culture, encouraging employees to seek ongoing improvements in both quality and performance. The study concludes that TQM practices are essential for enhancing SME performance in Pakistan's sports goods industry. Furthermore, ITT plays a moderating role in the relationship between TQM and performance. The study provides critical insights into how SMEs in Pakistan's sports goods industry can enhance performance by adopting a comprehensive TQM approach, while also emphasizing the need to adapt to technological changes in order to stay competitive.

5. LIMITATIONS AND DIRECTION FOR FUTURE RESEARCH

This study provides insights into the performance of small and medium-sized enterprises (SMEs) but acknowledges certain limitations. One challenge is the potential for common technique variance and non-response bias, which can affect behavioral research results. To address this, a single-factor analysis based on Harman's technique was used, showing no significant impact from common method bias. However, future studies could improve by gathering data from multiple participants within each SME (e.g., owners, managers) to reduce measurement errors and improve validity. The study focused on Pakistan's sports goods manufacturing sector, limiting generalizability to other industries. Broader sector-specific analyses are necessary to fully understand SME performance variations across different industries, which would help policymakers create more tailored interventions. The research relied solely on a quantitative approach using questionnaires, which may not always capture accurate responses. Future studies could benefit from combining quantitative and qualitative methods, such as interviews or focus groups, for deeper insights into SME dynamics. Integrating both approaches would enhance the study's robustness, provide a more comprehensive understanding, and allow for more targeted strategies to improve SME performance.

6. CONCLUSION

Conclusively, the study highlights the importance of TQM practices for boosting SME performance in Pakistan, confirming a significant positive relationship between TQM and performance. It also emphasizes the vital role of ITT, noting that adapting to technological advancements is crucial for maintaining a competitive edge. Ineffective IT management can lead to market share loss, reduced competitiveness, and lower profitability. To thrive, SMEs must embrace modern technologies, monitor market changes, and adapt quickly. The analysis using Baron and Kenny's method found that ITT significantly moderates the TQM-performance relationship, underscoring the need for effective resource optimization and technological adaptation. The study also identified several limitations to consider for future research. First, the cross-sectional design may have introduced response biases. Second, while TQM dimensions and SME performance were

sourced differently, both were based on the perceptions of SME owners or managers, which could affect objectivity. To address this, responses from multiple managers were aggregated. Future studies should use multiple data sets to track changes and link quality certifications to performance improvements.

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