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The Influence of TQM Practices on Organizational Performance in Jordanian Industrial SMEs: Exploring the Mediating role of Innovation

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Abstract. This study emphasizes the value of innovation in improving performance by examining the relationship between organizational performance, innovation, and Total Quality Management (TQM) in Jordanian industrial small and medium enterprises (SMEs). We selected the 381 prospective respondents, including managers, engineers, and technicians who make decisions, from the sampling framework using the standard random sampling technique. The study provided the self-managed questionnaires to the selected respondents, who replied within the allotted period. We obtained 344 valid answers after a few weeks. This study used the Covariance-Based Structural Equation Modeling (CB-SEM) method, as the model under examination was derived from established theories from previous studies. The study utilized IBM-SPSS-AMOS 25.0 to construct and assess hypotheses. Additionally, we examined the fitness, reliability, and validity of the constructs using confirmatory factor analysis (CFA). The findings suggest that all constructs demonstrated excellent fit, reliability, and validity, supporting their suitability for further analysis. The results showed that total quality management practices have a statistically significant effect on both the mediating role (innovation) and the performance of the organization when the mediator is present. The results showed that the mediating role (innovation) has a statistically significant impact on organizational performance in institutions. The impact of total quality management methods on organizational performance was not statistically significant.

Keywords: Industrial SMEs, Innovation, Jordan, Mediating role, Organizational performance, Total quality management (TQM), TQM practices.

1 | INTRODUCTION

Advanced innovation grounded in intellectual capital is anticipated to improve company competitiveness, organizational performance (OP), sustainable economic growth, and the investment climate. These are only a few of the innumerable results of innovation (Younus, Zaidan, & Mahmood, 2022). Research has established a connection between innovation and the development of new technologies through organizational performance reviews and updates to corporate procedures. This tendency has facilitated the collaboration and cultivation of novel ideas among innovative organizations. An organization can enhance its overall performance and competitive edge in the market by cultivating a culture that maximizes the utilization of its resources to deliver great services and goods (Rauter, Globocnik, Perl-Vorbach, & Baumgartner, 2019). Research indicates that innovation is crucial in the correlation between total quality management (TQM) and both non-financial and financial performance. This was consistently true, regardless of the monetary or non-monetary measures of success (Khan & Naeem, 2018). Total quality management (TQM) refers to the ongoing implementation of a management strategy aimed at consistently improving an organization's outputs and products. Effective implementation of total quality management necessitates establishing and maintaining transparent lines of communication with consumers to ascertain the optimal approach for fulfilling their requirements. We undertake this endeavor with the aim of fulfilling the requirements and anticipations of the consumer (Chen, Lee, & Wang, 2020).

2 | METHODOLOGY AND DATA

Cross-sectional studies collect data only once. The questionnaire's purpose was to gather data for this investigation. We made adjustments to the previously completed research items in this study. To ensure accurate parametric statistical analysis, we employed a 10-point scale (Asnawi, Awang, Afthanorhan, Mohamad, & Karim, 2019; Hosany & Martin, 2012). During the pre-testing phase, professionals verified the accuracy and effectiveness of the tools' criteria, content, and interface. Prior to the pre-testing phase, the researcher adjusted the items based on validation and expert comments. We ran a preliminary experiment on the investigation utilizing the revised items. The study employed exploratory factor analysis (EFA) to assess the utility, dimensionality, and reliability of each assessment item for each construct, using data from a pilot study (Shkeer & Awang, 2019). After the EFA was completed, we reorganize the items for the field study survey. The intended recipients comprise engineers and technicians employed in small and medium-sized enterprises in Jordan, along with the managers overseeing these enterprises. We conducted a systematic random sampling of individuals working in the engineering, electrical, and information technology industries. The selected participants completed a self-administered questionnaire at their convenience. Using real-world data, the study used confirmatory factor analysis (CFA) to check whether each measurement model was one-dimensional, valid, and reliable (Isah, Ibrahim, & Karim, 2023; Mohamad, Mohammad, Mat Ali, & Awang, 2018; Yusof, Awang, Jusoff, & Ibrahim, 2017). The study used structural equation modeling (SEM) to find the model and test the hypotheses, employing the structural model came from the research framework after confirmatory factor analysis (CFA) (Alshammari, 2022; Zulkifli, Aimran, & Deni, 2023) was done.

3 | RESULTS

Table 1 displays the age, greatest educational attainment, job title, current position, years of experience, monthly income range, employment status, nationality, corporate location by zone, and work experience of the participants.

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Table 1: The respondents' characteristics.

Respondent characteristics	Results (%)	Respondent characteristics	Results (%)
Age		Highest educational level	
Below 20 years old	18.0	Vocational institute	10.2
21-30 years old	26.2	College (Diploma)	26.7
31-40 years old	34.0	Bachelor's degree	36.6
41-50 years old	21.8	Postgraduate (Master)	26.5
Job title		Current position	
Facility owner/Manager	35.8	Manager / Owner	41.6
Manager/ Engineer	42.7	Supervisor	42.2
Technician / Manager	21.5	Technical worker	16.3
Length of service in present company		Years' experience	
2 years and below	9.6	2 years and below	4.4
3 to 6 years	23.0	3 to 6 years	21.5
7 to 10 years	29.9	7 to 10 years	29.4
11 to 14 years	24.1	11 to 14 years	26.2
15 to 18 years	13.4	15 to 18 years	16.6
		19 years and above	2.0
Monthly salary range		Employment status	
Below JD 250	2.3	Permanent	54.9
JD 250 – JD 349	4.9	Contract	45.1
JD 350 – JD 449	29.1	Nationality	344
JD 450 – JD 549	38.7	Jordanian	142
JD 550 – JD 649	23.8	Egypt ion	161
Above JD 650	1.2	Syrian	41

The framework consist one endogenous construct, organizational performance; one mediator construct, innovation; and one exogenous construct, TQM practices. The second-order construct, known as TQM practices, consists of five components. The study identified the following components: leadership (5 items), senior management commitment (5 items), customer focus (8 items), process management (8 items), and supplier quality management (6 items). We employ eleven items in a questionnaire to assess the first-order mediator, innovation, and the second-order endogenous construct, organizational performance. Two components of this architecture are financial performance (4 items) and non-financial performance (3 items). Figure 1 illustrates the research framework, concepts, elements, and objects utilized in this investigation.

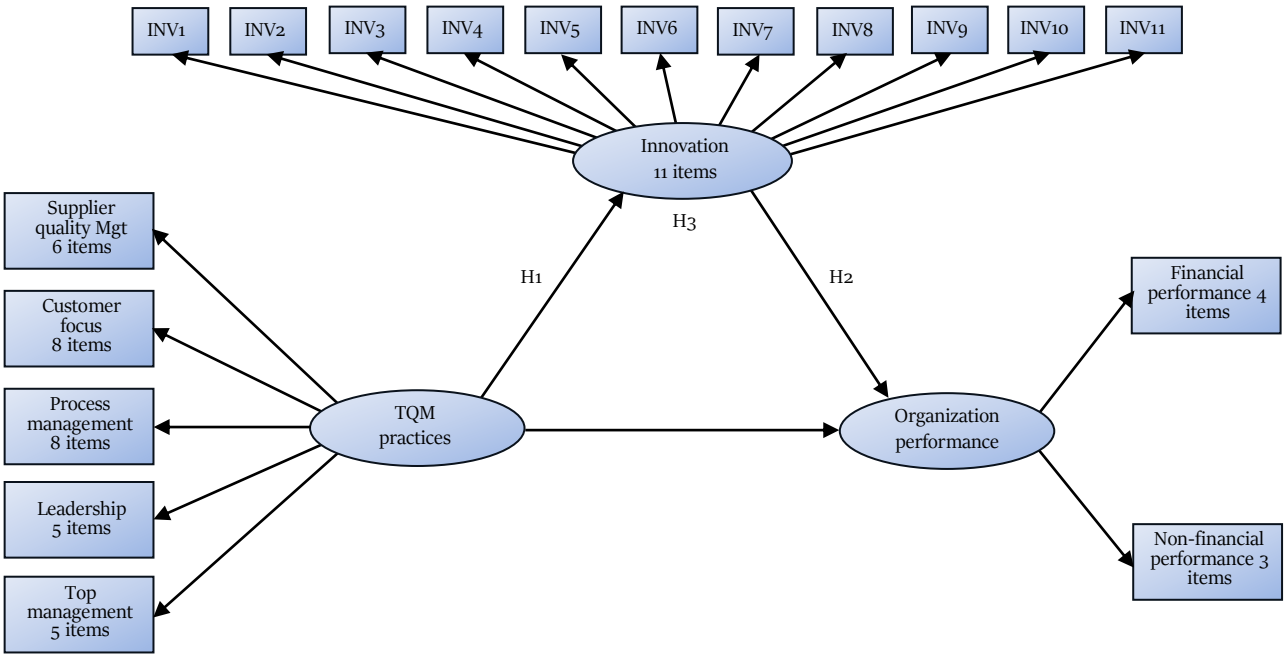

Figure 1: The framework and main hypotheses of this study.

3.1 | Assessment for Construct Validity for all Constructs in the Model

The fitness indices in Figure 2 have attained threshold values, as indicated by Table 2. The results suggest that the absolute fit class, RMSEA, is 0.093 (not exceeding the threshold of 0.10), the incremental fit class, CFI, is 0.905 (exceeding the threshold of 0.90), and the mismatched fit class, Chi sq/df ratio, is 3.943 (not exceeding the threshold of 5.0). The construct validity of each construct in the research has been satisfactorily demonstrated by the measuring methodology (Abdul-Rahim, Bohari, Aman, & Awang, 2022; Anuar, Muhammad, & Awang, 2023; Awang, Afthanorhan, Lim, & Zainudin, 2023; Baharum et al., 2023; ErsanAlown & Al-Gasawneh, 2021; Fitriana, Hutagalung, Awang, & Zaid, 2022; Mohamad et al., 2018; Mohd & Awang, 2022; Raza & Awang, 2020, 2021).

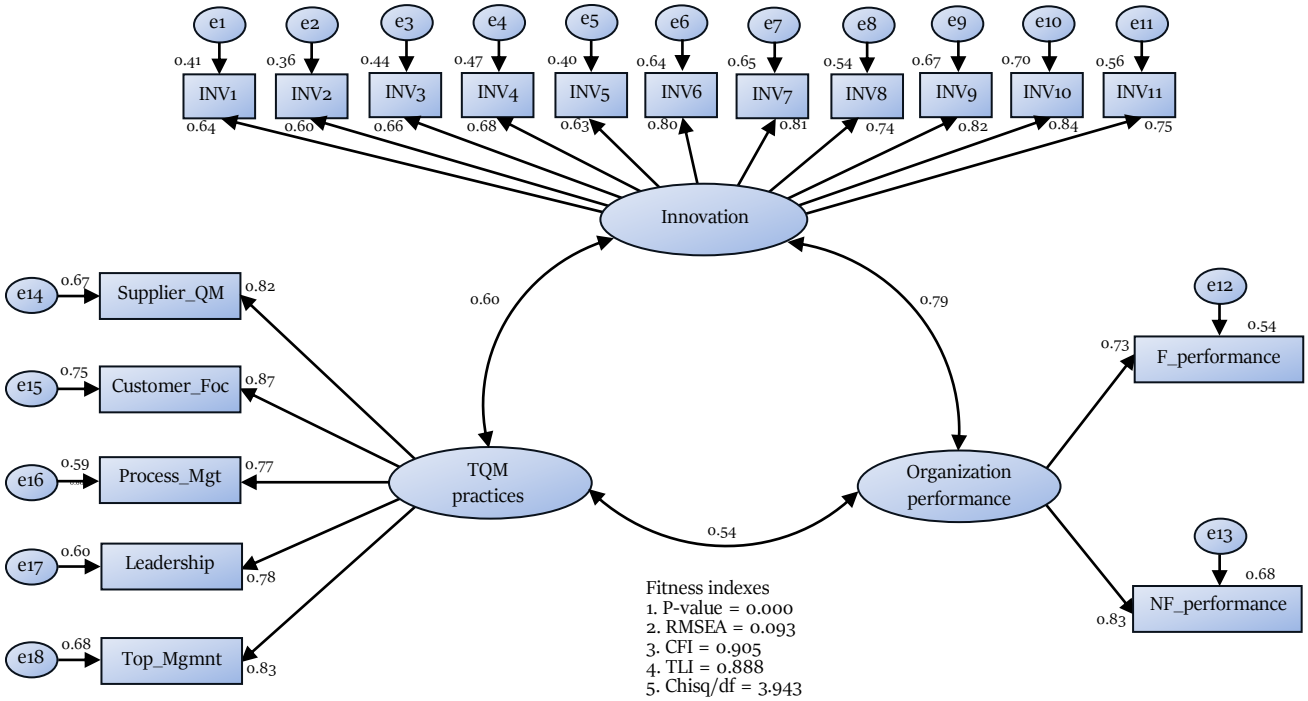

Figure 2: The results of Pooled CFA.

Table 2: The three categories of model fit and their level of acceptance.

Name of category	Name of index	Level of acceptance
Absolute fit index	Root mean square error approximation (RMSEA)	RMSEA < 0.08
	Goodness of fit index (GFI)	GFI > 0.85, Ideal if > 0.90
Incremental fit index	Adjusted goodness of fit index (AGFI)	AGFI > 0.85, Ideal if > 0.90
	Comparative fit index (CFI)	CFI > 0.85, Ideal if > 0.90
	Tucker-Lewis index (TLI)	TLI > 0.85, Ideal if > 0.90
	Normed fit index (NFI)	NFI > 0.85, Ideal if > 0.90
Parsimonious fit index	Chi Sq /df	Chi-square/ df < 5.0, Ideal if < 3.0

Note: The indexes are recommended since they are frequently reported in literature.
Source: Awang et al. (2023).

3.2 | Assessment for Convergent Validity and Composite Reliability

The study must compute Average Variance Extracted (AVE) in order to evaluate convergent validity. The construct gains convergent validity if its AVE exceeds the 0.5 threshold (Afthanorhan, Awang, & Aimran, 2020; Bahkia, Aisyah, Awang, Razak, & Idris, 2021; Mahfouz, Awang, & Muda, 2019; Rahlin, Awang, Afthanorhan, & Aimran, 2019; Rahlin et al., 2021; Sarwar, Awang, Habib, Nasir, & Hussain, 2022). In order to evaluate the Composite Reliability, the study must compute the CR, and its value must be greater than the 0.6 threshold value (Awang et al., 2023). Table 3 displays the computed values of the Composite Reliability (CR) and Average Variance Extracted (AVE) for each of the primary constructs and their corresponding sub-constructs.

Table 3: The AVE and CR for all constructs in the model.

Construct	Item	Factor loading	CR (Above 0.6)	AVE (Above 0.50)
TQM practices	Supplier_QM	0.82	0.908	0.664
	Customer_Foc	0.87		
	Process_Mgt	0.77		
	Leadership	0.78		
	Top management	0.83		
Innovation	INV1	0.64	0.919	0.612
	INV2	0.60		
	INV3	0.66		
	INV4	0.68		
	INV5	0.63		
	INV6	0.88		
	INV7	0.87		
	INV8	0.74		
	INV9	0.82		
	INV10	0.84		
	INV11	0.75		
Organization performance	Financial	0.73	0.758	0.611
	Non-financial	0.83		

The AVE and CR are greater than 0.50 and 0.60, respectively. Therefore, the study can declare that the organizational performance construct's Convergent Validity and Composite Reliability have been met (Awang et al., 2023).

3.3 | Assessment of Discriminant Validity among Constructs

The research must assess the discriminant validity, which is a form of model validity. We conduct a discriminant validity assessment to verify that the model does not include any unnecessary constructs (Awang et al., 2023). The model attributes redundancy to any pair of closely linked constructs. To assess discriminant validity, create a summary of the discriminant validity index, as depicted in Table 4. The bold diagonal values indicate the square root of the average variance extracted (AVE) for each construct, while the other values provide the correlation coefficient between each pair of constructs.

Table 4: The discriminant validity index summary for all constructs.

Construct	TQM practices	Innovation	Organization performance
TQM practices	0.82		
Innovation	0.60	0.80	
Organization performance	0.54	0.79	0.80

Based on Table 4, a construct is deemed to have discriminant validity if its square root of average variance extracted (AVE) exceeds the correlation value with other constructs in the model (Anuar et al., 2023; Awang et al., 2023; Baharum et al., 2023; Bahkia et al., 2022; Fitriana et al., 2022). The diagonal values, highlighted in bold, achieve discriminant validity when they surpass all other values in both the corresponding row and column. The values presented in Table 4 meet the criteria for discriminant validity. The investigation concludes that all constructs have successfully demonstrated discriminant validity.

3.4 | Structural Model and Structural Equation Modeling (SEM)

After completing the CFA report and satisfying all validity, reliability, and normality distribution thresholds, the researcher can confirm the validation of the measurement models for each of the latent constructs in the model (Abdul-Rahim et al., 2022; Afthanorhan, Mamun, Zainol, Foziah, & Awang, 2020; Awang et al., 2023; Sarwar et al., 2022; Yusof et al., 2017). Afterwards, the investigator needs to include these concepts in the structural model in order to do structural equation modeling (SEM). Arrange the external constructions on the leftmost side, the mediator constructs in the middle, and the endogenous constructs on the far right, following this sequence (Awang et al., 2023; Bahkia et al., 2022). Subsequently, the researcher establishes a connection between the external construct and the matching endogenous construct, aligning with the direction of the hypothesis. Figure 3 shows this connection with a single-headed arrow. Upon doing the SEM analysis for the structural model depicted in Figure 3, Figure 4 exhibits the standardized regression path coefficients.

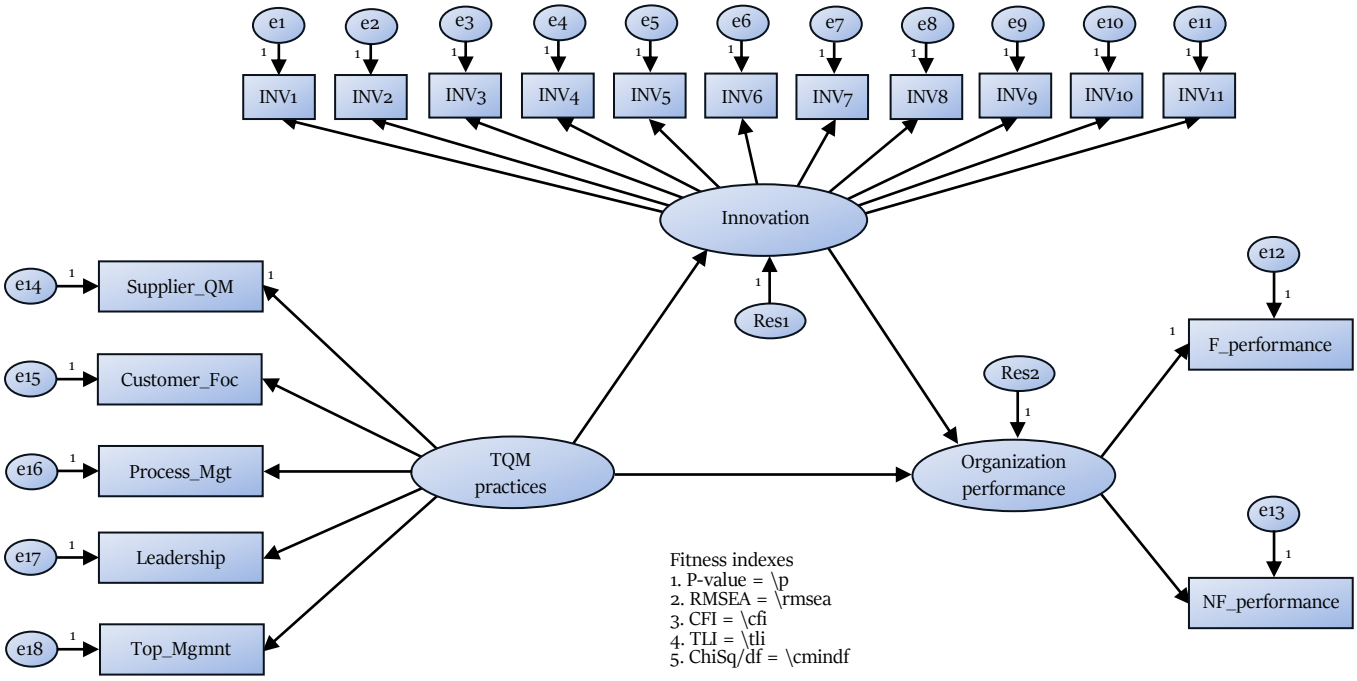

Figure 3: The structural model of the study in IBM-SPSS-AMOS graphic.

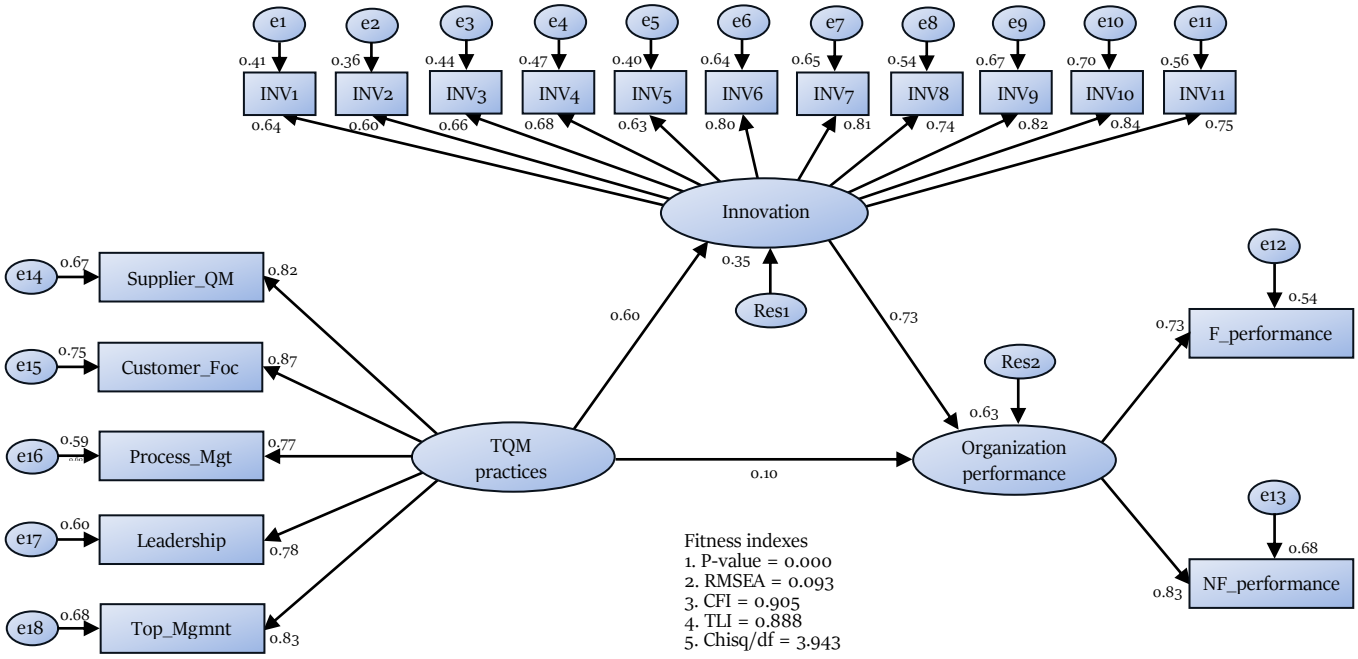

Figure 4: The standardized regression path coefficient among constructs in the model.

The model's R2 (coefficient of multiple determination) performance (Figure 4) is interpreted and explained in Table 5.

Table 5: The R2 of the model and its implication in this study.

Endogenous construct	R2	Conclusion
Innovation performance	0.35	The TQM practices by the organization contribute about 32% towards innovation performance
Organization performance	0.63	The TQM practices and innovation performance of the firm contribute about 63% of organization performance.

Table 6 provides an explanation of the regression path coefficient (beta) output for each independent (exogenous) construct's effects on dependent (endogenous) constructs that were taken from the graphical model in Figure 5.

Table 6: The regression path coefficient obtained from Figure 5.

Exogenous	Endogenous	Beta	Explanation
Innovation performance	TQM practices	0.42	When TQM practices goes up by one unit, innovation performance goes up by 0.42 units.
Organization performance	Innovation performance	0.89	When innovation performance goes up by one unit, organization performance goes up by 0.89 units.
Organization performance	TQM practices	0.09	When TQM practices goes up by one unit organization performance goes up by 0.08 units.

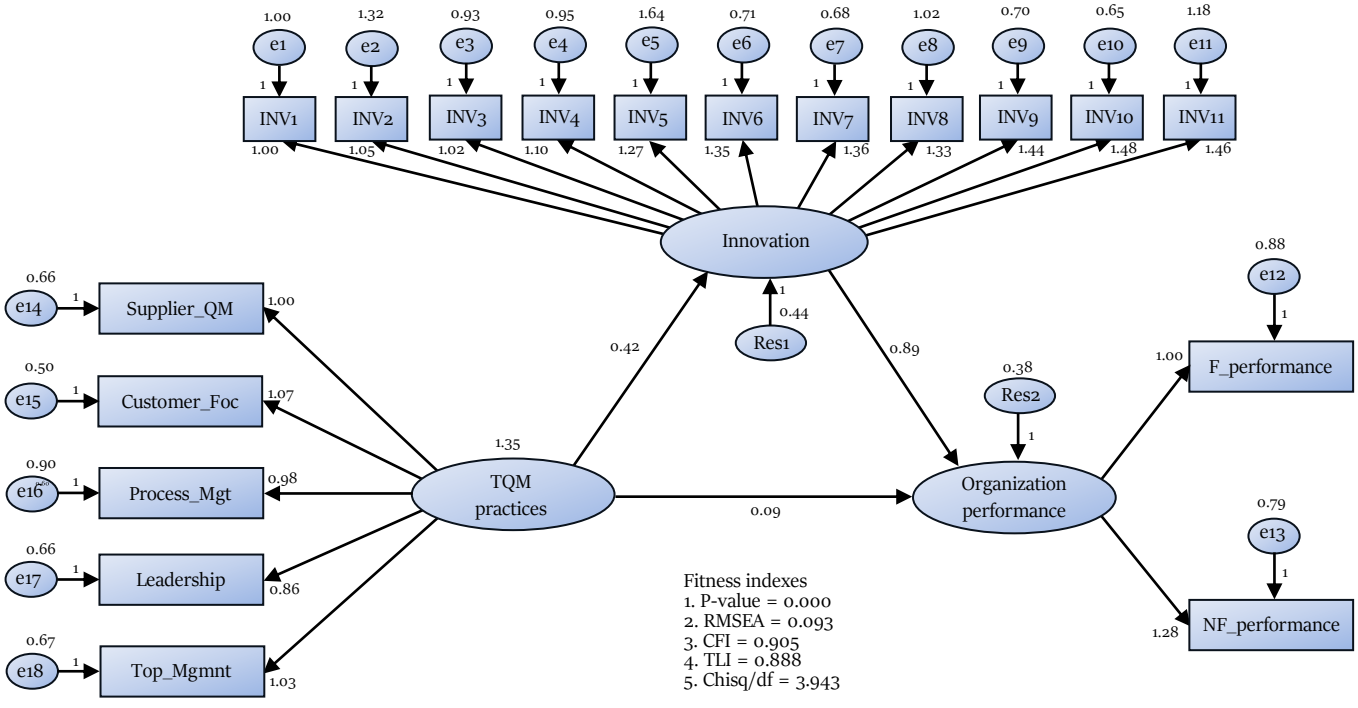

Figure 5: Regression path coefficient for all independent constructs between the models constructs.

The regression coefficient (beta) obtained in this study is presented in Table 7.

Table 7: The regression coefficient and its significance.

Endogenous	Effect	Exogenous	Estimate	S.E.	C.R.	P	Result
Innovation	<---	TQM practices	0.425	0.047	8.948	0.001	Significant
Organization performance	<---	Innovation	0.889	0.106	8.382	0.001	Significant
Organization performance	<---	TQM practices	0.091	0.054	1.67	0.095	Not significant

Table 7 displays the textual results for each direct effect link in this investigation, as determined by the model in Figure 5. Table 8 tests hypotheses using the p-value, which represents the probability value. If the P-value produced in the text output is smaller than the alpha value (type-1 error) set at 0.05, then the hypothesis is considered statistically significant (Abu-Raddad et al., 2022; Awang, Afthanorhan, Lim, & Zainudin, 2023; Bahkia et al., 2022; Rahlin et al., 2021).

Table 8: Testing the main hypothesis (Direct effects).

Hypothesis	Hypothesis statement	P-value	Result
H1	TQM practices have positive and significant effect on innovation performance...	0.001	Supported
H2	Innovation has positive and significant effect on organization performance...	0.001	Supported

Table 9: The hypothesis testing for mediation effect.

	Hypothesis statement	Statistical analysis
H3	Innovation performance mediates the relationship between TQM practices and organization performance	Path analysis in SEM

Table 8 extracts the figure for testing the hypothesis from the Figure 4 graphic output and Table 7's text output. According to Awang et al. (2023), the main criteria for testing the mediation effect is to determine the existence of mediation in the model as presented in Table 9. The mediation occurred because of two indirect effects, namely,

The effect of the endogenous construct to mediator is significant.

The effect of the mediator on the endogenous construct is significant.

If these two indirect effects are significant, it suggests that the mediator facilitates the transition from the exogenous to endogenous effects. Now the study needs to determine the types of mediation, whether full mediation or partial mediation.

To determine the type of mediation, the researcher needs to determine the direct effect of the exogenous construct (TQM practices) on the endogenous construct (organization performance).

Table 10: Testing hypothesis for mediation effect.

Exogenous	Effect	Endogenous	P-value	Result	Implication
TQM practices	To	Innovation performance	0.001	Significant	Mediation occurs since both indirect effects are significant
Innovation performance	To	Organization performance	0.001	Significant	
TQM practices	To	Organization performance	0.095	Not significant	Full mediation since the direct effect is not significant

Based on the result in Table 10 the study concludes that the hypothesis is supported, which indicates the existence of a mediation effect in this model. The type of mediation is full mediation since the direct effect of exogenous constructs directly on endogenous constructs is not significant (Abdul-Rahim et al., 2022; Awang et al., 2023; Bahkia et al., 2022; Rahlin et al., 2021). Based on the result in Table 10, the direct effect of TQM practice on organizational performance is not significant ($p > 0.05$).

Thus, the study can conclude that full mediation occurred in this model. In other words, TQM practices in these organizations have to contribute towards innovation performance for the organizational performance to take place. As a conclusion, innovation performance is important for achieving organizational performance. Without innovation performance, the TQM practices have no significant impact on organizational performance (P-value 0.095).

4 | DISCUSSION

The study's findings indicate that a significant portion of this section provides intricate details regarding the demographic attributes of the participants. After conducting a thorough examination of the respondents' files, it became apparent that the sample of respondents exhibited discernible attributes pertaining to age, highest level of education achieved, job title, current position, tenure in the current company, years of experience, monthly salary range, employment status, and the company's geographical location within the zone.

Nevertheless, the sample included people of both genders. Nevertheless, this study did not primarily emphasize gender comparisons. We considered the age range of the participants in relation to their qualifications, experience, and income. For this study, participants must have a minimum of 19 years of work experience in Jordanian industrial small and medium-sized enterprises (SMEs), or they must have worked for two years or less. Additionally, only those employed by small and medium-sized organizations in Jordan are eligible to participate.

The non-financial performance and financial performance components are the most often utilized organizational performance dimensions (Khan & Naeem, 2018). In order to evaluate the effectiveness of the company, this study will take into account both financial and non-financial performance (Secinaro, Brescia, Calandra, & Saiti, 2020). The business and service sectors utilize Total Quality Management (TQM) as a co-management technique. Organizations implement TQM in order to achieve a competitive edge in terms of quality, productivity, customer satisfaction, and profitability (Singh, 2019).

It has been demonstrated in previous research that empirically created frameworks contain measurable TQM practices (Al-Dhaafri & Alosani, 2020; Chen et al., 2020; Sweis, Elhawa, & Sweis, 2019; Yan, Zhang, Zhu, & Fan, 2019). Those studies investigated different practices of TQM.

For example, supplier quality management (Singh, 2019) customer focus (Mahmud, Hilmi, Mustapha, & Abu Karim, 2019), process management (Abu-Mahfouz, 2019), Leadership (Shafiq, Lasrado, & Hafeez, 2019), and top management (Subramani, Jan, Arumugam, & Sasikala, 2019).

If manufacturing organizations wish to maintain their competitive edge in the current global industrial production environment, they need to embrace innovation projects and provide support for them. This puts significant strain on manufacturing companies, necessitating them to prioritize innovation (Abu-Mahfouz, 2019). According to Awang et al. (2023) the main criteria for testing the mediation effect are to determine the existence of mediation in the model. The mediation occurred because of two indirect effects, namely,

1. The effect of the endogenous construct on the mediator is significant.
2. The effect of the mediator on the endogenous construct is significant.

If these two indirect impacts are significant, the mediator plays a crucial role in transitioning the effect from exogenous to endogenous. According to the findings of the study, the types of mediation, whether they are total or partial, need to be determined.

In order for the researcher to determine the type of mediation, they must determine the direct relationship that exists between the exogenous construct (TQM practices) and the endogenous construct (organization performance) in Jordanian industrial SMEs.

The conclusion of the study, which implies that there is a mediation effect in this model, lends weight to the idea. Full mediation is the type of mediation that is utilized since there is not much of a direct impact that the exogenous construct has on the endogenous construct (Abdul-Rahim et al., 2022; Awang et al., 2023; Bahkia et al., 2022).

5 | CONCLUSIONS

The introduction and results suggest a number of policy implications.

First, it is crucial for policymakers to provide assistance to small and medium-sized industrial enterprises in Jordan to apply Total Quality Management (TQM) practices. These practices include supplier quality management, customer focus, process management, leadership, and top management. Offering support and resources for Total Quality Management (TQM) training programs or consulting services has the potential to significantly enhance the performance and competitiveness of these organizations.

Second, it is imperative for companies to prioritize fostering an innovative culture. Policies that facilitate innovation could provide subsidies or incentives for research and development (R&D) initiatives, encourage collaboration between industry and academics, and establish platforms for information sharing. A conducive climate that recognizes and appreciates innovation can improve an organization's success.

Thirdly, to foster innovation, governments should focus on facilitating the transfer of knowledge among industrial businesses. Initiatives such as technology transfer offices, workshops, and industrial clusters or networks can encourage the exchange of technology, optimal methods, and concepts. Furthermore, it is critical to allocate resources towards improving leadership development in small and medium-sized enterprises. Grants, mentoring programs, and leadership training help cultivate a conducive workplace culture that promotes innovation and enhances performance.

Lastly, providing targeted assistance to small and medium-sized enterprises (SMEs) can enhance their performance and capacity for innovation. This encompasses several factors, such as monetary assistance, availability of funds, streamlining of regulations, and measures aimed at enhancing capabilities. By implementing these steps, policymakers may enhance the competitiveness and sustainability of Jordan's industrial sector, which in turn will stimulate economic growth and prosperity.

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Institutional Review Board Statement:
The Ethical Committee of the Faculty of Business and Management, Universiti Sultan Zainal Abidin, Malaysia has granted approval for this study (Ref. No. UniSZA.600-1/2/5 (63)).

Transparency:
The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests:
The authors declare that they have no competing interests.

Authors' Contributions:
All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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