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THE IMPACT OF TOTAL QUALITY MANAGEMENT PRACTICES ON THE PERFORMANCE OF SUPPLY CHAINS: ELECTRONIC SUPPLY CHAINS AS A MEDIATING VARIABLE: A FIELD STUDY OF INDUSTRIAL COMPANIES LISTED IN AMMAN STOCK EXCHANGE.

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Abstract
The study aimed to measure the impact of (TQMPPs) on the performance of supply chains; Electronic supply chains (ESCs) as a mediating variable: a field study of industrial companies listed in Amman Stock Exchange (ASE). The study community consisted of all administrative employees working in (153) industrial companies listed in ASE. Three companies including (200) employees were chosen from these companies to represent the study sample.
The results of the study conclude that the level of TQMPP, the level of performance of supply chains, and the level of ESCs were high. The results also show that there is a statistically significant effect of TQMPP dimensions on the performance of supply chain in the industrial companies listed in ASE. The results also show that there is a statistically significant effect of TQMPP on the performance of supply chains, and ESCs; as well as a statistically significant effect of SCM on ESCs. Finally, there is a statistically significant effect of the TQMPP on supply chains in industrial companies listed in ASE. The study recommends that the performance of supply chain departments should be developed by providing expertise and qualified cadres who can analyze the market and create materials that could help the company to have safe reserve.
Key words: TQMP, supply chain performance, electronic supply chains, industrial companies.

Introduction

SCM processes are ideal solutions because they work to confront many problems related to the supply process due to their direct connection with suppliers and their ability in handling marketing and financial problems through the relationship with customers who are capable of managing the reduction of supply and storage times(Hussein, 2019).
SCM represents life cycle of the product. It is an indicator of the success of the company's operations to maintain its position and continuity; in addition to saving time, cost, and effort, which help everyone to face many challenges to reach suitable alternatives that guarantee the company's workflow to obtain and distribute raw materials in a way that ensures sustainability of the company's work (Soin, 2014). The goal of SCM is to provide services and products that meet the desires of customers within price specifications, cost and quality. The quality of services indicates the company's interest to meet the desires and maximize its profits (Al-Khadidi 2022).

ESC Management represents the optimal use of technology to enable companies to be more responsive to partners and be on line with technological changes to integrate activities of the main supply chain process (Sabrina et al., 2019). Successful management is that which absorbs technology and utilizes it in activities that serve companies and customers (Suryana et al., 2018). Therefore, the direct link between quality management and SCM with the ESC help to create an integrated system to obtain data and services in order to simplify the period of obtaining the product, reduce time and effort, and improve customer services (Beheshti et al., 2012). Thus, the problem of the study focused on answering the question: What is the impact of TQMPP on the performance of ESC as a mediating variable in the industrial companies listed in ASE?

Study questions:

The problem of the current study focused on answering the following questions:

The first question: What is the level of TQMPP according to the perceptions of the study sample in the industrial companies listed in ASE?

The second question: What is the level of performance of the supply chains according to the perceptions of the study sample in the industrial companies listed in ASE?

The third question: What is the impact of ESC, according to the perceptions of the study sample on the industrial companies listed in ASE?

The fourth question: Is there an impact of TQMPP on the performance of supply chains through ESC in industrial companies listed in ASE?

Study Objectives:

1. Identifying TQMPP; the performance level of supply chains, and the impact of ESC on the industrial companies listed in ASE.
2. Analyzing the impact of TQMPP on the performance of supply chains through ESC in industrial companies listed in ASE .

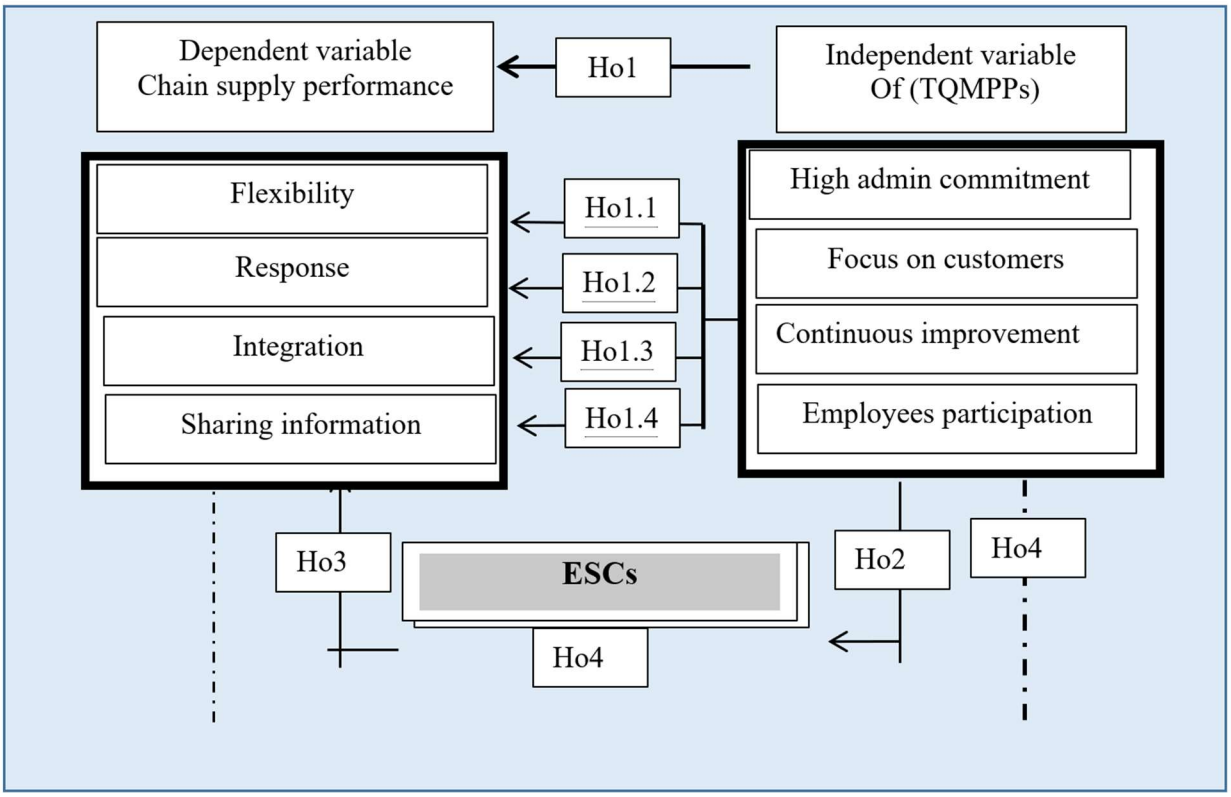
Study importance:

First: Scientific (theoretical) importance: It is one of the recent studies that approach the impact of three combined variables: TQMPP, the performance of supply chains, and ESC. The current study contributes to providing libraries with more information about the contents of the study, which puts researchers in the framework of searching for new variables that contribute to increasing scientific studies to integrate variables to apply them to other companies.

Second: Practical (applied) importance: The importance of the study stems from the importance of the important sector represented by industrial and food companies in general. Due to the importance of the role played by this institution, there are (53) companies listed in ASE within a budget of millions of dinars, which employ more than 17,000 employees. Therefore, the importance of this study stems from the great importance of the position of the companies.

Study model: Figure No. (1) depicts the study model, which explains the constituent variables of the current study, as follows:

Figure(1)



*Source: Prepared by the researcher, based on the following previous studies:

Indepoendent variable: total quality management practices: Casteleiro, & Mendes, (2022). Swastika & Jain, (2022)

Dependent variable: supply chains performance. Wang, Ye, M., Huang.& Si, (2022). Wang, Jiang, & Sun, (2017). S, Abdulhafiz 2024

Mediating variable: ESCs: Faraj, Ahmed (2020). Al-Jadaiya, Muhammad (2019). Taghipour, Murat, & Huang, (2021)ز

Study hypotheses:

First hypothesis Ho1:

There is no statistically significant effect at the significance level (0.05) ≥α) of the study sample perceptions of TQMPP dimensions (commitment of top-level management, focus on customers, continuous improvement, and employee participation) on the performance of supply chains dimensions of industrial companies listed in ASE.

Second hypothesis: Ho2

There is no statistically significant effect at the significance level (0.05) ≥α) of the study sample perceptions of TQMPP dimensions (commitment of top-level management, focus on customers, continuous improvement, and employee participation) combined with ESCs in listed industrial companies in ASE.

The third hypothesis: Ho3

Ho3 There is no statistically significant effect at the significance level (0.05) ≥α) of the study sample perceptions of ESCs on the performance of supply chains in all of their combined dimensions in industrial companies listed in ASE.

Fourth hypothesis: Ho4

There is no statistically significant effect at the significance level ≥α (0.05) of the study sample perceptions of TQMPP and their combined dimensions (commitment of top-level management, focus on customers, continuous improvement, employee participation) on the performance of supply chains and their combined dimensions with the presence of supply chains Electronic technology of industrial companies listed in ASE.

Theoretical framework and previous studies

TQMPP have become a standard for many organizations in measuring the performance, development and planning process. Al-Jalamdeh (2023) mentioned that TQMPP represents an important input in the development process because it is based on essential elements in the performance process as a whole. Quality management does not address a specific sector; all sectors benefit from it. The ultimate and common goal in the application of quality management is to reach scientific foundations in modernization and development processes based on international scientific bases in order to achieve excellence in the level of services, competition, and performance (Muhammad and Ashour, 2023).

The concept of TQMPP:

It is one of the negotiable concepts which revolves around one goal: to improve the performance and services of companies (Bahia., Abbas & Idan, 2023). TQMP is defined as the collaborative approach to perform business through available staff skills and competencies to achieve continuous improvement in productivity and quality (Al-Abri & Al-Hadrami, A. 2023). It is also the continuous effort of the management and employees of a particular organization to ensure long-term customer loyalty and satisfaction (Obeidat, Tawalbeh & Akour, 2019).

Importance of TQMP:

The quality represents an important element strategy for companies to achieve competitive advantage in the business environment (Bahia et al., 2023). TQMP requires organizational commitment to ensure customers' satisfaction through the application of an integrated system of tools, procedures, and training, which entails the continuous development of organizational processes to produce high-quality products and services (Al-Sahloun, 2016). There is a shift in the organization's culture, values, and belief systems regarding how it operates (Khalil, 2016). The importance of applying TQMP would contribute to improving many of the companies' foundations in the field of competition (Al-Omari and Al-Raziqa, 2022, Qarash and Hubbal, 2019). Improving performance leads to increasing productive and organizational capabilities of companies, which show their strengths and weaknesses and help in forming a programs that will increase the effectiveness of TQMP.

Dimensions of TQMP

Top-level management commitment:

Researchers agree that the commitment of leadership and top-level management provides a focal point for the energies, hopes, and aspirations of individuals in organizations when TQMP is implemented (Abbas, 2020). (Casteleiro & Mendes, 2022) indicated that the commitment and participation of top-level management are the most important factors for the success of TQMPP.

Focus on customers: Kalogiannidis,(2021) stressed that customers' satisfaction and loyalty are the ultimate goals in the implementation of TQMP. Focusing on customers is generally considered the most important principle of TQMP.

Continuous improvement: It is achieved when all members of the organization work together on continuous bases to improve processes and reduce errors to improve the overall performance of the organization. Continuous improvement consists of data collection, work process improvement, benchmarking, job analysis, and an effective open communication system, Vieira., Vidor, & Santos,(2021).

Employees' participation: Attention to employees at all administrative levels is an important source in the corporate system. Strategies must be prepared and implemented to ensure employees' full participation in decision-making, so that the organization can achieve strategic success and institutional excellence to achieve customers satisfaction (Casteleiro & Mendes, 2022).

SCM

It represents an important management because it provides suppliers and customers with what they need to obtain appropriate services, (Boateng, 2019). It is a network of companies working together to facilitate the distribution network between customers and the company's internal and external activities (Barraza et al, 2016).

Supply chains are defined as paths between suppliers and recipients, to deliver the product from the beginning to the hands of the consumer (Bastas & Liyanage, 2018). SCM consists of all parties involved, directly or indirectly, in the manufacturing process to meet customers' demand. It includes all functions that help in receiving an order from a customer and filling it (Yang., Jia & Xu, 2018). SCM is therefore vital to markets around the world (Huo et al, 2019). It is important because it is rooted in the daily life of companies to know the market and all the primary elements needed for the production process (Forozandeh, 2021).

Supply chain practices greatly affect a company. It is an important process planned through systematic coordination, such as procurement, purchase, transfer, and logistics services (Chakraborty and Gonzalez, 2018). It is also a basis for designing distribution management of products and services that aim at consumer satisfaction through good coordination with network companies, information systems, and high-performance processes to produce High-quality products and services (Zhou, 2016).

Supply chain dimensions

First, flexibility: It represents the ability to respond to environmental and outputs changes to respond to changes in demand (Liu, Dong & Shen, 2020).

Second, Responsiveness: The ability to respond more quickly to changing opportunities and strategies, and to quickly detect and respond to short-term problems (Masood, Lim, & González, 2020).

Third, Integration: Supply chain integration means exchanging information smoothly through planning, implementation, and completion of transportation and logistics operations throughout the life of the product (Liu, Dong, Shen, 2020).

Third: ESC

ESC are processes that use electronic technologies to enable organizations to make decisions regarding the supplies they need and their products demand. This technology improves the performance of suppliers; meets customer needs; develops more relationships with suppliers; and protects the organization (Attaran, 2020). It can adapt to changing circumstances allowing organizations to anticipate problems and respond in a timely manner without the need for advanced planning (Garay-Rondero, Martinez-Flores, Smith, Morales, & Aldrette-Malacara, 2020). ESCM is one of the modern concepts that have emerged in commerce as a result of the availability of modern technologies, which allow diversity of tasks to facilitate smooth transactions by organizations and industrial companies without the need to travel and waste time.

Al-Jedaya (2019) defined it as the set of basic operations related to the supply process from suppliers to customers electronically via communication technology (the Internet). It is also defined as the process of integrating all internal and external activities through technology to link many organizations and companies with the aim of integrating and completing the procurement process electronically (Pulevska & Kaleshovska, 2013).

Main requirements for managing ESC:

The organization needs to apply the following requirements to achieve ESC, (Marwan et al., 2019):

1. Clarity: all information related to the product must be clear and available in precise details to obtain credibility in the purchase and supply process in terms of the specified time and quantity.
2. Intelligence: artificial intelligence would inform the organization of any defect that occurs in the process of electronic supply to access data that will help to overcome the defect and complete the supply process correctly, as electronic intelligence makes performance closer to realism.
3. Scaling: electronic supply process proceeds according to clear steps to avoid any obstacle in the process, as clear scaling would facilitate completion of the supply process in a scientific and clear manner.
4. Open Platform: facing rapid fluctuations is one of the tasks that concern business management systems. Therefore, the electronic supply process must be compatible with rapid developments and changes in a flexible and efficient way. it is clear, through the foregoing statement, that the real contribution of the information and communication technology to SCM re-engineering projects is analysis and experience; as the application of e-commerce confirms

that it is the main factor for the success of supply chain operations, which are based on information systems and electronic transformation,

Previous studies:

Many researchers have dealt with the study of SCM.

First: the study of Abdeljalil and Alawi (2023), which found that the application of the principles of TQMP improve the quality of health services in the Tripoli Medical Center. The study of Al-Mishari, Al-Qadan, and Al-Ghasham (2022), whose results indicated that the level of performance improvement among workers in the charitable sector facilities in the Asir region came largely by applying the dimensions of TQMP. In addition, the study of (Al Sharaya & Bazadough, 2022) concluded that there was a statistically significant relationship between TQMP and institutional happiness. Another study by (Erkan & Unal, 2022) showed that applying TQMP had a significant impact on the level of health services provided to others.

Second: Studies that dealt with the supply chain. Al-Khudaidi's study (2022), showed that there was a relationship between SCM and enhancing the quality of services provided. Sultan's study (2021) showed a positive impact of operational and cultural compatibility between supply chain partners regarding supply chain process integration. Alshawabkeh et al. study (2022), showed that big data had significantly and positively affected SCM. A study by Manasriya and Saadi (2020) concluded that SCM was of great importance in improving the organization's performance in particular. A study by Zhu & Wu, (2022) showed that supply chain flexibility had a positive impact on supply chain sustainability, economic sustainability, social sustainability, and environmental sustainability. A study conducted by Prabusankar (2018) showed that practicing SCM improves the quality of products.

Third: Studies that dealt with ESC: Al-Hesban study (2022). which showed that there was an indication of the dimensions of the flexibility of the ESC in the operational performance of chemical industry companies. Faraj study (2020) found a relationship between ESC and increased profitability. A study conducted by Sugara & Azis (2020) showed that the application of ESC management in the retail industry had an impact on the speed of the exchange process between customers. Giménez & Lourenco study, (2006), showed speed in supply operations, and increase in the rate of production operations, and saving of time.

Study Methodology

The current study is based on the descriptive analytical method.

Study community and sample

The study community consisted of (153) industrial companies listed in ASE. The size of the target sample was determined by (3) companies including (200) employees from the industrial companies listed in ASE.

Study tool

A questionnaire included three areas was designed. The areas are : TQMP, supply chain performance, and ESC. It consists of (76) items. The following formula was applied to reveal the level of interest and degree of practice of the study variables by the study sample organizations,:

Period length = upper bound of the alternative – lower bound of the alternative= 1-5 =1.33
Number of levels 3

Where the level of relative importance was determined based on the value of the arithmetic mean of the weights of the estimates of the responses to the items of the study tool and its model variables. This was according to three levels, namely: low, medium, and high, as follows:

Table (1): level of relative importance of the items and variables of the study and the corresponding arithmetic mean

High	**medium**	**low**	level of relative importance
– 3.66less than5.00	- 2.333.66	than 1- less 2.33	arithmetic mean

Testing validity of the study tool

Content Validity Test (Face validity)

The questionnaire was presented to a group of faculty members specialized in the fields of study in Jordanian and Saudi universities. The observations and suggestions of the arbitrators were considered, and the amendments referred to by them were done in terms of addition, deletion, or reformulation of paragraphs.

Construct Validity Test

Construct validity test aims to verify the belonging of the paragraphs to the dimensions they express and their association with them. This test was conducted to find the Pearson correlation coefficient between the paragraphs and the dimensions.

Pearson's correlation coefficient between paragraphs and dimensions

This method is based on finding the value of the correlation coefficient between the paragraphs and the dimensions to which the paragraph belongs, as all values appeared statistically significant.

The stability test of the study tool

The following table shows the results of the study tool stability test

Table (**2**)**: Results of the stability test of the study tool.**

No	**Dimeionn**	**Alpha value**
1	Commitment of top-levelmanagement	0.872
2	Customer focus	0.832

3	continuous improvement	0.786
4	Employees participation	0.812
5	TQMP 0.842	
6	Flexibility	0.768
7	Response	0.829
8	Integration	0.893
9	Share information	0.875
0.831	supply chain performance	0.831
0.856	ESC 0.856	

Table (2) shows that the study tool has high reliability coefficients and that it is capable of achieving the study goal .

Presentation and discussion of the results and recommendations

First: Describing the answers of the study sample about the reality of TQMP.

The TQMPP variable was measured through (4) dimensions, namely: top-level management commitment, customer focus, continuous improvement, and employees participation. Table (3) shows the results:

Table 3: Arithmetic means, standard deviations, order and level of importance relative of the dimensions of TQMP

No	Dimension	Arithmetic mean	Standard deviation	Order	Relative importance level
1	Commitment of top- level management	0.587	4.406	4	High
2	Customer focus	0.573	4.471	3	High
3	continuous improvement	0.519	4.528	1	High
4	Employee participation	0.550	4.522	2	High
	TQMP	0.331	**4.482**	**high**	

The table shows that the level of respondents' perceptions of the TQMPP and its dimensions in industrial companies listed in ASE is relatively high, with arithmetic mean of (4.482) and a standard deviation of (.331) which shows high relative importance. The arithmetic mean values ranged between (4.406 - 4.528), with high relative perceptions for all dimensions.

Second: describing the answers of the study sample members regarding the reality and importance of the dimensions of supply chain performance

The supply chain variable was measured through (4) dimensions: flexibility, responsiveness, integration, and sharing information, as follows:

Table 3: Arithmetic means and standard deviation of the dimensions of supply chain

No	Dimention	Aarithmetic mean	Standard deviation	Order	Relative importance level
1	Flexibility	0.502	4.504	1	High
2	Response	0.550	4.452	2	High
3	Integration	0.448	4.372	4	High
4	Sharing information	0.368	4.422	3	High
5	Supply chain	**0.283**	**4.438**	high	

The table shows that the level of respondents' perceptions of the supply chain performance dimension is of an average level, with arithmetic mean of (4.438) and standard deviation of (0.283). The arithmetic mean values for the supply chain performance dimensions ranged between (4.372 - 4.504), with high perceptions.

Third: Responses of the study sample members to the ESC dimension

Table (5)

Arithmetic means and standard deviations of the ESC dimension

No	Dimension	Aarithmetic mean	Standard deviation	Order	Relative importance level
1	ESC contributes to reducing costs	.722	3.68	8	High
2	Electronic communication channels are available between the organization and suppliers	.819	3.67	9	High
3	The ESC increases manufacturing efficiency at all levels	.706	3.65	10	Medium
4	An ESC contributes to flexible supply operations that increase market share and sales	.774	3.69	7	High
5	ESC management improves the activities and methods used	.763	3.77	2	High

6	The Corporation exchanges information with suppliers transparently and electronically	.726	3.73	5	High
7	Post-supply services are compatible with the organization's requirements for electronic supply operations	.743	3.70	6	High
8	Suppliers' guarantees are characterized by the credibility of what is supplied electronically	.800	3.82	1	High
9	ESC is based on achieving efficiency between the organization and suppliers	.796	3.75	3	High
10	An ESC contributes to the excellent completion of business	.884	3.74	4	High
ESC	**---**	**0.379**	**3.79**	**high**	

The table shows that the level of respondents' perceptions of the ESC dimension is of an high level, with arithmetic mean of (0.379) and standard deviation of (0.379). The arithmetic mean values of the dimensions ranged between (3.65 - 3.82), with relative importance between high and medium.

Study hypotheses:

The first main hypothesis Ho1:

There is no statistically significant effect at the significance level ≥α (0.05) for TQMP with its combined dimensions (commitment of top-level management, focus on customers, continuous improvement, and employees' participation) concerning the performance of supply chains with its dimensions in the industrial companies listed in ASE.

Table(6)

Results of the multiple linear regression test to analyze the first main hypothesis

variance analysis (ANOVA)					**Model summary**	
Significance level	F calculate value	Squares mean	(DF) Freedom degrees	Sum of squares	(R^2) determination coefficient	(R) Correlation

							coefficient
0.000	81.437	17.989	4	Regression	71.954	0.626	0.791
		0.221	195	residuals	43.073		
			199	total	115.028		

Regression coefficient

Significence (T) value	(T)value	Standard error	(B) value	dimensions of the independent variable
0.247	0.161	0.048	0.056	Commitment of top-level management
0.000	3.717	0.055	0.205	Customer focus
0.405	3.835	0.060	0.050	continuous improvement
0.000	3.253	0.043	0.399	Employee participation
				Dependent variable: supply chain performance

*Statistically significant at the level (≤ 0.05α).

Table (6) indicates that there is a statistically significant effect of information technology with its combined dimensions (customer focus, employees participation), as the calculated (F) value was (81.437), with a statistical significance of (a≤0.05), which indicates that the effect is Statistically accepted. The correlation coefficient was (R = 0.791)), which indicates positive relationship between independent and dependent variables. The value of the determination coefficient is (R2 = 0.626); The quality management shows (62.6%) of variation in the performance of the supply chain in the companies listed in ASE.

As for the regression coefficients, they show that the (B) value of the dimension (commitment of top-level management) is (0.056), and that the (T) value is (0.161), with a significance level (a≤0.05), which is statistically insignificant). As for the (customer focus) dimension, it is (0.205), and its (T) value is (3.717), which is statistically significant. (B) value of the (continuous improvement) dimension is (0.050), and the (T) value is (3.835), which is statistically insignificant. Finally, (B) value for the (employees' participation) dimension is (0.399), and the (T) value is (3.253), with a significance level (a≤0.05), which is statistically significant.

With this result, the null hypothesis is rejected, and the partial hypothesis, (which states: There is a statistically significant effect) is accepted at the level of significance (α ≤ 0.05) on quality management with its combined dimensions (customer focus, employees participation), and in supply chain performance with its dimensions collectively (flexibility, responsiveness, integration, sharing information).

The second major hypothesis: Ho2

There is no statistically significant effect at the level of significance ≥α (0.05) for TQMPP and their combined dimensions (commitment of top-level management, focus on customers, continuous improvement, employee participation) on ESCs in industrial companies listed in ASE.

Table(7)

Results of the multiple linear regression test to analyze the second main hypothesis

variance analysis (ANOVA)						Model summary	
Significance level	**F calculate value**	**Squares mean**	**(DF) Freedom degrees**		**Sum of squares**	**(R^2)** determination coefficient	**(R)** Correlation coefficient
0.000	76.553	13.478	4	Regression	53.912	0.611	0.782
		0.176	195	residuals	34.332		
			199	the total	88.245		

Regression coefficient				
Significence (T) value	**T)value (**	**Standard error**	**(B) value**	dimensions of the independent variable
0.658	0.440	0.043	0.019	Commitment of top level management
0.000	3.674	0.049	0.181	Customer focus
0.573	0.565	0.054	0.030	continuous improvement
0.000	9.615	0.039	0.370	Employee participation
				Dependent variable: ESCs

*Statistically significant at (≤ 0.05α) level.

Table (7) indicates statistically significant effect of information technology with its combined dimensions (focus on customers and employee participation), where the calculated (F) value is (76.553) with statistical significance (a≤0.05). This indicates acceptance of the effect from a statistical standpoint. The correlation coefficient is (R=0.782), which indicates positive relationship between the dependent and the mediating variable. Besides, the value of the coefficient of determination reached (R2=0.611); Which indicates that TQMP shows (61.1%) of variance in ESCs in industrial companies listed in ASE.

Regression coefficients shows that the value of (B) for the dimension (commitment of top-level management) was (0.019), and that the value of (T) is (0.440), with a significance level (a≤0.05), which is a statistically insignificant value.) for the customer focus dimension, it is (0.181), and the value of (T) is (3.673), which is statistically significant. (B) value for the (continuous improvement) dimension is (0.030), and the (T) value is (0.565), which is statistically insignificant. Finally, (B)value for the dimension (employee participation) is (0.370), and the (T) value is (9.315), with a significance level of (a≤0.05) which is statistically significant. With this result, the null hypothesis is rejected, and the partial hypothesis (which states: There is a statistically

significant effect) is accepted. There is significance level of ($\alpha \leq 0.05$) in TQMP with its combined dimensions (focus on customers and employee participation), in ESCs in industrial companies listed in ASE.

The third main hypothesis: Ho3

There is no statistically significant effect at the significance level $\geq\alpha$ (0.05) for ESCs on the performance of supply chains with their combined dimensions in the industrial companies listed in ASE.

Table(8)

Results of the multiple linear regression test to analyze the third main hypothesis

variance analysis					(ANOVA)	Model summary	
(R) Correlation coefficient	**(R^2)** determination coefficient	**(R)** Correlation coefficient	**(R^2)** determination coefficient		**(R)** Correlation coefficient	**(R^2)** determination coefficient	**(R)** Correlation coefficient
0.000	911.221	94.495	1	Regression	94.495	0.821	0.906
		0.104	198	residuals	20.533		
			199	the total	115.028		

Regression coefficient				
Significence (T) value	**(T)value**	**Standard error**	**(B) value**	dimensions of the independent variable
0.000	30.186	0.034	1.035	ESCs
				Dependent variable: supply chain performance

*Statistically significant at ($\leq 0.05\alpha$) level.

Table (8) indicates statistically significant impact of ESCs on the performance of supply chains with all their dimensions in industrial companies listed in ASE, where the calculated (F) value is (911.221), and with statistical significance ($a\leq0.05$) This indicates that the effect is acceptable from a statistical standpoint, and the correlation coefficient is (R=0.906), and this indicates positive relationship between the independent and dependent variables. The value of the determination coefficient is (R2=0.821); Which indicates that ESCs accounts for an amount of (82.1%) of the variance in the performance of supply chains in industrial companies in ASE. Regression coefficients shows (B) value for the dimension ESCs which is (1.035), and (30.186) for the value of (T) , with a level of significance ($a\leq0.05$), which is statistically significant. With this result, the null hypothesis is rejected, and the proof hypothesis (which states: There is an important statistically significant effect) is accepted. A level of significance ($\alpha \leq 0.05$) is recorded for ESCs

in the performance of supply chains with their dimensions (flexibility, responsiveness, integration, information sharing), in the industrial companies in ASE.

Fourth main hypothesis: Ho4

There is no statistically significant effect at the significance level (0.05 ≥α) of TQMPP in their dimensions (commitment top-level management, focus on customers, continuous improvement, employee participation) on the performance of supply chains with their dimensions with the presence of ESCs as a mediating on companies in ASE..

To test this hypothesis, Path Analysis was used by applying the Amos program through the SPSS statistical analysis program to verify the existence of a direct and indirect impact of TQMPP dimensions on the performance of supply chains dimensions through ESCs in industrial companies listed in ASE; the results are:

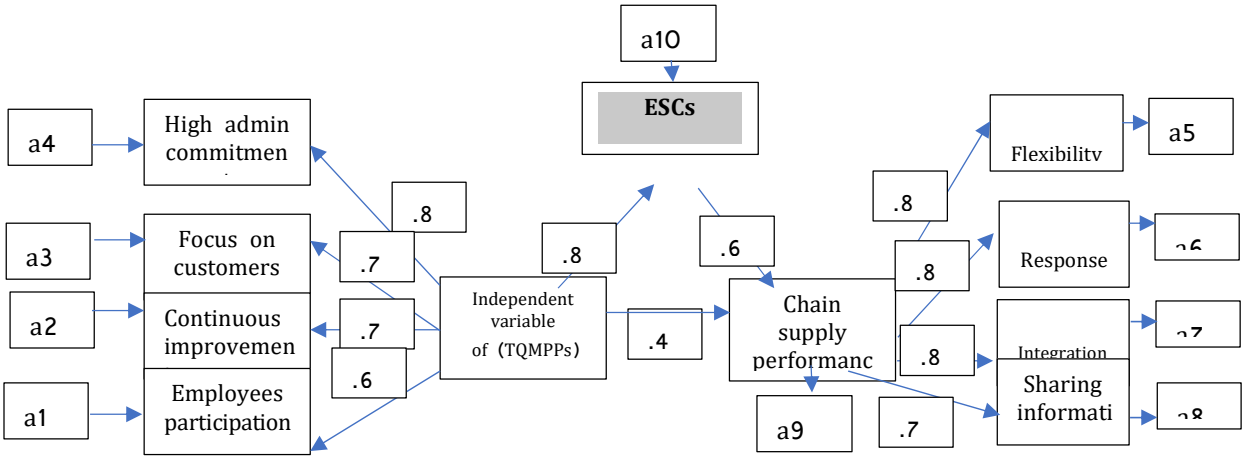


Figure (000) shows the Amos test to show the indirect impact of TQMPP on the performance of supply chains in the presence of ESCs.

Table (9)

Results of path analysis for the fourth hypothesis

P	indirect impact	P	C.R	direct impact	Path
0.002	0.505	0.000	5.76	0.417	Total Quality Management <-- SCM
-	-	0.002	9.496	0.616	
-	-	0.001	10.347	0.819	SCM <-- Performance of ESCs

The table shows that the direct effect of TQMPP on supply chains is (0.417) and the value of (C.R) is (5.76), which is higher than the tabular value (1.95) at the significance level (0.000); and the indirect effect is (0.505), which is a statistically significant value at Level (0.05), where the significance value is (0.002), which emphasizes the impact of the TQMPP on the management of supply chains. The direct effect of SCM on the performance of ESCs is (0.616), and the value of (C.R) is (9.496), which is higher than the tabular value (1.95) at the significance level (0.000). The indirect effect was canceled, which confirms the impact of chain management on the performance of electronic supply chains.

The direct impact of TQMPP in managing supply chains with the performance of ESCs as a mediator is (0.819), and the value of (C.R) is (10.347), which is higher than the tabular value (1.95) at the significance level (0.000). Accordingly, we reject the null hypothesis and accept the alternative hypothesis, as there is no statistically significant effect at the level of significance ≥α (0.05) for TQMPP dimensions (commitment of top-level management, focus on customers, continuous improvement, employee participation) on the performance of supply chains dimensions combined with the presence of ESCs and a mediator in the industrial companies listed in ASE.

Conclusions and recommendations

First: Conclusions related to the level of application of TQMPP in the industrial companies listed in ASE: The results of the study indicated that the level of application of TQMPP in the industrial companies listed in ASE showed a high degree, and all dimensions were at a high level. This can be explained due to companies nature which always seek to adopt the development approach through the participation of employees, as they are the main engine of the company's management and are fully aware of the course of matters that will increase the application of TQMPP. Besides, focusing on serving customers contributes to increasing customers desire for using the company and relying on it to meet their requirements. The commitment of top-level management to provide all means and procedures that would contribute to increasing the application of TQMPP had an impact on the constant attempts of employees and customers to depend on the company to meet their needs. This agreed with the results of the study of Abdel-Halil and Alawi (2023); and the study of Al-Mishari, Al-Qadan; and Al-Ghasham (2022); and the study of (Al Sharaya & Bazadough, 2022); and the study of (Erkan & Unal, 2022), which all showed that the application of TQMPP had a significant impact and that the practice of quality was high.

Second: The conclusions related to the level of performance of the supply chains in the industrial companies listed in ASE showed that the level of performance of the supply chains came at a high level, and all dimensions came at a high level of performance. This might be because of the policy followed by the company is flexible in the performance of supply chains, as it leaves space in considering some procedures that would avoid some obstacles when they do not affect supply chains of the company.

The speed of response and seizing opportunities would increase the level of profitability and prestige, and would increase the rate of competition in the performance of supply chains which had an effective impact. The results also indicated that sharing information would work to exploit

some opportunities and avoid the certain steps that might have a negative impact on the life of the organization. Therefore, avoiding some challenges and obstacles through sharing information had a significant impact. The process of integration between all departments and units in the organization contributed to increasing the performance of supply chains in terms of speed in meeting demands and exploiting opportunities for the benefit of the organization. It is consistent with the results of Al-Khadidi's study (2022); the study of Al-Shawabkeh et al; (2022), the study of Zhu & Wu, 2022, and the study of Prabusankar (2018), which all showed that the practice of SCM improves the quality of products.

Third: The conclusions related to the level of ESCs in industrial companies in ASE showed that the level of ESCs in these companies came at a high level. This shows that industrial companies are constantly working to employ all procedures in a way that contributes to the speed of response and meeting requests, which helps to increase the rate of competition; the level of quality in the delivery process and cost; and the level of performance of supply chains when materials that contribute to providing appropriate reserve to run the industrial wheel are needed.

ESCs have contributed positively to the progress of many companies by saving effort, money, and time, in addition to their ability to maintain a sufficient amount of organized supply operations for companies. It is consistent with the results of the Al-Hassan study (2022) which showed significance for the dimensions of ESC flexibility in operational performance. A study conducted by Sugara & Azis (2020) showed that the application of ESCM in the retail industry had an impact on the speed of the exchange process between customers. Besides, (Giménez & Lourenco study, (2006), also showed the speed of supply operations and the process of saving time.

Conclusions related to testing the study hypotheses:

Results related to testing the first main hypothesis: The results of the statistical analysis show that there is a statistically significant effect of TQMPP dimensions on the performance of supply chains. This result indicates that companies seek greatly and constantly to apply the best means that will provide the company with lasting relationships and parallel continuous updating of everything that aims to raise level of quality. This result agreed with Al-Khudaidi's study (2022) which showed that there is a relationship between smooth management Supply and enhancing the quality of services provided. A study conducted by Prabusankar (2018) showed that practicing SCM improves the quality of products.

Results related to testing the second main hypothesis: The results of the statistical analysis showed that there is a statistically significant effect of TQMPP dimensions on ESCs. This confirms that achieving comprehensive quality is an integrated process, whether by meeting customer requirements or by employee participation, and that the electronic supply process would give many positive aspects to the company in the speed of exchange and response in export and import process. This result agreed with the findings of Faraj's study (2020), which showed that there was a relationship between ESCs and increased profitability efficiency, and a relationship between ESCs and increased profitability. A study conducted by (Sugara & Azis, 2020) showed that the application of ESCM had an impact on the speed of the exchange process between customers.

(Giménez & Lourenco study, (2006), showed that there was speed in supply operations, and increase in the rate of production operations and saving time.

Results related to testing the third main hypothesis: The results of the study indicated that there is a statistically significant effect of ESCs on the performance of combined supply chains. This result indicates that the contribution to employing ESCs in companies, especially with technical development, contributes significantly to increasing the rate of supply chain performance and speed of response. This result was consistent with the study of Al-Hesban (2022), which showed that there was significant effort for the dimensions of ESC flexibility in the operational performance of chemical industry companies. Besides, The study of Faraj (2020) and that of (Giménez & Lourenco, (2006) showed speed of supply operations, and increase in the rate of production operations, and saving time.

Results related to testing the fourth main hypothesis: The results of the study indicated that there was a statistically significant impact of the TQMPP on the management of ESCs in the presence of the performance of ESCs. These results indicate that technological processes have a clear impact on TQMPP and the flexibility of SCM through using modern technologies to communicate, obtain information and products, and reduce financial and time costs. This result agreed with the study of Manasriya and Saadi (2020) which concluded that SCM is of great importance in improving the performance of the enterprise in particular. A study of (Zhu & Wu, 2022) showed that supply chain flexibility for supply chain sustainability, economic sustainability, social sustainability, and environmental sustainability has a positive impact. A study by Prabusankar (2018) showed that the practice of SCM improves the quality of products.

Recommendations:

Based on the findings of the study, the study recommends the following:

1. Increasing institutional development by employing comprehensive quality elements extensively in all units and departments in industrial companies
2. Employing technical aspects that would be of great complement to companies' performance in terms of speed of response and interaction with other companies, which will increase the level of competition.
3. Developing the performance of supply chain departments by providing expertise and competencies that will analyze the market and create materials that help the company to have a safe reserve.
4. Activating ESCs in companies on a larger scale and circulating them to other companies, which save a lot of time, effort and money.

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