

## The Effect of Total Quality Management in Improving Supply Chain Performance

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### Abstract

**Purpose** – Supply chain performance has received a lot of attention in all companies as contemporary business organizations seek to find various methods to achieve competitive advantage and thus maximize profit for the group of investors and other shareholders. This research aims to identify the role of total quality management practices in improving supply chain performance in 11 manufacturing firms in Burg El-Arab city at Alexandria.

**Design/methodology/approach** – For the purposes of the study, the 4 dimensions of quality principles (strategic quality planning, supplier relations management, customer focus and management commitment) were used to check their impact on supply chain performance from the perspectives of 36 managers from the studied firms. The multiple regression analysis is used to test the research hypotheses.

**Findings** –The results showed that the supply chain performance is influenced by the strategic quality planning (Sig= 0.014), the supplier relations management (Sig= 0.005), the customer focus (Sig= 0.017) and the management commitment (Sig= 0.004). Thus, all 4 hypotheses of the research were accepted.

**Research limitations/implications** – The findings were related to only 11 manufacturing firms in Burg El-Arab city at Alexandria and belongs the

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impact of only 4 dimensions of quality principles on supply chain performance.

**Originality/value** – There is a noticeable shortage in researchers that focus on the impact of TQM on the performance of supply chain in manufacturing firms in Egypt. The assessment of quality practices isn't easy because of their intangible nature. This research offering useful findings those help in supporting supply chain performance in manufacturing firms.

**Keywords** TQM, Supply Chain Performance, TQM Dimensions.

**Paper type** Research paper

## 1. Introduction

Supply chain performance has received a lot of attention in all companies as contemporary business organizations seek to find various methods to achieve competitive advantage and thus maximize profit for the group of investors and other shareholders (Otto and Kotzab, 2003; Asamoah *et al.*, 2022). The performance of the supply chain includes all chain activities that extend to meet the needs and desires of customers in order to achieve their interests, which are the availability and provision of the product, its delivery, product features and characteristics, the various uses of the product and the delivery of the product on time (Christopher, 2016). This means that the performance of the supply chain is related to the organization's ability to create a competitive advantage by reducing per unit costs, reducing waste and saving time, in addition to ensuring a flexible response to other emerging requirements (Harrison and Van Hoek, 2008).

Supply chain management has evolved to become a cornerstone of overall organizational success in contemporary business organizations as it is the ideal means by which an organization manages the flow of products from suppliers to consumers (Christopher, 2016). The supply chain in a company includes all the processes that lead to enhancing the flow of the product through the supply chain to the end consumer. These operations need to activate monitoring in order to control them accurately to ensure the support of the company's competitive advantage (Hausman, 2004).

The primary focus of supply chain management is on the relationship between material costs and their quality as well as efficient delivery which are the three pillars that can be accomplished with increased effectiveness if the quality of the various supply chain related processes is ensured (Hugos, 2011). Supply Chain Management focuses on meeting the needs of various organizational stakeholders which can only be achieved through effective and continuous collaboration between supply chain management team and total quality management team in the organization around the flow of materials within it (Otto and Kotzab, 2003).

The integration of both quality control and quality assurance into the supply chain as a major focus in contemporary business organizations is not new, as organizations have sought since the last decade of the last century to adopt total quality management as an effective tool to support the performance of the supply chain in companies to ensure their superiority (Forker *et al.*, 1997; Chang, 2009).

This study tries to identify the role of total quality management practices in improving supply chain performance in companies by identifying the impact of the total quality strategic planning, supplier relationship management, customer focus and management commitment on supply chain performance in the companies under study

## 2. Research Problem

Stadtler (2005) and Njoroge (2014) indicated that there is an urgent and continuous need to improve the quality of supply chain performance in various sectors in order to achieve quality management of costs and assets and increase the degree of reliability. Garetti and Taisch (2012) believed that the poor performance of the supply chain in contemporary business organizations represents more than half of the challenges facing these organizations at the local and global levels, which reduces the chances of excelling in the performance of them.

By analyzing the performance of the supply chain in a number of companies, Katua (2014) concluded that there is a severe shortcoming in the ability of supply chains to meet the needs of contemporary consumers, which is the same thing that Oketch *et al.* (2014) confirmed when they evaluated the performance of the supply chain in a number of pharmaceutical manufacturers. Talavera (2010) believes that the deterioration in the performance of supply chains is due to the presence of weak internal systems that deserve review and treatment. Therefore, the role of total quality management in improving supply chain performance was emphasized as one of the main practices that contribute to improving chain performance on the

one hand and improving the quality of the entire organizational system on other hand.

The adoption of total quality management reduces costs, enhances focus on customers and achieves their satisfaction as well as improving processes to become more innovative and reliable, which means that the returns on investment in the quality of the supply chain far outweigh the costs (Cai *et al.*, 2009).

Generally, there is a noticeable shortage in researchers that focus on the impact of TQM on the performance of supply chain in manufacturing firms in Egypt. The assessment of quality practices isn't easy because of their intangible nature. Therefore, this research offering useful findings those help in supporting supply chain performance in manufacturing firms. Hence, the value of the current study stands out. According to the previous, the research problem can be illustrated by the following research questions:

- What is the impact of the total quality strategic planning on the performance of the supply chain?
- Is there any impact of supplier relationship management on the performance of the supply chain?
- What is the impact of customer focus on the supply chain performance?
- What about the impact of management commitment on supply chain performance?

### **3. Research Objectives**

The research aims to identify the role of total quality management practices in improving supply chain performance in companies. To achieve such objective, the research aims to accomplish the followings:

- Knowing the impact of the total quality strategic planning on the performance of the supply chain in the companies under study.

- Evaluating the impact of supplier relationship management on the performance of the supply chain in the companies under study.
- Assessing the impact of customer focus on the supply chain performance of the companies under study.
- Determine the impact of management commitment on supply chain performance in the companies under study.

#### 4. Literature Review

##### 4.1. Supply Chain Performance

Improving supply chain performance entails meeting the needs of the end customer effectively and efficiently by making the product available, responding quickly to customer requirements, providing the required diversity, utilizing production capacity and delivering the required products on time (Gunasekaran *et al.*, 2004). Measuring supply chain performance requires a comprehensive assessment of the overall operating level of the company's units, measuring the performance of each of those units and determining the position of each of those units within the supply chain (Hervani *et al.*, 2005; Abdirad and Krishnan, 2022).

Gunasekaran *et al.* (2004) has developed an effective approach to measuring supply chain performance that includes a broad range of metrics at all strategic, tactical and operational levels. Strategic level metrics focus on the extent to which an organization's management adheres to organizational supply chain management objectives, elicits the support of senior management and informs the broad base of employees of decisions about adopting or amending policies. Tactical level metrics are concerned with everything related to resource allocation and performance appraisal according to predetermined objectives and pre-established criteria. As for operational metrics, they relate to everything that related to the organization's day-to-day activities (Wagner and Bode, 2008).

The supply chain performance objectives must be linked to the planning and execution processes. The steps to achieve the supply chain performance objectives must be incorporated into the daily work routine (Cai *et al.*, 2009).

To this end, supply chain planning, supplier selection and supplier integration are indicators to ensure reliability, responsiveness and flexibility in the supply chain and the effectiveness of the chain asset and cost management system (Cagnazzo *et al.*, 2010).

#### *4.2. Practices of the Total Quality Management*

Total quality management aims as an approach to enhance the quality and organizational performance of the company by providing products that are consistent with the needs and desires of customers (Goetsch and Davis, 2014; Turan and Bozaykut-Bük, 2016). In order to achieve the objectives of TQM, the various functions and processes related to quality must be integrated (Chen *et al.*, 2022). TQM focuses on both the management of quality standards and guidelines including design, development, improvement, assurance, monitoring and maintenance of all quality applications (Dale, 2015, Toni *et al.*, 2021).

TQM aims to do the right things right from the first time and every time (José, 2005; Ahmed *et al.*, 2018). By applying the principles of total quality management, the organization is able to save the time needed to correct errors, modify defective products and improve the services provided (Khalaf and Salem, 2018). The organization may resort to setting its own quality standards based on a set of internationally recognized standards such as those of the International Organization for Standardization (Vanagas and Žirgutenė, 2015; Alauddin and Yamada, 2022).

The core principles of TQM can be summarized as top management support, training, customer focus, decision-making, methodology and tools, supplier relationship management, strategic planning, continuous improvement, company culture, employee engagement, continuous communication and feedback measurement (Hashmi, 2007; Shankhdhar *et al.*, 2022). Top management support plays a crucial role in achieving TQM objectives by providing a work environment that ensures the success of quality implementation (Ababneh, 2021). The workforce needs regular training on

quality methods and concepts to improve productivity and performance (Kelly, 2013; Roh et al., 2022). Communication and feedback represent the aspect responsible for measuring the extent to which stakeholders appreciate the company's quality efforts, and thus provide incentives to contribute to achieving quality objectives. Supplier relationship management is fundamental to the effective selection and integration of suppliers (Dahlgaard *et al.*, 2008). Strategic planning must be relied upon at all stages of the supply chain. Strategic supply chain planning practices include all processes of demand management, distribution and warehousing. Customer focus should be associated with various measures of product and service quality improvement in order to increase customer satisfaction (Mohideen and Vijayavel, 2014).

The decision-making process in the company must be objective and based on a set of measurements and evidence in order to reduce failures and errors to the minimum (Crainer and Dearlove, 2004). Companies must also rely on the appropriate methodology and tools to monitor cases of non-conformities and take immediate corrective actions to achieve standardization and consistency of quality (Yong and Wilkinson, 2001). By striving to achieve continuous improvement goals, the organization is able to improve manufacturing quality (Evans and Dean, 2003). There is no doubt that spreading the culture of quality in the company will lead to the development of employees' capabilities to improve quality (Farooq *et al.*, 2007). It is also necessary that all employees at all organizational levels be involved in the implementation of quality activities and their applications (José, 2005).

#### *4.3. Supply Chain Performance and Strategic Quality Planning*

According to the study conducted by Tan *et al.* (2014), which aimed to examine the relationship between total quality management practices and supply chain performance in a number of logistics companies in Malaysia, the results indicated the strength positive correlation of strategic quality planning with the performance of supply chain management. The results confirmed the need to adopt more variables related to total quality management, such as

management commitment and supplier relationship management. Kamau *et al.* (2015) evaluated the supply chain quality planning process and its relationship to the performance of water bottlers in Nairobi. The study focused on a number of key dimensions of strategic quality planning in the supply chain which are: demand management, distribution management, warehouse planning and strategic sourcing. The results showed that strategic planning for supply chain quality has a strong positive impact on supply chain performance.

According to more recent studies, Hamalia *et al.*, (2020), Kumar *et al.*, (2020), Saragih *et al.*, (2020), Shahzad *et al.*, (2020), Fu *et al.*, (2022). Nguyena *et al.*, (2022) and Wachira *et al.*, (2022) found a significant impact of the strategic quality planning on the performance of supply chain. In line with that, the first hypothesis of the research was formulated as follows:

**H<sub>1</sub>: Strategic quality planning impacts supply chain performance.**

#### *4.4. Supply Chain Performance and Supplier Relations Management*

Talib *et al.* (2011) studied the relationship of total quality management to supply chain performance. The results showed that supplier relationship management has a strong positive impact on supply chain performance. In the same context, Kithaka (2015) studied the effect of the quality of supplier relationships on the performance of supermarkets in Kakamega, Kenya. The results indicated the impact of the various dimensions of supplier relationship management under study on the performance of the supply chain, where the study found a strong positive impact of each of the supplier audits, supplier development and supplier performance on the quality of the supply chain. In the study conducted by Rajab (2015), a link was made between TQM and the supply chain performance of large manufacturing firms in Africa was done. Partnership with suppliers has been identified as one of the most prominent aspects of supplier relationship management and one of the most important total quality management systems applied in those companies. The results

showed that partnering with suppliers has a strong positive impact on supply chain performance.

The investigation of the recent researches results revealed that Chileshe and Phiri (2022), Hamid *et al.*, (2022), Herath and Endagamage (2022), Qazi *et al.*, (2022), Ungureanu (2022), Xu and Zhao (2022) and Zhang *et al.*, (2022) found a significant impact of the supplier relations management on the effectiveness of the supply chain performance. According to that, the second hypothesis of the research was formulated as follows:

**H<sub>2</sub>: Supplier relations management impacts supply chain performance.**

#### 4.5. Supply Chain Performance and Customer Focus

All quality practices and activities should focus on customer satisfaction (Sampaio *et al.*, 2022). Talib *et al.* (2011) found a strong positive influence relationship between customer focus as one of the most prominent principles of total quality management and supply chain performance. In the study by Tan *et al.* (2014) on TQM and supply chain management practices, findings revealed that customer focus positively affected supply chain performance. The results of the study conducted by Masindet and Ogollah (2014) also indicated that customer focus and orientation positively contributed to improving supply chain performance. The results of the study conducted by Sik and Hong (2017) also confirmed that the performance of the supply chain was strongly influenced by customer focus and orientation.

Depending on what had been found by Yu *et al.*, (2019), Chandak *et al.*, (2021), Alshibawi and Halleem (2022), Gonzalez *et al.*, (2022), Jafari *et al.*, (2022), Maaz and Ahmad (2022) and Zhang *et al.*, (2022), there is a significant impact of the customer focus and orientation on the performance of the supply chain. Therefore, the third hypothesis of the research was formulated as follows:

**H<sub>3</sub>: Customer focus impacts supply chain performance.**

#### *4.6. Supply Chain Performance and Management Commitment*

Khalfan *et al.* (2022) confirmed the relationship between the management commitment and the overall organizational Quality. Talib *et al.* (2011) found a strong positive influence relationship between management's commitment to TQM principles and supply chain performance. In the study conducted by Vanichchinchai and Igel (2011) on auto manufacturers that targeted two major auto suppliers in Thailand, the results indicated that the commitment of the top management of the two companies under study to TQM practices had a strong positive impact on supply chain performance. Masindet and Ogullah (2014) also examined the relationship of TQM to supply chain performance. The study concluded that management commitment positively enhanced supply chain performance. In the study carried out by Kitheka (2015), referred to above, the results indicated that the commitment of companies to total quality management has strong positive effects on improving the overall performance of the supply chain. The results of the study conducted by Rajab (2015) also indicated that management's commitment to the principles of total quality management positively affects the performance of supply chains. Fouad *et al.* (2015) focused on the relationship of TQM to supply chain performance in an oil pipeline company in Baghdad. The study proved that total quality management affected the performance of the supply chain, which positively affected the overall performance of the company.

In line with findings of Hashemi *et al.*, (2022), Leksono *et al.*, (2022), Qureshi (2022), Som and Anyigba (2022), Uddin (2022), Uddin and Akhter (2022), Zhang *et al.*, (2022) and Lyu *et al.*, (2023), there are a significant influence of management commitment on the supply chain performance. According to this significant relationship, the final hypothesis of the research was formulated as follows:

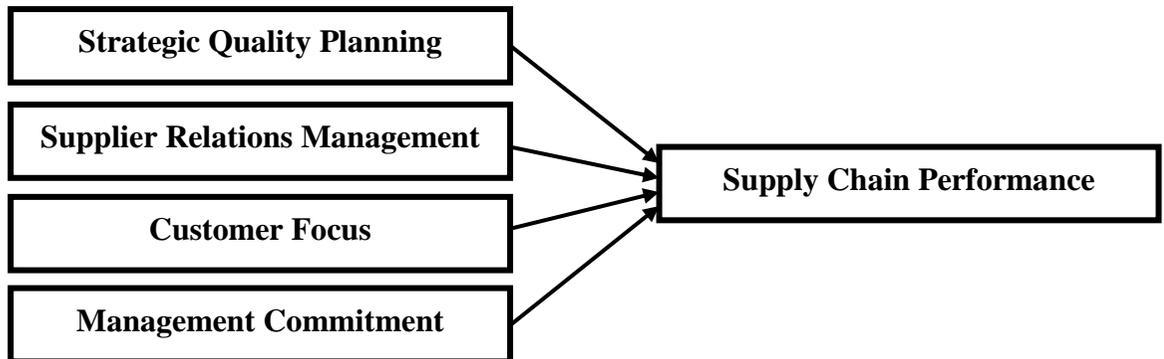
**H4: Management commitment impacts supply chain performance.**

### 5. Research Variables

Depending on research hypotheses, the variables of the research can be classified into:

- Independent variables: Strategic quality planning, supplier relations management, customer focus and management commitment.
- Dependent variables: Supply chain performance.

According to the relation between these 2 types of variables, the research conceptual framework can be illustrated by figure (1).



**Figure 1. The Research Conceptual Framework**

### 6. Research Methodology

For the purposes of the study, the 4 dimensions of quality principles (strategic quality planning, supplier relations management, customer focus and management commitment) were used. The research depends on such 4 dimensions because most previous studies referred that these 4 dimensions are the most dimensions that are closed to supply chain performance (Kumar et al., 2020; Alshibawi and Halleem, 2022; Gonzalez et al., 2022; Herath and Endagamage, 2022; Nguyena et al., 2022; Qazi et al., 2022; Qureshi, 2022; Som and Anyigba, 2022; Uddin, 2022; Uddin and Akhter, 2022; Lyu et al., 2023). To collect the research data, a Likert scale questionnaire was designed and distributed to the research sample. By calculating Cronbach's Alpha, the

results showed that the scale is valid (0.872) and reliable (0.933). While 59 questionnaires were distributed to a sample of managers from 11 manufacturing firms in Burg El-Arab city at Alexandria, only 42 questionnaires were returned within 2 months (August and September, 2022). By checking the returned questionnaires, 6 questionnaires were excluded from the sample because of incomplete data. Thus, the research sample consisted of only 36 questionnaires, which are valid for analysis (see Table I). Depending on version 18 of PASW statistics, the collected data was analyzed by using the statistical methods of descriptive statistics and the multiple linear regression to achieve the research objectives.

**Table I. The Research Sample**

Distributed Questionnaires	Returned Questionnaires	Excluded Questionnaires	Valid Questionnaires (The Sample)
59	42	6	36
100%	71.18%	10.16%	61.01%

## 7. Results and Discussion

### 7.1. Supply Chain Performance

Table II provides descriptive statistics related to supply chain performance among 11 manufacturing firms under the study. The costs of the supply chain consist of 2 parts. Part one is related to the costs of the supply chain management processes, which are at approximately between 4% and 5%. The Part two is belongs the cost of sold goods that ranged between 45% and 63% and averaged at 58%. The average cycle time of the cash-to-cash for the studied firms is 2 weeks. The averages return on fixed assets and working capital related to the supply chain in such firms is between 6% and 3%. To measure the flexibility and responsiveness of the supply chain, the study asked about both the cycle time of order fulfillment and flexibility of the upside supply chain. The average cycle time of order fulfillment is more than 2 weeks (16 days). That means the firms under the study are effectively control the time needed for sourcing, production and delivery. The flexibility

of the upside supply chain is used to express its responsiveness. It was of 21 days as an average. It means that the firm needs 3 weeks to fulfill any unscheduled increase in demand without incurring any additional expenses or incurring any penalties related to the delay.

**Table II. Supply Chain Performance.**

Dimensions of Supply Chain Performance	Items	Min	Max	Mean	Std. Deviation
Costs of the Supply Chain	Cost of the Supply Chain Management	3.73	5.32	4.7684	0.61974
	Cost of the sold Goods	45	63	53.7684	6.91976
Reliability of the Supply Chain	Cycle Time of the Cash-to-Cash	11.51	19.08	14.0001	2.80177
	Return on Fixed Assets related to Supply Chain	5.34	8.01	6.2506	0.90015
	Return on Supply Chain Working Capital	4.00	5.08	3.3527	0.25745
Flexibility and Responsiveness of the Supply Chain	Cycle Time of Fulfilling Order	12.7	18.8	16.7684	2.26546
	Flexibility of the Upside Supply Chain	19.4	28.3	21.0001	1.68219

### 7.2. Strategic Quality Planning

Table III describes the strategic quality planning in the 11 manufacturing firms under the study from study sample perspective. The majority of respondents agreed that their companies are keen to participate in strategic sourcing for the purpose of ensuring timely delivery of high quality products (mean= 3.8056). They indicated that their companies have effective demand management systems (mean= 4.0278), effective system for managing the distribution process (mean= 3.9444) and effective warehouse planning systems to ensure the quality of product storage operations (mean= 4.1111). The average of means of all despondences related to all sentences belong the assessment of the strategic quality planning in studied companies is 3.97222. Thus, the results indicated that there is a strong satisfaction among all respondents on the strategic quality planning in their companies.

**Table III. Strategic Quality Planning**

Sentences	Mean	Std. Deviation
The company is keen to participate in strategic sourcing for the purpose of ensuring timely delivery of high quality products.	3.8056	1.26083
The company has an effective demand management system.	4.0278	1.31987
The company has an effective system for managing the distribution process.	3.9444	1.43317
The company has an effective warehouse planning system to ensure the quality of product storage operations.	4.1111	1.30445
<b>Average</b>	<b>3.97222</b>	<b>1.32958</b>

### 7.3. Quality of the Supplier Relations Management Process

Table IV describes the quality of the supplier relations management process in the 11 manufacturing firms under the study. The majority of respondents agreed that their companies have appropriate structures that enable them to efficiently manage relationships with their suppliers (mean= 4.0000). They indicated that their companies usually cooperate with suppliers for the purpose of ensuring quality control (mean= 4.0000). They are also referred that their companies have supplier audit systems that meet the specified quality standards (mean= 4.0833). The respondents believed that their companies have clear policies and specific action plans regarding suppliers to ensure continuous quality improvement (mean= 4.1111). Thus, they engage suppliers in the formulation and implementation of quality control initiatives (mean= 3.6389). They also indicated that their companies have specific benchmarks to ensure that suppliers are selected competitively based on their ability to contribute to support the quality activities (mean= 4.0278). The average of means of all despondences related to all sentences belong the assessment of the quality of the supplier relations management process in studied companies is 3.97685. Thus, the results indicated that there is a strong satisfaction among all respondents on the quality of the supplier relations management process that applied in their companies.

**Table IV. Quality of the Supplier Relations Management Process**

Sentences	Mean	Std. Deviation
The company has appropriate structures that enable it to efficiently manage relationships with its suppliers.	4.0000	1.26491
The company usually cooperates with its suppliers for the purpose of ensuring quality control.	4.0000	1.26491
The company has a supplier audit system to meet the specified quality standards.	4.0833	1.20416
The company has a clear policy and a specific action plan regarding suppliers to ensure continuous quality improvement.	4.1111	1.40972
The company engages suppliers in the formulation and implementation of quality control initiatives.	3.6389	1.37639
The company has specific benchmarks to ensure that suppliers are selected competitively based on their ability to contribute to support the quality activities.	4.0278	1.36248
<b>Average</b>	<b>3.97685</b>	<b>1.31367</b>

#### 7.4. Customer Focus

Table V describes the customer focus in the 11 manufacturing firms under the study from study sample perspective. The majority of respondents agreed that their companies' quality management systems are based on an effective communication platform to ensure constant communication with and guidance of various (mean= 3.6389), therefore, the products are designed and produced according to a set of customer-oriented standards (mean= 3.6667). The companies under study are interested in studying the levels of customer satisfaction and loyalty (mean= 3.3333), provide a variety of products directed to customers in order to satisfy their diverse needs, desires and tastes (mean= 3.4167) and manage their relations with customers by studying their comments on a regular basis and dealing with their complaints promptly (mean= 3.5833). The average of means of all despondences related to all sentences belong the assessment of the customer focus in studied companies

is 3.52778. Thus, the results indicated that there is a strong satisfaction among all respondents on the customer focus in their companies.

**Table V. Customer Focus**

Sentences	Mean	Std. Deviation
The company's quality management system is based on an effective communication platform to ensure constant communication with and guidance of various stakeholders.	3.6389	1.31264
The company's products are designed and produced according to a set of customer-oriented standards.	3.6667	1.14642
The company is interested in studying the levels of customer satisfaction and loyalty.	3.3333	1.35225
The company seeks to provide a variety of products directed to customers in order to satisfy their diverse needs, desires and tastes.	3.4167	1.18019
The company is interested in managing its relations with customers by studying their comments on a regular basis and dealing with their complaints promptly.	3.5833	1.38099
<b>Average</b>	<b>3.52778</b>	<b>1.27449</b>

### 7.5. Management Commitment

Table VI describes the management commitment in the 11 manufacturing firms under the study from study sample perspective. The majority of respondents agreed that their companies' leaders have the ability to formulate and promote quality policies (mean= 3.5278) as the companies' managements are concerned with quality planning as one of the most important aspects of total quality management in order to improve the performance of the supply chain (mean= 2.9722), Thus, they work on a permanent and continuous evaluation of the guidelines and policies related to quality (mean= 3.4444), have a dedicated quality standards team responsible for monitoring the implementation and adherence to quality policies (mean= 3.5833) and allocate appropriate portions of companies' resources to support quality initiatives (mean= 3.7778). The average of means of all despondences related to all sentences belong the assessment of the management commitment in studied companies is 3.4611. Thus, the results indicated that there is a strong

satisfaction among all respondents on the management commitment in their companies.

**Table VI. Management Commitment**

Sentences	Mean	Std. Deviation
Company leaders have the ability to formulate and promote quality policies.	3.5278	1.34134
The company's management is concerned with quality planning as one of the most important aspects of total quality management in order to improve the performance of the supply chain.	2.9722	1.29804
The management works on a permanent and continuous evaluation of the guidelines and policies related to quality.	3.4444	1.31897
The company has a dedicated quality standards team responsible for monitoring the implementation and adherence to quality policies.	3.5833	1.15573
An appropriate portion of company resources is allocated to support quality initiatives.	3.7778	1.19788
<b>Average</b>	<b>3.4611</b>	<b>1.26239</b>

### 7.6. Taste of Research Hypotheses

To test the research hypotheses, the multiple linear regressions analysis was used as shown in Table VII where the value of  $F= 0.458$  at a significant level less than 0.05 ( $Sig= 0.011$ ), which means that the supply chain performance in the studied firms has been positively affected by the all 4 dimensions of quality under the study (strategic quality planning, the supplier relations management process, the customer focus and management commitment). It was also found that the value of  $R= 0.888$ , which reflects a high level of association. The multiple linear regressions analysis has revealed that the value of  $R^2= 0.788$ , which means that 78% of the total supply chain performance is attributed to the 4 dimensions of quality under the study.

According to the data shown in Table VII , the supply chain performance is influenced by the Strategic quality planning ( $Sig= 0.014$ ), the supplier

relations management (Sig= 0.005), customer focus (Sig= 0.017) and management commitment (Sig= 0.004). Thus, all 4 hypotheses of the research were accepted. These results are in agreement with the findings of Vanichchinchai and Igel (2011), Masindet and Ogollah (2014) and Fouad *et al.* (2015) who found that the dimensions of total quality management are positively influences the performance of the supply chain in manufacturing sector.

**Table VII. Test of the Research Hypotheses**

R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate	Durbin-Watson	
0.888a	0.788	0.765	2.20001	1.810	
ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	4.682	4	1.171	0.458	0.011a
Residual	286.527	32	8.954		
<b>Total</b>	291.201	36			
Coefficient					
Model	B	Std. Error	Beta	T	Sig.
<b>(Constant)</b>	9.043	0.500		18.09	0.003
Strategic Quality Planning	0.701	0.301	0.694	2.329	0.014
Supplier Relations Management	0.830	0.536	0.799	1.549	0.005
Customer Focus	0.567	0.107	0.498	5.299	0.017
Management Commitment	0.489	0.394	0.398	1.241	0.004

### **H<sub>1</sub>: Strategic quality planning impacts supply chain performance**

By checking the value of B, the coefficient for the strategic quality planning is 0.701. It means that any increase in strategic quality planning implementation by one unit would lead to an increase in supply chain performance by 70% unit. This impact is statistically significant (P-Value= 0.014). Therefore, the 1<sup>st</sup>

hypothesis of the research was accepted. This result is in agreement with the findings of Tan *et al.* (2014), Kamau *et al.* (2015), Baraza (2015), Hamalia *et al.*, (2020), Kumar *et al.*, (2020), Saragih *et al.*, (2020), Shahzad *et al.*, (2020), Fu *et al.*, (2022). Nguyena *et al.*, (2022) and Wachira *et al.*, (2022) who found that strategic quality planning influences the performance of the supply chain in manufacturing sector.

### **H<sub>2</sub>: Supplier relations management impacts supply chain performance.**

As the coefficient for the supplier relations management 0.830, any increase in supplier relations management by one unit would lead to an increase in supply chain performance by 83% unit. This impact is statistically significant (P-Value= 0.005). Therefore, the 2<sup>nd</sup> hypothesis of the research was accepted. This result is in agreement with the findings of Talib *et al.* (2011), Kitheka (2015), Rajab (2015), Chileshe and Phiri (2022), Hamid *et al.*, (2022), Herath and Endagamage (2022), Qazi *et al.*, (2022), Ungureanu (2022), Xu and Zhao (2022), Zhang *et al.*, (2022) who found that supplier relations management influences the performance of the supply chain in manufacturing sector.

### **H<sub>3</sub>: Customer focus impacts supply chain performance.**

By checking the coefficient for the customer focus, the value of B is 0.567. It means that any increase in customer focus by one unit would lead to an increase in supply chain performance by 56% unit. This impact is statistically significant (P-Value= 0.017). Therefore, the 3<sup>rd</sup> hypothesis of the research was accepted. This result is in agreement with the findings of Vanichchinchai and Igel (2011), Masindet and Ogullah (2014), Kitheka (2015), Rajab (2015) Fouad *et al.* (2015), Yu *et al.*, (2019), Chandak *et al.*, (2021), Alshibawi and Halleem (2022), Gonzalez *et al.*, (2022), Jafari *et al.*, (2022), Maaz and Ahmad (2022) and Zhang *et al.*, (2022) who confirmed that customer focus influences the performance of the supply chain in manufacturing sector.

#### **H4: Management commitment impacts supply chain performance.**

According to the coefficient for the management commitment, the value of B is 0.489. It means that any increase in management commitment by one unit would lead to an increase in supply chain performance by 48% unit. This impact is statistically significant (P-Value= 0.004). Therefore, the 4<sup>th</sup> hypothesis of the research was accepted. This result is in agreement with the findings of Vanichchinchai and Igel (2011), Masindet and Ogullah (2014), Rajab (2015), Fouad *et al.* (2015), Hashemi *et al.*, (2022), Leksono *et al.*, (2022), Qureshi (2022), Som and Anyigba (2022), Uddin (2022), Uddin and Akhter (2022), Zhang *et al.*, (2022) Lyu *et al.*, (2023) who indicated that management commitment influences the performance of the supply chain in manufacturing sector.

#### **Conclusion and Recommendations**

This research tries to identify the role of total quality management practices in improving supply chain performance in companies by identifying the impact of the total quality strategic planning, supplier relationship management, customer focus and management commitment on supply chain performance in the companies under study. The results approved that the supply chain performance is influenced by all 4 dimensions under the study. Thus, all 4 hypotheses of the research were accepted. According to the research findings, some recommendations could be introduced as follows:

- As the results indicated the role of TQM practices in improving supply chain performance, there is a need for more activation of TQM activates in all sectors to support the performance of the supply chains.
- The workforce needs a regular training on quality methods and concepts to improve productivity and performance.
- There is a need to enhance communication and feedback processes with all stakeholders to support the company's quality efforts.
- More incentives should be offered to push employees to contribute in achieving quality objectives in companies under study.

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- As the research focused only on 4 dimensions of TQM (strategic planning, supplier relationship management, customer focus and management commitment), more research efforts are needed to focus on other TQM dimensions which are training, decision-making, methodology and tools, continuous improvement, company culture, employee engagement, continuous communication and feedback measurement.
  - The research aims to identify the role of total quality management practices in improving supply chain performance in manufacturing companies. Therefore, it is recommended to reapply the research in other sectors.

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