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Role of Total Quality Management on Improving Supply Chain practices

Nile Paints Company

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المستخلص:

هدفت الدراسة إلى الكشف عن أثر تطبيق مبادئ الجودة الشاملة على ممارسات سلسلة التوريد في شركة النيل للدهانات، ولتحقيق أهداف الدراسة استخدم الباحثون المنهج الوصفي. ولجمع المعلومات الأولية منعينة الدراسة تم تصميم استبانة تحتوي على 24 فقرة تم توزيعها عشوائيا على 30 مشارك، حيث تم استخدام مجموعة من الأساليب الإحصائية للتحليل مثل مربع كاي ، النسبة المئوية والرسوم البيانية. اثبتت الدراسة ان هنالك التزام من قيادة شركة النيل للدهانات بتطبيق مبادئ الجودة الشاملة، وانه توجد علاقة ارتباطية إيجابية بين تطبيق مبادئ الجودة الشاملة وممارسات سلسلة التوريد. واوصت الدراسة مستقبلا بإجراء دراسات حول اثر إدارة الجودة الشاملة في إدارة سلسلة التوريد من حيث التنسيق داخليا وخارجيا واعتماد نهج المقارنة في القطاع الصناعي.

الكلمات المفتاحية: إدارة الجودة الشاملة ؛ الموردین؛ تحسين

ABSTRACT:

The purpose of this study was to investigate the role of applying total quality management (TQM) principles on improving supply chain practices in Nile Paints Company. To achieve the objectives of the study, a descriptive approach was employed using a questionnaire consisted of (24) items. Data were collected from 30 participant using random sampling technique, and the hypotheses were tested using the Statistical Packages for Social Sciences (SPSS) program, where a set of statistical methods was used for analysis such as chi square, percentage, graphs. The results of this study showed that the leaders of Nile Paints Company are committed to apply the principles of total quality management. In addition, the results revealed that there is a positive and significant relationship between total quality management principles and supply chain practices. A further study should focus on investigating TQM in supply chain management in terms of internal and external coordination and the adoption of comparative approaches in the industrial sector.

Keywords: Total Quality Management; Supply Chain; Improvement.

Introduction:

Total Quality Management (TQM) is a management philosophy that seeks to integrate all organizational functions (marketing, finance, design, engineering, and production, customer service, etc.) to focus on meeting customer needs and organizational objectives. TQM views an organization as a collection of processes. The simple objective of TQM is "Do the right things, right the first time, every time." TQM is infinitely variable and adaptable. Although originally applied to manufacturing

operations, and for a number of years only used in that area, TQM is now becoming recognized as a generic management tool, it is as applicable in service and public sector organizations. Simchi-Levi et al, (2003) define the term Supply chain management as “a set of approaches utilized to integrate suppliers, manufacturers, warehouses, and stores so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements”. This definition leads to several observations. First, supply chain management takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centers to retailers and stores. Indeed, in some supply chain analysis, it is necessary to account for the suppliers’ suppliers and the customers’ customers because they have an impact on supply chain performance. Second, the objective of supply chain management is to be efficient and cost-effective across the entire system; total system wide costs, from transportation and distribution to inventories of raw materials, work in process, and finished goods Simchi-Levi et al, (2003)

Problem Statements and Study Questions

In light of recent development in the business management practices, it is becoming extremely difficult to ignore the existence of Quality concepts. Many companies, institutions and organizations are moving towards the implementation of Total Quality Management principles in supply chain management because it plays a major role in improving its performance, making it efficient and cost effective across the entire system; from transportation and distribution to inventories of raw materials, work in process, finished products and differentiating the organization from its competitors. However, supply chain management is troubled with challenges particularly in today’s business environment. Organizations are under increasing pressure of global manufacturing, shorter product life cycles, changing market demands, and consolidation of supplier base to create consistently high-quality products and to ensure that they meet local and international regulatory standards in manufacturing, packaging, handling, and shipping of their products. These challenges result in higher costs, wasted materials, production errors, longer lead-time, more inventory and poor throughput. This paper attempt to address challenges faced supply chain practices and its relation with total quality management principles. Based on the stated problem, the study tried to answer the following research questions:

What is the effect of total quality management principles on supply chain practices?

- a. What are the demographic variables of individuals that affect the implementation of total quality management on the Supply Chain?
- b. What is the role of leadership commitment on the implementation of the Supply Chain practices?
- c. What are areas that need to be considered to improve Supply Chain practices?

These influence the researchers to endeavor to examine effect of Total Quality Management Principles (Customer focus, Leadership, Involvement of people, Process management, System management, continual improvements, Factual approaches to decision making and mutually beneficial supplier relationships) Implementation on Supply Chain practices.

Objectives of the Study

The objectives of this study:

- a. To investigate the effect of total quality management implementation on supply chain practices.

- b.To determine the demographic variables of individuals that affect the implementation of Total Quality Management on the Supply Chain practices.
- c.To identify the role of leadership commitment on the implementation of the Supply Chain practices.
- d.To propose area(s) that need to be considered to improve Supply Chain practices.

Hypotheses of the Study:

This study set to examine the four following alternative hypotheses.

H1: There is statistical significant effect of total quality management principles on supply chain practices.

H2: leadership commitment positively and significantly influences the effectiveness of Supply Chain practices.

H3: The demographic variables of individuals have significant effect on the implementation of total quality management on the supply chain.

Importance of the Study:

Central to the entire discipline of Supply chain management is the concept of Total Quality Management and its effect on the coordination of production, inventory, transportation and delivery in the supply chain to achieve the best mix of responsiveness and efficiency for the market being served. It is important to integrate supply chain practices into the procurement process strengthening the relationship between supply chain management practices and planning of various types of purchases and stages and to clarify the relationship between TQM and supply chain management specifically in the paint industry. On the other hand, highlighting the criteria used to evaluate the performance of suppliers resulting from the implementation of the principles of TQM in the supply chain management, which equip the executive with the right tools achieve the organization objectives. Finally, the results of the study should make a significant contribution to the field of Supply chain management and proposing areas for future researches Croxton et al, (2001).

Literature review and Previous Studies:

Previous Studies:

Beheshti (2010) identified a Decision Support System for Improving Performance of Inventory Management in a Supply Chain Network. The study aimed to integrate all internal and external business activities of their supply chain within an integrated system to maximize the performance of total systems while reducing costs within the integrated supply chain system. The study applied the model to a single plant with a number of retailers and distributors. The study also aimed to build an integrated supply chain system based on enterprise resource planning which is key to functional integration consisting of three basic stages in the supply chain: procurement, conversion (production), distribution within the integrated supply chain management system. The study demonstrate the usefulness of the decision support model in analyzing and developing the environment of cooperation among supply chain members in order to reduce the cost of inventory in addition to the cost of goods sold. The proposed model illustrates the shortcomings of individual improvement in the integrated supply chain system as well as the advantages of cooperation among the supply chain members in finding the minimum cost. The decision support model allows decision makers throughout the supply chain to employ a range of analyze to provide different scenarios for reducing the cost of products to the customer.

Awad (2006) Proposed Framework for the Supply Chain Decision Support System, Application to the Food Industry. The study aimed at developing a framework for supply chain support system in the oil and cheese companies in Egypt. The study was based on

a survey of (11) companies for (101) managers within these companies to determine the availability of the components of the supply chain decision support system and the importance of the existence of this system and its activation among the members of the supply chain. The study found that there are significant benefits to the components of the supply chain support system. The study suggested five types of supply chain support systems; Business Process Guidelines, Communication-oriented decision support systems, Data-driven decision support systems, Model-oriented decision support systems and Knowledge-oriented decision support systems within the supply chain.

Chuang (2004) evaluated Supplier selection and order allocation in supply chain management. The aim of the study was to find new ways and means of selecting suppliers within the supply chain. The study focused on the mechanisms of selecting suppliers for the purpose of reducing their base, as well as determining the quantities of demand in advance, depending on the decisions related to their selection. The study population consisted of small and medium-sized Korean industrial organizations. The study sample consisted of 280 industrial companies and various industrial sectors. The study found that the mechanisms of selecting suppliers are very important for the companies examined and have a positive correlation with the activities of the identification of requests. It also helps the organizations to maintain their competitive advantage, based on specific considerations such as quality, time, costs and energies, and with a variety of methods. The study showed that organizations are able to develop cooperative relationships, reduce uncertainties in their environment using business processes capable of effectively allocating important resources, and high response and flexibility of organizations to market pressures to make supply chain performance more effective .

Roman and Vinelli (2001) assessed the Quality Management in A Supply Chain Perspective Strategic Operative Choices in A Textile Apparel Network. The study aimed at linking the concepts of quality management on the one hand and supply chain management on the other hand, as applied to the field of the Italian garment industry. This study focused on managing the interrelationships within the supply chain to achieve the best quality results. It relied on the concepts of quality management as an independent variable and the relationships within the supply chain as a dependent variable and applied to the field of the Italian garment industry through a survey of 10 companies.

Distinctive Features of the Current Study

Previous studies have focused on the applications of supply chain management and inventory decision applications in many economic decisions and problems facing organizations in view of the multiplicity of objectives they seek to achieve, the constraints imposed on them and the conditions under which they operate. Previous also studies focused on the role and importance of supply chain practices and explained that there are specific dimensions and practices of supply chain management adopted by different organizations. It is clear that there are some practices focus on the relationships with suppliers, customer relations and then follow the important levels of exchanging information and the quality of the information, followed by the phase of delay. Most of these studies highlighted the importance of using supply chain practices in organizations to achieve coordination between the objectives of the organizations and their suppliers and their customers. The study also revealed the importance of supply chain practices in addressing many problems and help making many decisions to help management to achieve efficiency in the performance and rationalization of decisions and contribute to

the coordination and integration between different departments and departments in organizations.

The present study differs from previous studies in that it deals with supply chain practices from a TQM perspective. It focus on the application of the principles of TQM and its effect on supply chain management especially in procurement and how to evaluate suppliers as one of several ways to test efficiency and the commitment to apply the principles of TQM.

Literature review

Total Quality Management

Definition of TQM

Mallur (2011, p. 9) defined Total Quality Management as ‘ a management approach that tries to achieve and sustain long term organizational success by encoring employee feedback and participations, satisfying customer needs and expectations, respecting societal values and beliefs and obeying governmental statues and regulations’

Principles of TQM

ISO 9001:2015 proposed eight TQM Principles as described below:

- a.Customer focus
- b.Leadership
- c.Involvement of people
- d.Process management
- e.System management
- f. Continual improvements
- g.Factual approaches to decision making
- h.Mutually beneficial supplier relationships

Customer focus:

Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations (ISO 9000:2005).Focusing on the customers is the main idea of TQM because quality initiatives start from customers’ needs and end with customer feedback. Quality problems come from of insufficient communication among the supply chain members. Therefore, organizations and all supply chain parts must pay more attention to the needs and expectations of its customers. The needs and expectations of customers must be deployed in the entire levels of supply chain system. End users will be satisfied if each member of the supply chain meets the customers. Moreover, satisfying customers can improve the efficiency of the supply chain.

Leadership :

Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives (ISO 9000:2005). The effectiveness of quality management depends on leadership commitment because quality initiatives can only be successful by supportive leadership (Chang, 2009). In the supply chain, top management plays crucial role because it sets the strategic direction and operating objectives of the supply chain practices that improve the efficiency and effectiveness of the supply chain processes. Therefore, top management must identify the needs and expectations of all the stakeholders, establish smart goal, and inspiring employees to achieve that goal. At the same time, top management must continually improve and sustain TQM in all the supply chain and keeping them responsible motivated.

Involvement of people:

People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit (ISO 9000:2005). Involving employees is one of the most important principles of quality management. In the context of the supply chain, providing adequate work environment for the operation of processes is necessary for organizations to achieve conformity of products and services by helping every employee to work effectively to achieve the organizational objectives. Every employee should understand his/her role and responsibility in the supply chain, Furthermore, we can make all employees participate in the quality management of the supply chain and strive for customer satisfaction by creating quality control teams that focus on improving TQM implementation .

Process of management:

A desired result is achieved more efficiently when activities and related resources are managed as a process (ISO 9000:2005). To produce product that meets customer requirements and enhance its satisfaction organizations need to adopt the process approach. At each step of the supply chain, there are many interrelated and interacting processes, such as procurement, production, inventory, distribution and after sales services. These operations have their own objectives and activities. Therefore, processes and their effects should be identified to ensure consistent supply chain practices. This will help all organizational operations, to produce high quality products and services, decrease variation and eliminate waste, through continuous improvement and organizational wide quality control at the entire supply chain.

System management:

Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives (ISO 9000:2005).A system is a configuration of interacting, interdependent parts that are connected through a web of relationships, forming a whole that is greater than the sum of its parts (Holland 1998). Systems are overlapping, nested, and networked; they have subsystems and operate within broader systems (von Bertalanffy, 1955; Barabasi and Frangos, 2002).Implementing system approach in quality management is important to identify and manage organizational processes. In the supply chain context, organizations must address interacting and interdependent processes in the supply chain, eliminating boundaries between the supply chain parts, and developing integrating processes .

Continual improvements:

Continual improvement of the organization's overall performance should be a permanent objective of the organization (ISO 9000:2005). Continuous improvement is one of the main areas of modern research and quality practice. The organizations must continuously improve product and service and reduce cost meet customer needs. Organizations must regularly review processes for improvement ,using problem-solving tools, quality improvement teams, quality circles, self-assessment, internal auditing and using benchmarking to identify need for change, Promoting innovation and Building quality culture around all organization's departments. In supply chain context, constant pressure for improvement becomes increased due to the tough competition in the market place. Top management and stake holders, such as suppliers, vendors and logistics providers, needs to improve their products and services.

Factual approaches to decision making :

Effective decisions are based on the analysis of data and information (ISO 9000:2005).(Adequate and sufficient data and information are the basis for making the right and effective decisions. So far, many organizations have started collecting and handling all

kinds of data and information by utilizing many advanced information technologies such as EDI, MRP, ERP, POS and Intranet / Extranet / Internet to provide the basis for effective decision making. In the supply chain context, organizations must collect data and information for the parts of the supply chain. Therefore, potential problems in any step of the supply chain can be found due to the results of data analysis. After that, the right decision can be made in time to avoid or correct the problem (Chang, 2009)

Mutually beneficial supplier relationships:

An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value (ISO 9000:2005). Suppliers' selections must be based on quality and capability. In order to deliver high quality products and services organizations need to establishing a long-term relationship with suppliers and ensuring quality of supplies before delivery and encouraging auditing of suppliers .

Supply Chain Management and Practices

Supply chain:

Mentezer et al, (2001, p. 5) defined Supply chain as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/ or information from a source to a customer. Supply chain term used to describe the management of the flow of material information and funds across the entire supply chain from supplier to consumer this discretion talks about managing three flows physical information financial across the chain and the importance of the customer (Karan , 2010, p. 4). The objective of SCM is to manage the network of organizations that are involved through upstream and downstream linkages in the different process and activities that produce value in the form of products and service in the hands of the ultimate customer (Karan2010, p. 4)

Supply chain management:

Bolumole (2000) argues that 'Supply chain management offers an integrated philosophy for managing organizations' purchasing and distribution processes based on a marketing perspective'. The supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. Suppliers, but also transporters, warehouses, retailers and customers. Within each organization, such as a manufacturer, the supply chain includes sell functions involved in fulfilling customer requests. These functions include new product development, marketing, operations, distribution, finance, and customer service. Supply chain management involves the management of flows between and within stages in a supply chain to maximize total profitability (Meindl and Chopra , 2001, p. 30). Supply chain management is the integration and management of supply chain organizations and activities through cooperative organizational relationships, effective business processes, and a high level of information sharing to create high performing value systems that provide member organizations sustainable competitive advantage (Handfield and Nichols, 2002, p. 30). Although definitions of Supply chain management differ across authors, according to Mentzer, et al , (2001, p. 5) they can be classified in three categories: a management philosophy, implementation of a management philosophy, and as a set of management processes..

Supply Chain Management as a Management Philosophy :

Supply chain management as a management philosophy takes a system approach to viewing the supply chain as a single entity. This means that the partnership concept is extended in to a multi-firm effort to manage the flow of goods from suppliers to the ultimate customer. Mentzer et al, (2001, p. 7) points out that each firm in the supply chain directly or indirectly affects the performance of the other supply chain members, as

well as the overall performance of the supply chain. According to Mentzer et al, (2001, p.7) Supply chain management as philosophy has the following characteristics:

- A systematic approach to viewing the supply chain as a whole and managing the total flow from the supplier to the ultimate customer.
- A strategic orientation toward cooperative efforts to synchronize and converge intra-firm and inter-firm operational and strategic capabilities into a unified whole.
- A customer focus, to create unique and individualized sources of customer value, leading to wards customer satisfaction.

Objective of supply chain management :

Mentzer et al, (2001, p. 15) argues that SCM enhances customer value and satisfaction, which in turn leads to enhanced competitive advantage for the supply chain, as well as each member firm. This, ultimately, improves the profitability of the supply chain and its members. Durai and Sentamilselvan (2016, pp. 16-26) identified many SCM objectives such as service orientation, system orientation, competitiveness and efficiency, minimizing the time, minimizing work in progress, improving pipeline visibility, improving visibility demand, improving quality, reduces transportation cost, and reduces warehousing cost .

Types of supply chain management :

Durai and Sentamilselvan (2016, pp. 16-26) proposed 7 types of supply chains (Internal supply chain , External supply chain, Green supply chain, Out sourced supply chain, Self-monitored supply chain, Raw supply chain and Ripe supply chain.)

Supply chain practices: supply chain is the collection of steps that an organization takes to transform raw materials into the final product. Harland (1996) proposed the following three basic components of SCM.

1. Procurement: All activities and tasks associated with sourcing, purchasing, and payables can be fully automated and streamlined across a company's entire supplier network with a supply chain software package. As a result, businesses can build stronger relationships with vendors, better assess and manage their performance, and improve negotiations to leverage volume or bulk discounts and other cost-cutting measures
2. Processing At the third stage, the product is manufactured, tested, packaged, and scheduled for delivery. This is the manufacturing step. Supply chain managers schedule the activities necessary for production, testing, packaging and preparation for delivery. This is the most metric-intensive portion of the supply chain - one where companies are able to measure quality levels, production output and worker productivity
3. Distribution. Then, at the logistics phase, customer orders are received and delivery of the goods is planned. This fourth stage of supply chain management stage is aptly named deliver. This is the part that many SCM insiders refer to as logistics, where companies coordinate the receipt of orders from customers, develop a network of warehouses, pick carriers to get products to customers and set up an invoicing system to receive payments.

Theoretical framework :

In order to examine the Role of Total Quality Management on Improving Supply Chain practices. The current study, based on a thorough review of literature proposed Theoretical framework that shows the relationship between TQM and Supply Chain practices shown in figure 1.

Figure 1: A Theoretical Framework for The Role of Total Quality Management on Improving Supply Chain practices

Source: Developed by the researchers, 2017

Research Methodology and Data Collection

The Research Design

In this research, a descriptive method was used, using a questionnaire to examine the effect of the implementation of total quality management principle on Supply Chain practices in paints industry.

Population of the Research

This study conducted in Nile Paints a company targeting only the departments of marketing, Sales, production, quality control, supply chain and maintenance. This represents deferent departments in the organizations.

Sample of the Research

The sample was selected by using random sampling technique to select 30 participants in order to examine The Role of Total Quality Management on Improving Supply Chain practices .

The Research Instrument

The researcher used the questionnaire tool to collect preliminary data from the study sample. The questionnaire consists of two main parts. The first part is general information of the sample such as the gender, age, years of experience and the scientific qualification. The second part is the basic data divided into the main study variables. The questionnaire used five point Likert scale measurement ranging between 5=Strongly Agree, 4 = Agree, 3=Neither,2= Disagree and 1=Strongly Disagree. The statistical methods used in the study was Frequency tables, Percentages, Graphs, Mode, Chi square, Cronbach's alpha.

Reliability and Validity Analysis

Reliability

To measure the instrument reliability the responses of the participant were scored using Cronbach's Alpha which is a measure of internal consistency (reliability), that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability for attitude measures and correlations, the acceptable values should be more than (60%) according to (Sekaran2006, p. 311). or 70% in other sources, therefore the value exceeding the foregoing proportion indicates that the survey/questionnaire is reliable.

Table 1 shows that reliability coefficients for all Study Variables were above the cutoff point of 70% used in the current study. To verify this, 15 samples were distributed to the sample by means of internal consistency (Cronbach's alpha). The reliability coefficients for all the items ranged from 0.82 to 0.95. Therefore, the current study's instrument is of reasonable satisfactory reliability.

Table 1: Instrument Reliability

Item	Study Variables	Item no.	No. of items	Reliability Coefficients
1	Customer focus	3-1	3	0.89
2	Leader ship	6-4	3	0.87
3	Involvement of people	9-7	3	0.91
4	Process management	12-10	3	0.89
5	System management	15-13	3	0.91
6	Continual improvements	18-16	3	0.95
7	Factual approaches to decision making	21-19	3	0.82
8	Mutually beneficial supplier relationships			
24-22	3		3	0.89

Source: Primary data (Developed by the researchers, 2017)

Validity

After reliability was examined, the items of the study's questionnaire were tested for Validity. Content validity typically refers to the extent that a measure represents a

construct in its entirety. One way to provide evidence for content validity is by using subject matter experts (SMEs) to review a measure for any construct deficiency or contamination. Support for a measure's content validity does not necessarily have to come through an empirical process. When the dimension being measured is an abstract construct that is inferred from directly observable events, then we may speak of "construct validity." To measure content validity we described the population of the study and then asked experts arbitrators to judge how well representative our sample is of that population then the notes of those reviewers were taken into consideration to improve some of the questionnaire items in a manner that fits the study variables.

Data Analysis and Statistical Techniques:

Data were gathered from 30 participants that who completed and returned the questionnaire. All analyses were carried out using SPSS, version 11.5. Prior to analyzing the data, the questionnaire were checked for bias. Missing or extreme data was excluded from the analysis process. Then the data were transform computed, and were recorded with new names, especially nominal scale data as used according to the study variables. Additionally, statistical analysis techniques were conducted by analyzing descriptive statistics and chi square analysis in order to test the hypotheses developed in the current study concerning the relationship amongst study variables.

Findings and discussion:

Study Results:

The profile of the respondents

Descriptive analysis, which involved simple descriptive statistics, Frequencies measures of central tendency and measures of dispersion, as presented in table 2 is used to analyses the following demographic variables:

- (1) Gender, (2) Age, (3) Educational level, (4) Years of experience, (5) Position.

Table 2: Demographic variables and profile of the respondents

Characteristics	Frequency	Percentage
Gander		
Male	21	%70
Female	10	%30
Total	30	%100
Age		
25years and less	7	%23.3
35-26years	17	%56.7
45-36years	3	%10
60-46years	3	%10
Total	30	%100
Educational level		
PhD	3	%10
MSc	8	%26.4
BSc	19	%63.3
Total	30	%100
Years of experience		
5years and less	14	%46.7
15-6years	11	%36.7
25-16years	2	%6.7
26years and more	3	%10
Total	30	%100
Position		
Manager	5	%16.7
supervisor	3	%10
Employee	22	%73.3
Total	30	%100

Source: Primary data (Developed by the researchers, 2017)

Inferences of demographic profile:

Gender: The percentage of male participants (70.0%) is greater than that of female participants, featuring (30.0%).

Age: The percentage of participants aged between (46-60 years) and (46-60 years) is equal (10.0%) are the lowest. The percentage of participants aged between (26-35 years) are the highest (56.7%).

Educational level: The lowest participants are holders of Bachelor's degree (10.0%) and most of them have a Doctoral degree (63.3%).

Years of experience: The proportion of participants with 16-25 years of experience (6.7%) was the lowest. However, most participants have years of experience of 5 years and less (46.7%).

Position: Employees are the most participants (73.3%), Supervisor are the lowest (10.0%).

Data Analysis and Hypotheses Testing

The first objective of the study was to investigate the effect of total quality management implementation on supply chain practices. In order to analyze the information and data obtained through the questionnaire, these data were entered into the computer and then a number of statistical treatments were applied to it, as indicated in the following table.

All the items on the questionnaire were scaled on five points Likert scale. The responses was analyzed using Medians and Pearson Chi-Square as summarized in Table: 3 below.

Table 3: The Overall median and chi-square value for the Study Variables.

No	Study Variables	Chi-Square	df.	Sig.	Median	
1	Customer focus	17.00	2.7	000.	4	Agree
2	Leadership	15.71	2.0	000.	4	Agree
3	Involvement of people	14.95	3.0	000.	4	Agree
4	Process management	12.66	2.3	000.	4	Agree
5	System management	19.51	3.0	000.	4	Agree
6	Continual improvements	13.64	3.0	000.	4	Agree
7	Factual approaches to decision making	6.71	3.0	000.	4	Agree
8	Mutually beneficial supplier relationships	29.93	2.3	000.	4	Agree

Source: Primary data (Developed by the researchers, 2017)

From the Table above (3) we can see that the overall median was (4) with Sig. of (.000) for the for all Study Variables (Customer focus, Leadership, Involvement of people, Process management, System management, Continual improvements, Factual approaches to decision making and Mutually beneficial supplier relationships) with chi-square value ranging between of (6.71-29.93). The overall scale for the all variables is agree. The most obvious finding to emerge from this these results is that total quality management implementation positively affects supply chain practices.

Hypotheses Testing

Chi square test was used to test the hypothesis of the study. Further, the study hypotheses were tested to accept the alternative hypotheses if the value of the level of significance is less than or equal to 0.05 ($\alpha \leq 0.05$). these hypotheses are:

H01: There is statistical significant effect of total quality management principles on supply chain practices.

Table 4: Hypothesis (1) Result.

Chi square	df.
sig.	
Medium	
Statistical significance	

29.40 2.00 0.00 0 4.0 Statistically significant

Table (4) shows that the value of the Chi-square test (29.400) by significant value (0.00) it's less than the probability value (0.05) this means that there is a positive and significant relationship between Total Quality Management and Supply Chain practices.

H2: leadership commitment positively and significantly influences the implementation effectiveness of Supply Chain practices.

Table 5: Hypothesis (2) Result.

Chi square	df.		
sig.			
Medium			
Statistical significance			
43.12	4.00	0.00	4.00
Statistically significant			

Table (5) shows that the value of the Chi-square test (43.125) by significant value (0.00) it's less than the probability value (0.05) this means that there is a positive and significant relationship between leadership commitment and Supply Chain practices.

H3: The demographic variables of individuals have significant effect on the implementation of total quality management on the supply chain.

Table 6: Hypothesis (3) Result.

Variable				
Chi square	df.	Sig.	statistical significance	
Gender				
1.42	2.00	0.49	Not statistically significant	
Age				
3.72	6.00	0.71	Not statistically significant	
Qualification				
3.50	4.00	0.47	Not statistically significant	
Years of Experience				
	24.58	6.00	0.00	Statistically significant
Position	8.05	4.00	0.00	Statistically significant

Table (6) shows that the value of the Chi-square test (1.42, 3.72, 3.50, 24.58 and 8.05) for the demographic variables of individuals (Gender, Age, Qualification, Years of Experience and Position) respectively. By significant value (0.49, 0.71 and 0.47), for Gender, Age and Qualification which are more than the probability value (0.05) this means that there is no relationship between these demographic variables and the implementation of total quality management on the supply chain. While the significance value for (0.49, 0.71 and 0.47) for Years of Experience and Position are (0.00 and 0.00) which are more than the probability value (0.05) this means that there is a positive and significant relationship between these demographic variables and the implementation of total quality management on the supply chain.

Conclusion, Implications and Limitations

This study has investigated the effect of total quality management on supply chain practices. The eight principles of TQM used in this study were Customer focus,

Leadership, Involvement of people, Process management, System management, Continual improvements, Factual approaches to decision making and Mutually beneficial supplier relationships .One of the most significant findings to emerge from this study is that the implementation of total quality management positively and significantly influence the Supply Chain practices. This is because the organization focus on the quality of operations through continuous improvement and overall quality control throughout the system and the supply chain practices such as procurement, logistics, production, inventory, sales and mutual effects are identified and managed to ensure consistent operation. The second major finding was that leadership commitment; positively and significantly influence the Supply Chain practices. The findings in this study provide a new understanding of the effect of total quality management implementation on supply chain practices. The evidence from this study suggests that implementing TQM principles is crucial for any organization to optimize the effectiveness procurement, processing and distribution activates that necessary for the operation of its processes to achieve conformity of products and services. The study concluded that the implementation of TQM principles have a strong and effective effect in the management system as it raises the level of operational performance and improves the internal and external coordination process that leads to profitability High quality and competitive position in the paint industry. Supply chain managers could benefit from this study because it provides them with a better understanding of what quality management principles that need to be adopted in order to improve the supply chain practices. The current study has only considered principles of ISO 9001:2008 .Using convenience sampling method is a possible limitation of the study because of it is possible bias in data gathering coupled with high level of sampling error, which restrict the generalizability of its results. Therefore, this limitation means that study findings need to be interpreted cautiously. This study has thrown up many questions in need of further investigation. It would be interesting to examine the role of TQM on supply chain management by adopting a comparison approach with the best companies in the industrial sector internally or externally. Further studies need to be carried out in order to examine The Mediating Role of Total Quality Management between Supply Chain practices and supplier performance.

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