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Influence of Quality Control and Certifications on Performance of Manufacturing Firms in Kenya

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Abstract: *Quality control is the process of ensuring that the products, services and processes of a company are of an appropriate quality that meets the set standards and subsequently the needs and expectations of the customers. To ensure the companies have a standard framework of quality control, there are quality standardizing organizations such as ISO which carry out certifications to ensure companies conform with key set standards. Embracing quality control and certification has been found to be an essential move for companies to remain competitive and enhance performance. This however needs a backing from the Kenyan perspective particularly among the manufacturing firms, hence the motivation of this study. Using a descriptive approach, 160 respondents were surveyed through a structured questionnaire. The findings revealed that quality control and certification was essential in enhancing firm performance by enabling the companies to meet the quality standards and assure this to customers. The study concluded that failure by most of the companies to embrace quality certification affected their image and this significantly led to decline in their competitiveness and performance. The study recommended the need for management of manufacturing firms to embrace quality control and certification as a way of enhancing their performance through increased quality assurance to their customers.*

Keywords: *ISO 9001 Certification, Quality Control, Quality Certification, Manufacturing firms, Kenya.*

I. Introduction

Quality is a fundamental aspect in any business that defines the ability of a product or service to meet the needs of the customers. Achieving quality is way close to making the customers satisfied, and this consequently enhances firm competitiveness. One of the major concepts that have been used to describe the need for quality in products and services is the quality control (QC). This is the process of ensuring that the products and services given by a given organization are of the desired quality, in that they meet the needs and expectations of the customers and their standard can cut across a definite Characteristic of users. Quality control is driven by three major aspects in an organization. One is the management which ought to be committed to offering good quality products, secondly is the workforce who has the mandate of implementing key measures that ensure less defects and enhanced quality, and last is the process which defines the ability of the company to offer good quality products and services.

According to Sutherland, Sim, and Lee (2021), quality control easily helps in distinguishing between a company that is committed to meet the needs of its customers, and one that has little or no commitments to satisfy its customers. While expounding on the for quality control, Zahra (2020) mentions the aspect of certification which he expounds as the means of ensuring easy identification of a company with quality control standards and one that has not such standards. According to Milošević et al. (2018), quality control and certification are two concurrent processes, where after a company ensures improvement of its

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quality, it receives certification to ensure compliance and as a sign of identification. This plays a key role in enabling such companies stand against the competitors by proving their ability to promote, uphold and implement quality standards.

The management of a supply chain emphasizes the need to align all the activities that create value for customers and are performed across the supply chain, in order to achieve high levels of customer service in a cost effective way (Skipworth et al., 2015). Supply chain alignment requires consistency of strategies, objectives, processes and adherence to six sigma variables among different supply chain members to improve business competitiveness (Mokadem, 2016).

Wong et al. (2012) observed that a well aligned supply chain lead to revenue growth, working capital efficiency, operating cost reduction, better perceived customer value, etc. across the whole supply chain. Including six sigma variables such as defining your objectives, measuring them, analysing them, continuously improving them and finally control their implementation, greatly aligns an organization's supply chain.

However, supply chain alignment has been constrained or boosted by many factors, including the role of quality models in improving both intra and inter-organizational alignment from a variety of perspectives that includes, but not limited to, total quality management philosophy, International Standardization Organization 9000 certification, European Foundation Quality Model (Casadesus & De-Castro, 2015; Dellana & Kros, 2014).

Studies explored the role of quality models in supply chains. Robinson and Malhotra (2015) referred to the importance of extrapolating the widely recognized quality programs such as the TQM, the Malcolm Baldrige national quality award and ISO 9001 (international quality management system standard) to supply chains in order to better manage supply chain relationships.

In that sense, some previous studies affirmed that a firm's quality management approaches and supply chain management practices complement each other and their integration facilitate reaching superior business performance (Kannan & Tan, 2010; Kaynak & Hartley, 2014; Mellat-Parast, 2013). Theodorakioglou, Gotzamani and Tsiolvas (2016) identified that one would expect that a firm which implements quality practices will have better opportunity to effectively manage their supply chain relations. Similarly, Casadesus and De-Castro (2015) identified that implementing TQM in its widest and most correct sense improves supply chain management.

The manufacturing sector in Kenya stands as one of the integral industries in the country's economy. Its success however has often been affected by the inability of the companies to continue meeting customer needs and gaining competitiveness across the region. This has derailed the success of the companies in the sector and shows the need for these companies to turn to quality control and certification. According to Antunes et al. (2020), through quality control and certification, companies are able to distinguish themselves from their peers as committed entities ready to meet the quality needs of their customers. Manufacturing companies in Kenya can also embrace quality control and certification in order to stabilize their competitiveness and performance by meeting customers' needs in terms of quality. The sector's contribution to the country's GDP has been ranging from 4% to 5% since 2013. However, to achieve the vision 2030, the manufacturing industry ought to be contributing over 10% to the GDP. This can be possible only if the sector can be more competitive compared to international competitors by providing quality products. This will the other hand require appropriate quality control and certification.

Statement of the Problem

The performance of most of the manufacturing firms if not all highly depends on their ability to meet the customer satisfaction through quality goods. This has been an essential

aspect in most of the global leaders in the manufacturing industry who focus on doing all possible to enhance the quality of their products to meet the customer needs (Kaur et al., 2021). In Kenya, the manufacturing industry has been facing a tremendous decline, mainly blamed on the competition from imported goods which are of superior quality and affordable prices. This puts the question on whether the local manufacturing industry are committed to meet the quality standards and ensure their products are of good quality and capable of meeting the customer expectations. Previous evidence shows that quality control and certification is an integral process that is meant to streamline the way companies commit their resources and skills towards meeting the standard quality and do so sustainably for the interests of the customers. According to Rogala and Wawak (2021), through bodies such as the International Organization for Standardization (ISO), companies get certification regarding the quality of their products and processes, thus steering the confidence of the customers on their products. Through quality control and certification as highlighted by Midor and Wilkowski (2021), companies have a more defined framework on how to meet the quality requirements in their products and services. However, this lacks any contemporary backing from a local perspective. This motivated the need for this study to assess the effect of quality control and certification on the performance of manufacturing firms in Kenya. The aim is to determine the moderating influence of quality control and certification on the performance of manufacturing firms in Kenya.

II. Review of Literature

2.1 Theoretical Framework

The study was anchored on the lean theory by Womack and Jones who used the model to describe the 2:1 difference in productivity they found between car assembly plants in Japan and those in Europe. They subsequently explained how companies could make dramatic improvements in performance by adopting the lean approach to manufacturing pioneered by the Toyota Corporation. Lean is a functional model which basically discounts the value of economies of scale and focuses on how to reduce costs as a result of small, incremental and continuous improvement. Lean management has certainly become increasingly significant in general management (Buttle, 2013).

Initially organizations involved in manufacturing of products used to involve themselves in lean manufacturing techniques and ISO certifications, this has ceased as lean has expanded beyond manufacturing (Carmignani, 2009). Lean manufacturing law seeks to explain how organization should manage its TQM system and needs. It states that TQM can be used as a strategic differentiator by the organization and further goes on to say that not all continuous improvement is about waste (Casadesus & De-Castro, 2015).

The theory stated that TQM strategies developed by an organization should support the customer's need and expectations (Kannan & Tan, 2010). TQM strategies and Six Sigma should not be a driver on how much and when a product was delivered to a customer, rather, the customers' expectations should be understood and management strategies is designed purposely to meet those expectation. This therefore implies that cost associated with management cannot be achieved through inconsistent management network designs (Karapetrovic & Willborn, 2012). This theory is relevant to the study because continuous improvement through quality control and certification is a key component in effective and efficient performance among the manufacturing firms.

2.2 Empirical Literature

Casadesus and De-Castro (2015) affirmed that quality control plays a considerable role in better managing and aligning supply chain relations. Theodorakioglou et al. (2016)

examined how the quality control framework facilitates firm performance and revealed that through quality control, firms are able to meet the needs of their customers through more enhanced quality of goods and services thus enhancing firm performance. Yang et al. (2013) developed and applied a six sigma methodology in a leading manufacturing organization to improve supply chain operations. They concluded that such methodology could play a considerable role for successful supply chain thinking. Similarly, Mehrjerdi (2013) confirmed the role of implementing six sigma tools in improving coordination efforts in supply chains.

In 1987, the International Standardization Organization (ISO), originally interested in the regulation of measurement activities in the different industrial sectors, published the first edition of the ISO 9000 series. In few years later, the ISO 9000 standards became an important leading reference for quality systems all over the world (Franceschini et al., 2009). Today, the ISO 9000 standards has become a prerequisite for all firms operating in industrial sectors with around one million implementers all over the world from different industrial sectors (Jang & Lin, 2014). The ISO 9000 standard series is considered a general application to develop a quality management system that aims to improve product quality through adequate management of organization resources and processes (Boiral & Roy, 2010).

It is widely accepted that the ultimate aim of implementing ISO standards is to satisfy the demand of external customers as well as potential customers (Douglas, Coleman & Oddy, 2013). Bagchi et al. (2013) referred to a study conducted in the USA and the UK in 2004, 2005, 2006 that concluded that the internal benefits of earlier versions of ISO 9000 takes precedence over external benefits. However, Robinson and Malhotra (2015) argued that quality practices must expand from traditional intra-firm mind sets to include inter-organizational supply chain activities. In that sense, Boiral and Roy (2010) assumed that ISO 9000 leads to better intra-organizational processes and in turn will provide organizations with better ability to respond to customers and competitors pressures. Several studies referred to the importance of the dual focus on internal (intra-organization) and external (inter-organization) quality performance as a key strategy for achieving competitive differentiation (Mellat-Parast, 2013).

Carmignani (2009) highlighted that the ISO 9000 is more concerned with quality aspects within a single company and lacks a systemic approach to the supply chain. Thus, he proposed a modified interpretation of ISO 9000 standard to extend and apply the ISO 9000 concepts to a whole supply chain. The aim is to make supply chain partners implement ISO 9000 to align all the supply chain links. However, he identified the need to validate the proposed model through real applications.

2.3 Conceptual Framework

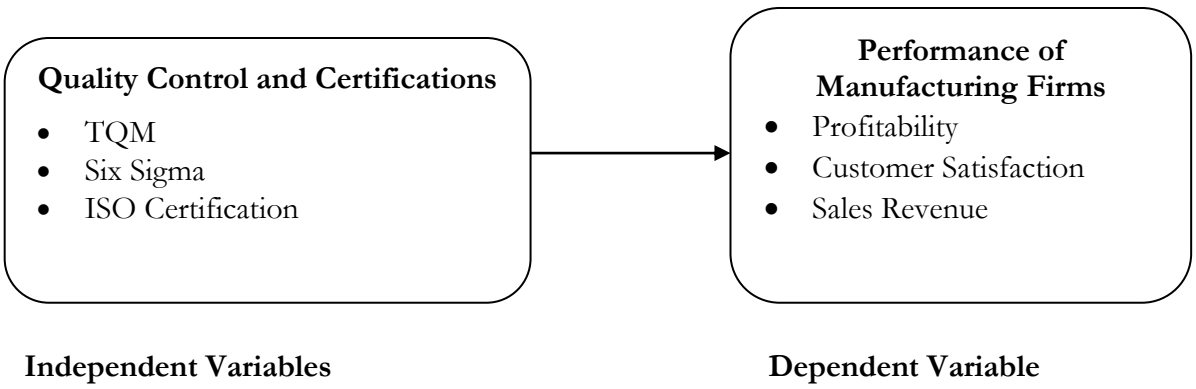

Figure 1. *Conceptual Framework*

III. Research Methods

The study adopted both qualitative and quantitative methodology. This was mainly supported by descriptive research approach and the positivism research philosophy. Descriptive research design sets out to extensively describe whether supplier relationship management is related to performance of manufacturing firms in Kenya.

The study targeted the large manufacturing firms in Kenya. The 2017 KAM directory has listing of members (firms) by sectors which contains a register of 12 sectors of those in manufacturing firms spread all over the country (KAM, 2017). The population of the large sized registered members as per the directory is 461. This study used Cochran's formula to sample 160 large manufacturing firms from the total population.

The research utilized a structured questionnaire to collect primary data. A timetable for data collection was developed and scheduled appointments with the respondents, specifying in detail the date, time and place where the data was to be collected.

This study adopted a descriptive data analysis and inferential data analysis. Descriptive data analysis was adopted for this study because descriptive analysis was used to describe the basic features of the data in a study. It provides simple summaries about the sample and the measures. The study adopted inferential data analysis in order to enable it reach conclusions that extend beyond the immediate data alone to infer from the sample data about the population.

IV. Results and Discussion

4.1 Response Rate, Reliability Test and Background Information

a. Response Rate

A response rate of 79.4% was obtained where 127 questionnaires out of 160 were dully filled and returned for analysis. This was considered adequate for analysis.

b. Reliability Test Results

Reliability test was carried out using Cronbach's alpha coefficient. A threshold of 0.70 was adopted. Quality control and certification had a Cronbach's alpha coefficient of 0.799 while firm performance had a coefficient of 0.822. These were deemed reliable hence the subsequent analysis was carried out. Table 1 summarizes the results.

Table 1. Reliability Test Results

Variable	Number of Items	Cronbach's Alpha
Quality Control and Certification	13	0.799
Firm Performance	8	0.822

c. Background Information

Most of the firms had been in operation for more than 20 years and were privately owned companies. Most of the companies had between 2 and 6 products and sub-sectors such as chemical and allied, printing and paper, food, beverage and tobacco and leather and textiles were presented. Diversity was obtained and various demographic characteristics were obtained among the corresponding companies.

4.2 Quality Control and Certifications

The study sought to establish the relationship between quality control and certifications and performance of manufacturing firms in Kenya. The findings are as shown

on Table 2. As the results portray, majority of the respondent agreed that their companies were ISO certified. Majority also with a mean of (3.86) agreed with the statement that the six sigma tool plays a significant role in cost reduction. The measure of dispersion around the mean of the statements was 0.91 indicating the responses were varied. The findings revealed that majority of the respondent as indicated by a mean of (3.86) agreed with the statement ISO certifications play a significant role in cost reduction. The standard deviation for comments for poor performance was 0.932 showing a variation. The result revealed that majority of the respondent (3.84) agreed with the statement Strategic collaborations play a significant role in cost reduction. The results were varied as shown by a standard deviation of 0.912

It was further established that ISO certification plays a significant role in improving lead time. The mean for this comment was 3.98 accompanied by a varied response of 0.93.Results indicated that ISO certifications plays a significant role in improving productivity. The mean for this comment was 3.85 accompanied by a varied response of 0.91. The results indicated ISO certifications play a significant role in improving lead time.

Table 2. Descriptive Results on Quality Control and Certification

Measurement Aspect	N	Mean	Std. Dev.
Our company is ISO certified	127	3.76	0.89
Controlling the quality of production through total quality management has been essential in reducing the operation costs	127	3.86	0.93
The embrace of six sigma tool has been an essential way of enhancing quality in the organization	127	3.84	0.91
Through ISO certifications, the company enhances its ability to deliver the right quality of goods	127	3.98	0.93
Managing the quality of the products ensures higher productivity for enhanced performance	127	3.91	0.83
Through use of six sigma the defects and errors in the production process in the company are reduced.	127	3.9	0.94
Certifications plays an essential role in assuring the customers of the quality of the products	127	4.08	0.86
Controlling the quality of the production processes has been essential in enhancing the lead time	127	3.85	0.91
Analysing the key data from the supply chain processes through sic sigma is an integral in enhancing the effectiveness of operations	127	4.06	0.97
The company has been upholding certifications and quality control to ensure its supply chain processes are efficient	127	3.86	0.93

4.3 Effectiveness of Quality Control and Certification

The study further sought to establish the respondents rating of the influence of quality control and certification on the performance of manufacturing firms in Kenya. The results as shown in Table 3 indicated that 44.9% of the respondents claimed that quality control and certifications implemented their organization was very ineffective. 40.9% of the respondents ranked indicated that they quality control and certifications implemented in the organization was somehow effective, 11% of the respondents agreed that they quality control and certifications system implemented in the organization was effective. Further results indicated that 3.1% regarded quality control and certifications implemented in their organization as very effective.

Table 3. Rating the Effectiveness of Quality Control and Certification

Category	Frequency	Percentage
Very Effective	4	3.1%
Effective	14	11.0%
Somehow Effective	52	11.0%
Ineffective	57	44.9%
Total	**127**	**100%**

4.4 Performance of Manufacturing Firms

The study sought to establish the performance of the manufacturing firms in Kenya. The respondents were asked to indicate their level of agreement on specific statements regarding the performance of their respective firms. The findings as shown in Table 4 revealed that majority of the respondents disagreed that their company has been committed to reduce the costs of operations in all its activities. Majority of the respondents disagreed that the customer waiting time had been reduced continuously over the years in their respective firms, and a further majority disagreed that the positive customer feedbacks had been increasing in their respective companies for the past five years (Mean =2.51; standard deviation = 1.28). It was further established that most of the organizations recorded high returns from their customers, as a result of not meeting the needs and specifications of the customers. The respondents further disagreed that that there were stable revenue flows in their respective companies' operation framework over the years.

Table 4. Descriptive Results on Organizational Performance

Statement	Mean	Std. Dev.
Our company has been committed to reduce the costs of its products	2.61	1.35
The customer waiting time has been reducing continuously over the years in our firm	2.46	1.35
The positive customer feedbacks have been increasing in our company for the past five years	2.51	1.28
There are fewer returns/rejections by our customers than it was in the past	2.39	1.47
The company has been recording sustainable profit margins in the past five years	2.41	1.46
The attained profits have been adequate for re-investment in other ventures by our company	3.21	1.27
There are stable revenue flows in the company's operation framework over the past five years	2.18	1.29

The respondents were further asked to indicate the extent to which the aspects of supply chain alignment influenced the performance of their respective companies. The findings as shown in Figure 2 revealed relational behaviour was rated to be the most aspect influencing performance at 44.1% followed by operations and processes at 37.8%then supplier relationship management at 33.9% and lastly quality control and certification at 15.7%.

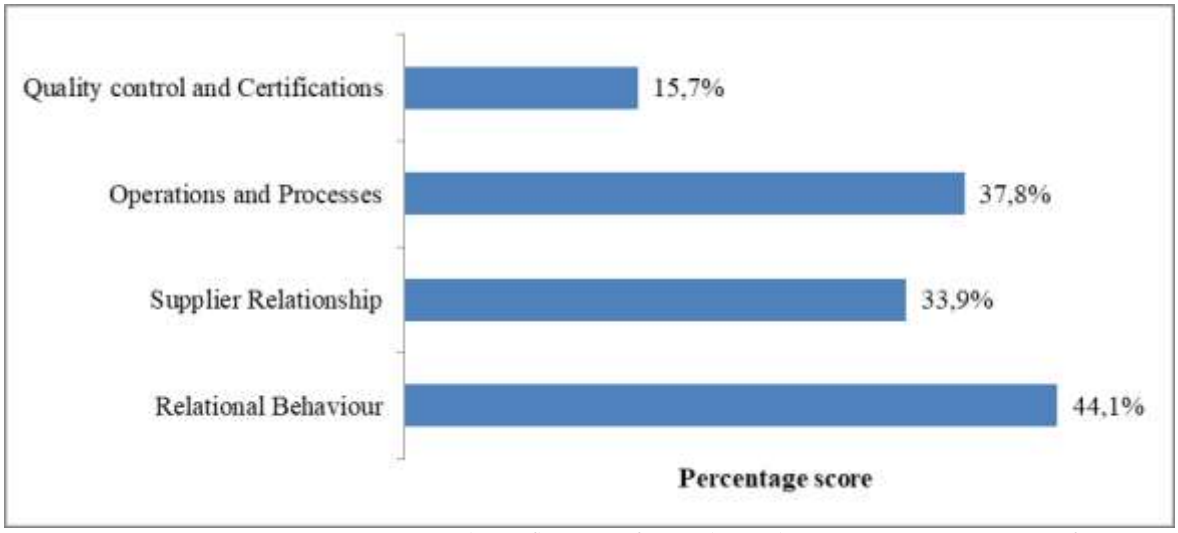

Figure 2. *Rating the Influence of Supplier Alignment Aspects on Performance*

4.5 Hypothesis Testing

The study sought to test the hypothesis that *quality control and certification has no significant effect on the performance of manufacturing firms in Kenya.* The results indicated that quality control and certification had a significant effect on the performance of manufacturing firms in Kenya. This is as shown by the Beta coefficient of 0.242 and a P-value of 0.001<0.05. The hypothesis is therefore rejected and a conclusion drawn that quality control and certification has a significant effect on the performance of manufacturing firms in Kenya. The findings compare with those by Chiarini (2019) who established that quality control stands as an integral driver of success among the manufacturing firms in that it helps the firms to align their quality standards with the international standards thus enhancing customer satisfaction.

Table 5. Regression Coefficients on Quality Control and Certification and Firm Performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.583	.296		1.966	.052
Quality Control and Certification	.242	.071	.231	3.399	.001
a. Dependent Variable: Performance of Manufacturing Firms					

IV. Conclusion

Quality control and certification was found to have a significant effect on the performance of manufacturing firms in Kenya. It was therefore concluded that through quality control and certification, the manufacturing firms are able to meet the needs of their customers, thus enhancing their performance. In supply chain and other processes of the organization, quality control and certification sets the pace for implementing key metrics to ensure good quality that suits the expectations of the customers.

The study recommends that there is need for the management of the manufacturing firms to be steadfast in ensuring quality control as a way of ensuring their firms are able to meet the quality standards in their products. Seeking certifications from bodies like the ISO would be an essential move to assure the customers of the quality of their products, thus putting the firms a step ahead towards gaining competitiveness and performing effectively.

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