

# **EVALUATING THE EFFECT OF IMPLEMENTING THE HOUSE OF QUALITY FRAMEWORK ON PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES (SMES) IN KENYA**

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## **ABSTRACT**

**Purpose of Study:** This study evaluated the effect of implementing the House of Quality (HoQ) framework on performance of SMEs in Kenya.

**Problem Statement:** Performance of Small and Medium Enterprises (SMEs) is crucial to the economic growth and development of Kenya, where these businesses contribute significantly to employment and GDP. However, many SMEs struggle with maintaining consistent quality in their products and services, which hampers their competitiveness and long-term sustainability.

**Methodology:** The study utilized a mixed-methods approach, combining qualitative and quantitative data collected through interviews and structured questionnaire respectively. The target population consisted of SME owners and Managers across all the manufacturing sectors in Kenya. The study employed linear regression model to analyze quantitative data, while thematic triangulation was used to analyze qualitative data.

**Result:** Findings of the study indicate a positive correlation between implementing HoQ and operational performance ( $p < .001$ ). The study also shows that 60.4% of variations in performance of SMEs in Kenya is caused by the implementation of HoQ in their processes. Further a unit increase observed in implementing HoQ causes 0.654 units of increase in performance of SME in Kenya.

**Recommendation:** The paper recommends that SMEs implement HoQ in their operations to effectively meet the needs of their customers, improve their employee retention and grow their market share. The study also recommends that appropriate policies that encourage SMEs to implement HoQ be developed to enhance performance of SMEs given their pivotal role in national economic development and also to sustain their operations.

**Keywords:** *Performance, Quality Function Deployment, House of Quality, Competitive Advantage, Small and Medium Enterprises*

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## INTRODUCTION

Small and Medium Enterprises (SMEs) are recognized globally as critical drivers of economic growth, job creation, and innovation, particularly in developing countries. In Kenya, SMEs contribute approximately 40% of GDP and employ more than 80% of the working population, positioning them as a backbone of the country's economy (KNBS, 2022). Despite their central role, many SMEs in Kenya face persistent challenges in maintaining product quality, meeting customer expectations, and competing in increasingly dynamic local, regional and global markets (Bett & Anene, 2023). To address these issues, there has been growing interest by SMEs in the application of structured quality management tools, such as the House of Quality (HoQ), to enhance their operational performance, market growth and customer satisfaction.

The House of Quality, which is an integral part of the Quality Function Deployment (QFD) framework, provides a systematic approach for translating customer needs into technical specifications (Akao & Mazur, 2003). This tool is particularly valuable for ensuring that customer requirements are prioritized throughout the product development process, thereby improving quality, reducing production costs, and minimizing the time required to bring products to market (González, Quesada & Bahil, 2003). Understanding customer requirements for SMEs allow them to improve their product or service development, develop and sustain competitive advantage in their sectors, increase their sales and revenues, improve their product quality and customer satisfaction and maintain brand loyalty among their customers. Several studies have demonstrated the effectiveness of HoQ in large organizations, but its impact on SMEs, especially in developing economies like Kenya, remains under-explored (John, Smith, Chotipanich, Pitt, 2014; Hu-Chen, Hua, ZhiWu, Chun-Yan, 2022). Given its simplicity and visibility, HoQ has been broadly utilized in a variety of industries for product or service planning to improve their performance.

In Kenya, SMEs operate in a highly competitive environment where the need to align products and services with customer preferences is critical to survival and growth (Ocharo & Kinyua, 2021). Customer Preference relates to the specific choices and tastes of consumers when selecting products or services, which can be influenced by factors such as quality, fashion, and price.

Together with the uncertainty of predicting future markets, SMEs also need to respond quickly to changes once they are known as customers preferences are dynamic and can change very quickly (Litster, David, & Bogle, 2019). To predict customer preferences, SMEs require the help of HOQ to predict regular customer expectations and changes in demand as they occur.

Despite the existence of many quality management tools that SMEs can use to improve their performance, including HoQ, they sometimes lack the resources, expertise, and organizational structure to implement them effectively and fail to realise the benefits associated with their implementation (Mutingi, Chakraborty & Vashishth, 2018). This research aims to evaluate the effect of implementing HoQ on the performance of SMEs in Kenya. Specifically, the study explores how integration of customer-driven design and quality management through HoQ affects operational performance, employee retention, market share, and customer satisfaction in the SME sector in Kenya.

## **LITERATURE REVIEW**

The House of Quality (HoQ), a core component of Quality Function Deployment (QFD), is widely recognized as an essential tool for translating customer needs into actionable design and process improvements. The House of Quality (HoQ) is a systematic approach designed to integrate customer desires into product and service design through a matrix that connects customer requirements to technical specifications (Akao & Mazur, 2003). It is a product planning matrix that is built to show how customer requirements relate directly to the ways and methods manufacturing companies can use to identify customer needs in a product, and create it using technical and competitive benchmarking data. House of Quality's significance lies in its ability to align operational goals with customer expectations, ensuring that products meet or exceed customer needs (Hooks & Farry, 2020). Research indicates that implementing HoQ fosters improved communication across functions such as marketing, design, and manufacturing, leading to greater product quality (International Trade Centre, 2019). However, the practical implementation of HoQ in SMEs faces distinct challenges compared to larger firms due to limited resources and expertise (Bahia, Idan, & Athab, 2023).

### ***SMEs in Kenya***

In determining the contributors to the economy of Kenya, SMEs have been found to be part of the major contributors at nearly 40% to the country's GDP and providing 80% of employment

opportunities (KNBS, 2022). Performance of SMEs is therefore critical towards reducing unemployment levels and promoting competitiveness of products from Kenya to the East African regional markets. Despite their critical role, Kenyan SMEs face a myriad of challenges including, inadequate access to affordable capital, marketing challenges, stiff competition from both established businesses and illicit trade, and stringent government regulations, and lack of appropriate technology (KIPPRA, 2021). These constraints often lead to low productivity and hinder competitiveness on both national and international markets. Nevertheless, it has been established that on average Kenyan establishments have an average age of 3.8 years at closure with about 80 per cent of them shutting down before their 5th year of operation and 46.3 closing during their first year of establishment (Mokwaro & Nyamu, 2019). This is indeed an indictment to the country's entrepreneurship culture.

Kenya Vision 2030, the long-term development blueprint that seeks to transform Kenya into a newly industrializing, high middle-income country, recognizes the key role of SMEs in attaining its goals. According to KIPPRA (2023), SMEs are important players in the manufacturing sector towards the realization of Kenya Vision 2030 goals, and also towards achieving the United Nations 2030 Agenda on Sustainable Development Goals – especially Goal 1 (end poverty in all its forms everywhere), Goal 8 (promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all) and Goal 9 (build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation). Therefore, the significance of SMEs in Kenya relate both to the local goals of growing the economy and international Goals on bilateral agreements between Kenya and other global organizations.

At the regional and continental levels, SMEs play an important role in increasing intraregional and interregional trade as envisaged in the regional trade agreements (RTAs), especially the recently launched African Continental Free Trade Area. According to Gammadigbe (2021), RTAs stimulate economic growth in participating countries through increased trade, economies of scale, knowledge and technology transfer. However, it fosters income divergence, reflecting the distribution of the gains from regional integration in favor of the more developed economies of the continent. Kenya, with its growing population, strong educational system, improved business confidence, vibrant private sector and innovative financial sector, has the potential to expand even more and efforts to make SMEs more competitive can help the country achieve its development

objectives by creating more jobs, strengthening sectors and developing business models that work as it continues to integrate further in the RTAs.

### *House of Quality and SME Performance*

House of Quality has been conceptualized by several studies as process approach, leadership, and involvement of people, mutually beneficial supplier relationships, customer focus and continual improvement (Tort-Martorell, Grima & Marco 2011; Wiengarten, Fynes, Cheng & Chavez, 2013). This study conceptualizes HoQ in SMEs as Customer requirements and industry competitive advantage.

Customer requirements are influenced by their wants which reflect the desired preferences for specific ways of satisfying a need related to particular products, brands, or services that satisfy their needs in a specific way. According to Maslow, human behaviour including product preference is related to their needs that progress through five levels from the basic to self-actualization. Needs are what motivates the behavior of people to make a decision to find a solution, which in many cases is “consumption behavior” (Trivedi, & Mehta, 2019). Small and Medium Enterprises translate the consumption behaviour of their customers into product and their performance is a measure of the efficiency of translating the customer requirements into a final product.

Studies investigating the effect of HoQ on performance of SMEs have shown mixed results, largely depending on the industry and the organizational readiness for quality management practices (Bahia, Idan & Athab, 2023). Performance of SMEs can be determined using both financial and non-financial indicators. Financial performance indicators are metrics used by SMEs to track, measure, and analyze their financial health and fall under a variety of categories, including profitability, liquidity, solvency, efficiency, and valuation. Non-financial indicators are important when measuring the performance of SMEs as they help explain and provide context for financial KPIs and are easier to link to certain aspects of the overall SMEs strategy. Non-financial indicators are linked to learning and growth, internal processes, and the customer of SMEs. Research by Al-Qudah et al. (2021) found that SMEs using HoQ experienced a significant improvement in product development and customer satisfaction due to its structured approach in identifying and prioritizing customer needs. González et al. (2019) highlighted that HoQ helps SMEs in resource-

constrained environments streamline operations, reduce waste, and minimize rework, which are critical for them to maintain their competitiveness.

In Kenya, the implementation of HoQ in SMEs remains relatively low, due to the barriers they face including a lack of technical expertise, insufficient resources, and resistance to change, lack of formalized processes for product development and poor organizational culture Mureithi, Ndambiri, and Rotich (2018), despite existing evidence suggesting its potential to enhance performance when adequately applied. From the foregoing, a hypothesis to test the effect of implementing the HoQ on performance of SMEs in Kenya was developed.

***H<sub>1</sub>: Implementing the house of quality framework has a significant effect on performance of SMEs in Kenya.***

## **METHODOLOGY**

This study was a descriptive cross-sectional study that involved SMEs in Kenya. House of Quality was operationalized using customer requirements and competitive benchmarking, while performance was operationalized using customer satisfaction, employee retention and market share of the SMEs. A self administered questionnaire was used to collect data from the respondents. The study employed a stratified sampling method across the industrial sector in Kenya with 80 questionnaires sent to SMEs. A total of 63 returned questionnaires were found to be appropriate for analysis giving a response rate of 78.75%. Diagnostic tests were done to confirm if the data were normally distributed to allow for parametric tests to be undertaken, while descriptive statistics and stepwise multiple linear regression analysis was used to develop the best regression model for testing the relationship between the study variables. Content analysis was used to analyse qualitative data to identify the main patterns between the variables in the study.

## **RESULTS**

### ***Industry Analysis***

The study sought to determine the period respondents had worked in the current SME. The results show that 52.4% of the respondents had been working at their current SMEs for between 1 year and 15 years while only 6.4% had worked for more than 15 years. The results show age diversity in terms of period employees work at an SME that provides mentoring opportunities, lowers hiring costs (79.3% of the respondents had been at the SMEs for between 4 and 15 years), improves their

performance (due to team cohesion over the period of time the respondents had been working at their current SMEs), improves employee engagement, customer satisfaction and leadership pipeline that assures good succession planning. Results are presented in Table 1.

**Table 1: Period in Employment at Current SME**

	Frequency	Percent	Cumulative Percent
Less than 1 Year	9	14.3	14.3
Between 1- 3 Years	21	33.3	47.6
Between 4 – 9 Years	17	27.0	74.6
Between 10 -15 Years	12	19.0	93.7
Between 16-19 Years	1	1.6	95.2
Over 20 years	3	4.8	100.0
Total	63	100.0	

***Implementation of HoQ and Period Employees have worked at Current SMEs***

The results from the study show that 73.02% of the SMEs had implemented HoQ in their operations. The results also show that for the companies that had not employed HoQ in their operations, they did not have any employee working for them beyond 15 years, while a total of 6.35% of the employees in SMEs that had implemented HoQ had worked for more than 15 years. Results are shown in Table 2. Arising from the results shown in Table 1, these results also show that HoQ has an effect of employee retention with a positive relationship to mentoring opportunities, lowering of hiring costs, improving performance of the SMEs, higher employee engagement, improved customer satisfaction, stable leadership pipeline and good succession planning.



**Table 2: Cross Tabulation of Period in Employment and Implementation of HoQ**

		Has your company implemented HoQ		
		Yes	No	Total
<b>Period in Employment at Current SME</b>	Less than 1 Year	7.94	6.35	14.29
	Between 1- 3 Years	28.57	4.76	33.33
	Between 4 – 9 Years	15.87	11.11	26.98
	Between 10 -15 Years	14.29	4.76	19.05
	Between 16-19 Years	1.59	0.00	1.59
	Over 20 years	4.76	0.00	4.76
<b>Total</b>		73.02	26.98	100.00

**Diagnostic Results**

*Reliability Test*

Results show that Cronbach’s ( $\alpha$ ) was between 0.814 and 0.959. Specifically, customer requirements with 18 items had the highest Cronbach’s ( $\alpha$ ) and competitive benchmarking had the lowest value. The values of Cronbach’s ( $\alpha$ ) on the study instrument were between robust ( $>.81$ ) and excellent (0.959) (Taber, 2018). Reliability is concerned with the ability of an instrument to measure consistently and avoid situations in which either a test or scale is wrongly discarded or the test is criticised for not generating trustworthy results. Results are presented in Table 3.

**Table 3: Reliability Results**

	Number of Cases			Number of items in Case	Cronbach’s ( $\alpha$ )
	Valid Cases	Excluded Cases	Total Cases		
Customer Requirements	62	1	63	18	0.959
Competitive benchmarking	61	2	63	10	0.814
Customer Satisfaction	62	1	63	14	0.921
Employee Retention	62	1	63	18	0.950
Market Share	61	2	63	15	0.842

*Normality Test*

Results in Table 4 show that the data was normally distributed using the range for both Skewness and Kurtosis to be -1.96 and +1.96 for normally distributed data (Musebe, 2024). This results allow



parametric tests to be done on determining the relationship between the variables in the study. Results are presented in Table 4.

**Table 4: Normality Test**

	Number of Cases	Skewness	Kurtosis
Customer Requirements	63	-.833	.314
Competitive benchmarking	63	-1.054	1.718
Customer Satisfaction	63	-.499	-.641
Employee Retention	63	-.371	-.489
Market Share	63	-.702	.949

*Multi-Collinearity Test*

Multicollinearity test was done on the study variables to determine if there was an occurrence of high intercorrelations among the variables in the regression model. Multicollinearity can lead to skewed or misleading results when determining how well the independent variable can be used most effectively to predict or understand the dependent variable in a statistical model. The VIF test for multicollinearity test with a threshold of 3 was considered appropriate for this study. Results show the variables were not correlated (VIF 1.000). The results are presented in table 5.

**Table 5: Multi-Collinearity Test**

Variable	Collinearity Statistics	
	Tolerance	VIF
House of Quality	1.000	1.000
<b>a. Dependent Variable: Performance of SMEs in Kenya</b>		

*Hypothesis Testing*

The study sought to establish the effect of implementing HoQ on performance of SMEs in Kenya by testing the following hypothesis:

*H<sub>1</sub>: Implementing House of Quality has a significant effect on performance of SMEs in Kenya.*

Simple regression analysis was used to test this hypothesis. The model summary shows a positive relationship between implementing HoQ and performance of SMEs in Kenya (R=0.777). Results from the model summary also show that implementing HoQ accounts for 60.4% of variations in performance of SMEs in Kenya (R<sup>2</sup>=0.604). The results are presented in Table 6. The import of

this finding is that implementing HoQ enables SMEs to improve their customer satisfaction index, employee retention, market share and consequently have better performance.

**Table 6: Model Summary**

Model	R	R Square	Adjusted R Square
1	.777 <sup>a</sup>	.604	.597

a: Predictors (Constant), Implementing HoQ

The ANOVA summary statistics on the effect of implementing HoQ on performance of SMEs in Kenya show a significant F-ratio at a confidence level of 95% (F=91.378, p< .05). This shows the regression model attained goodness of fit and was appropriate for analyzing data for the study. Results also show a significant relationship between implementing HoQ and performance of SMEs in Kenya (p<.05). Results are presented in Table 7.

**Table 7: ANOVA**

	Sum of Squares	Df	Mean Square	F	Sig.
<b>Regression</b>	10.235	1	10.235	91.378	<.001 <sup>b</sup>
<b>Residual</b>	6.720	60	0.112		
<b>Total</b>	16.955	61			

a. Dependent Variable: Performance of SMEs in Kenya

b. Predictors: (Constant), HoQ

Regression coefficient results on implementing HoQ and performance of SMEs in Kenya, also show that implementing HoQ statistically predicts performance of SMEs in Kenya at a confidence level of 95% ( $\beta=.654$ ,  $t = 9.559$ ,  $p< .05$ ). Arising from this finding, that a unit change in implementing HoQ explains 0.654 units of variance in performance of SMEs in Kenya, SMEs expect to increase their market share, improve their employee retention and improve their customer satisfaction index when they implement HoQ in their operations. Results are presented in Table 8.

**Table 8: Coefficients**

		Coefficients <sup>a</sup>				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	1.465	0.277		5.298	0.000
	House of Quality	0.654	0.068	0.777	9.559	0.000

a. Dependent Variable: Performance of SMEs

## DISCUSSION OF RESULTS

The study investigated the effect of implementing HoQ on performance of SMEs in Kenya. In operationalizing the variables, customer requirements and competitive benchmarking were used for HoQ while customer satisfaction, employee retention and market share were used for SME performance. These results show that implementing HoQ has a positive effect on performance of SMEs in Kenya and suggest that implementing HoQ leads to better performance in SMEs. The results in Table 6 reveal a positive relationship between implementing HoQ and performance of SMEs in Kenya ( $R=.777$ ), also, the results in Table 6 show that 60.4% of the variations observed in performance of SMEs is caused by implementing HoQ ( $R^2= .604$ ). Further, the results in table 7 show the linear regression model used in the study was appropriate to determine the relationship between implementing HoQ and performance of SMEs in Kenya ( $F=91.378$ ,  $p< .05$ ) and from table 8 the results show that a unit change in implementing implementing HoQ results in .654 units of variation in performance of SMEs in Kenya ( $\beta=.654$ ,  $t = 9.559$ ,  $p< .05$ ).

The HoQ as one of the concepts used in total quality management, addresses the issues raised by customers (Voice of the customer) and incorporates the attributes that a customer would like to have or experience in the product. Results from the study show that when SMEs interpret the voice of the customer they improve their customer satisfaction. As a consequence of these results SMEs should not assume they know what their customers want, and understand the importance of correctly translating the needs of customers into the final product. Results from the study are similar to findings by Hauser and Clusing (1988) that HoQ provides interfunctional planning and communication with the output effect of improving performance of manufacturing companies.

Further, results of the study show that implementing HoQ helps SMEs improve their performance through employee retention. Results in Table 2 show that SMEs that had implemented HoQ retained their employees for a longer period compared to those which had not. Employee retention in SMEs provides an opportunity for mentorship among the employees. Mentoring enhances performance management program in SMEs by creating a culture of continuous learning and improvement, where employees are motivated to seek and share feedback, learn from mistakes, and pursue new challenges and opportunities. Mentoring also helps SMEs to develop their employees' skills, competencies, and potential to increase their productivity, quality, and

innovation. Employee retention also helps SMEs to lower their hiring costs, have higher employee engagement, improved customer satisfaction, stable leadership pipeline and succession planning.

Results of the study also show that implementing HoQ enables SMEs to improve their performance by growing their markets and market share. Market share is a key indicator that reflects business performance (Chi & Seock-Jin , 2017). Market share is important to performance of SMEs as it can affect operations, pricing of products and services. A growing market share corresponds to growing revenue, and a business can scale up its operations and opportunity for greater profitability as gaining market share is a serious business goal for SMEs. Implementing HoQ helps SMEs to improve their innovation, build and solidify customer loyalty, employ a talented, dedicated workforce, and deploy effective pricing products and services efficiently.

### **CONCLUSIONS AND RECOMMENDATIONS**

The study sought to determine the effect of implementing HoQ on performance of SMEs in Kenya. The study concludes that indeed, there exists a significant positive relationship between implementing HoQ and performance of SMEs in Kenya. Further, the study concludes that implementing HoQ helps SMES to realize growth in their markest share, have better employee retention and improve their customer satisfaction. The study recommends SMEs to entrench the use of HoQ in their processes, as a way of mitigating the various factors that cause them to close early, with an average age of 3.8 years at closure, about 80 per cent of them shutting down before their 5th year of operation and 46.3 closing during their first year of establishment (Mokwaro & Nyamu, 2019).

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