

## Customer Relationship Management as a Firm-level Factor and its role in Firm Performance: A Study on the Firms Listed

<sup>1</sup>Ndungu Samuel Machiri, <sup>2</sup>Margaret Oloko, <sup>3</sup>John Karanja Ngugi, <sup>4</sup>Romanus Odhiambo

<sup>1,2</sup>Jomo Kenyatta University of Agriculture and Technology Kenya, <sup>3</sup>Kenyatta University, Kenya, <sup>4</sup>Meru University of Science and Technology, Kenya

### ARTICLE INFO

#### Article history:

Received 18 November 2023

Accepted 30 January

Available online 31 January

#### Keywords:

Customer Relationship Management, Firm-level Factors, Organizational Performance, Listed Firms, Nairobi Securities Exchange

### ABSTRACT

The study sought to examine the relationship between customer relationship management and performance of firms listed at Nairobi Securities Exchange. While the listed firms remain integral in the country's economy, their continued performance has been declining over the years. This has seen some of the firms get delisted and others suspended from trading due to subsequent years of loss-making. Customer relationship management on the other hand has been found to be instrumental in determining the performance of modern firms, in the midst of growing competition and dynamic operating environment. The motivation of this study was therefore the limited literature on the relationship between customer relationship management and performance of listed firms. The study utilized a descriptive-exploratory research design, where 240 senior management personnel drawn from the 64 listed firms were surveyed using a structured questionnaire. The data was analysed using SPSS and Amos software for descriptive statistics, regression model and structural equation modelling respectively. The findings revealed that customer relationship management had a significant influence on the performance of firms listed at the NSE ( $R^2 = .265$ ;  $\beta = 0.353$ ;  $P=0.0001<0.05$ ). It was therefore concluded that customer relationship management as a firm-level factor is instrumental in determining the performance of the listed firms at the NSE. The study recommended the need for the management of the listed firms to be at the forefront of pushing for enhanced customer relationship management so as to strengthen the firms' performance.

© 2024 The Author(s). Published by AIRA.

This is an open access article under the CC BY-SA license (<http://creativecommons.org/licenses/by-sa/4.0/>).



### Corresponding Author:

Ndungu Samuel Machiri

Jomo Kenyatta University of Agriculture and Technology Kenya

Email: [ldck2030@gmail.com](mailto:ldck2030@gmail.com)

## 1. INTRODUCTION

A customer is a purchaser of an organization goods and services. Thus, for any organization to be successful it must meet the customers' demands through clear focusing of the organization practices. According to [1] Customer Relationship Management (CRM) refers to the practices, strategies, and technologies that organizations use to manage and nurture their interactions with current and potential customers. It involves a systematic approach to understanding customer needs, building relationships, and delivering value to enhance customer satisfaction and loyalty. Organizations constantly seek to establish and maintain relationships with their customers. These relationships are forged by studying customers' purchasing behavior, as their traits and characteristics can vary significantly.

The changeable nature of customers' traits is influenced by numerous factors within the competitive business environment[2]. Additionally, customer behaviors differ across various industries and sectors. Therefore, the way customers are treated and managed by an organization depends on the specific trade field it operates in, creating a conceptual or concrete standard for handling customers within that particular industry. Through CRM, organizations increase customer satisfaction since they are

able to better understand customer needs, preferences, and behaviors, allowing them to personalize interactions and deliver superior customer experiences[3].

CRM also enables increased customer retention and loyalty by nurturing customer relationships, addressing concerns, and providing proactive support [4]. This helps build trust and loyalty, reducing customer churn and increasing customer lifetime value[5], continued focus on customers and streamlining the relationship serves to enhance marketing effectiveness by enabling targeted marketing campaigns, enabling organizations to deliver personalized messages, track campaign performance, and optimize marketing strategies based on customer insights. This also improves cross-departmental collaboration, facilitating better communication and coordination between sales, marketing, and customer service teams. As a strategic management driver, CRM is therefore essential for enabling managers to drive organizational strategies by including customers in the matrix for enhanced performance.

One of the key aspects of CRM is customer service and support. This is the set of mechanisms and systems to support customers and provide additional services (after-sale services) that the customers may require CRM facilitates efficient customer service and support by providing a unified view of customer interactions and history. Customer service representatives can access customer information quickly, track service requests, resolve issues, and provide personalized assistance, enhancing customer satisfaction and loyalty. Customer service and support refer to the processes, strategies, and activities that organizations undertake to assist customers before, during, and after their purchase or interaction with a product or service [6]. According to [7], effective customer service and support contribute to customer retention, loyalty, and positive word-of-mouth referrals. It helps organizations build strong customer relationships, differentiate themselves in the market, and create a competitive advantage. By prioritizing customer satisfaction and providing exceptional support, organizations can foster customer loyalty and drive long-term business success[8].

Customer engagement is another aspect of CRM. This is the active participation, interaction, and emotional connection between a customer and an organization. It goes beyond the transactional relationship and focuses on fostering a deeper connection and ongoing involvement with the customer. Customer engagement tends to bring customers closer to the organization by enhancing communication, interaction, and feedback, building emotional connections with the customers as well as creating value for them. Engaged customers are more likely to make repeat purchases, refer others to the organization, and remain loyal even in the face of competition[9]. By focusing on customer engagement, organizations can foster long-term relationships, drive business growth, and differentiate themselves in a competitive market, thus enhancing sustainable performance.

Customer data management is another critical aspect of customer relationship management. This is the processes, strategies, and technologies implemented by organizations to effectively collect, organize, store, and utilize customer data. It involves the systematic management of customer information throughout the customer lifecycle to support various business activities and enhance customer relationships. Having the right CRM systems to centralize and organize customer data, including contact information, purchase history, preferences, and interactions across various touch-points is core to streamlining customer satisfaction and retention [10].

A critical analysis of firm level competencies can expand the understanding of how firms compete in the market-place and what factors influence their relative success. Within the Kenyan context, there are examples of disparities in performance of various firms despite their operating within the same economic environment, accessing similar talent pool and other critical resources. Three (3) firms; Uchumi, Mumias Sugar and Kenya Airways, for example are undergoing operational difficulties and might require government bail-out to survive. noted that at least 4 NSE-listed firms (Uchumi, Kenya Airways, Mumias Sugar, CMC Holdings and Express Kenya) were reported to either be insolvent, nearly insolvent or operating on negative working capital

In contrast, there are firms that continue to perform exceedingly well within the same environment; KCB, Safaricom Ltd, Equity Group, Nation Media Group, Kenya Power & Lighting Co. This study argues that the variance in performance is driven by how firms configure and recombine firm level competencies to sustain their competitiveness thereby delivering above average returns. This study proposes that the differences in performance can be attributed to managerial competencies, customer engagement strategies, organizational learning and investments in IT capabilities.

Listed firms in Kenya are companies whose shares are traded in the Nairobi Securities Exchange (NSE) and operate as public companies incorporated and registered under the Companies Act Cap 486, Laws of Kenya. The NSE is Africa's fifth largest securities exchange in terms of market capitalization as a percentage of Gross Domestic Product (GDP); which stood at 25% as at 2009 and 31% in 2012; Kenya was ranked seventh behind South Africa (212%), Ghana (61%), Morocco (59%), Egypt (53%), Mauritius (55%) and Botswana (32%), (CMA Report 2008-2009, 2012). The country was placed fourth largest in terms of trading volumes in Africa (World Bank, 2012). The NSE facilitates the Kenyan economy by creating an enabling environment for intermediation of scarce financial resources to investment in productive enterprises, assisting in the rational and efficient allocation of capital and improves the access to finance by different types of users by providing opportunities and avenues for investments.

Statement of the Problem in this research the firms listed at the Nairobi Securities Exchange (NSE) play a fundamental role in the country's economy by being the indicators of the status of business environment (NSE, 2022). However, the performance of most of these firms has been unstable, as it has been revealed in various annual reports. A cross-examination of NSE reports spanning from 2009 to 2022 reveals a consistent drop in performance across most of the Commercial and Services Companies listed on the NSE. Companies such as Kenya Airways, Eveready East Africa, Express Kenya, Standard Group, and TPS Eastern Africa experienced either negative or decreasing Return on Assets (ROA) during this period. While Nation Media Group did have a positive ROA from 2009 to 2020, there was a notable decline from 27% in 2012 to 1% in 2020. Similarly, Sameer Africa and WPP Scangroup demonstrated mixed results, with the highest ROA falling below 5% for the period from 2014 to 2020. With the exception of Express

Kenya Ltd, all these companies reported an ROA of less than 5% in 2020, indicating a subpar performance, as a favorable ROA is typically considered to be 5% or higher. Decline in performance deter investor from investing in such firms (NSE, 2020). For instance, Standard Chartered bank reduced its profits by Sh3.7 billion in 2020 compared to Sh1.8 billion in 2019. In insurance, two-thirds of the listed firms recorded a drop in profits comparing the 2017 to 2018 performance (NSE, 2019).

Previous evidence has shown that Customer Relationship Management (CRM) as one of the firm-level factors plays an integral role in determining the performance of modern organizations. A study revealed that customer focus was instrumental in driving customer satisfaction thus leading to organizational performance. Moreover, a study by [1] revealed that through customer relationship management, organizations understood better the needs of the customers thus striving to meet them for enhanced performance. Similar results were also noted by who established that CRM was a significant firm-level factor that enhanced firm performance. These studies, however, have been carried out in different contexts and conceptualized CRM differently. This therefore raised this need for this study to assess the influence of Customer Relationship Management on the performance of listed firms in NSE. The objective of this study is to examine the influence of customer relationship management on performance of firms listed at Nairobi Securities Exchange.settlements.

## 2. RESEARCH METHOD

The study employed a combination of descriptive and exploratory survey research designs. Descriptive survey research, as defined by Polit and Beck, is a systematic method for gathering data through questions, observations, and interviews. On the other hand, exploratory research design is a flexible approach that allows the researcher to investigate various aspects of a problem and attempt to elucidate potential relationships between phenomena. In this study, both designs were utilized to examine the connections between identified independent variables and the dependent variable.

The study focused on firms listed on the NSE that were actively trading as of December 31st, 2020. These firms are regulated by the Capital Markets Authority and are obligated to furnish audited financial statements, ensuring the availability of objective and reliable economic and financial performance data .There were a total of 64 publicly listed companies, categorized into ten industry sector groups according to the NSE Handbook 2013. These sectors include Agriculture, Automobile and Accessories, Banking, Commercial and Services, Construction and allied, Energy and Petroleum, Insurance, Investments, Manufacturing and Allied, Telecommunication, and Technology.

All the listed firms were included in the survey. Data was collected using a principal informant research approach, prioritizing key decision makers in these companies, particularly those in top management positions. A sample of 240 respondents was obtained, with four respondents selected from each firm, typically drawn from senior personnel such as Chief Executives, Managing Directors, General Managers, or Executive Directors responsible for strategy formulation, implementation, and review in their respective firms. The unit of observation in this study was senior executives from each of the listed firms.

The primary data collection tool was a questionnaire, administered to senior executives at the General Manager or Senior Executive Director level in each of the listed firms. The collected data was screened, coded, and entered into the primary statistical tool used in the research, which was the Statistical Packages for Social Sciences (SPSS). Data analysis encompassed coding, response analysis, diagnostic tests, descriptive analysis, model development and testing, and ultimately hypothesis testing. Conclusions were then drawn from the analysis[11]–[15].

The Structural Equation Modeling (SEM) model was specified using AMOS, a visual statistical software integrated within SPSS, specialized for SEM, path analysis, and confirmatory factor analysis. Additionally, regression models were employed to test the hypotheses. Each independent variable was regressed against the dependent variable, with results presented using correlation (r), variance (ANOVA), regression (R<sup>2</sup>), and regression coefficients[16].

## 3. RESULTS AND DISCUSSION

### 3.1 Instrument Return Rate

The study surveyed 240 respondents. Out of these, 180 questionnaires were dully filled and given back for analysis. This represented a response rate of 75%. According to Kothari (2014), a response rate of above 60% is adequate to represent the sampled population in a social-science study. The 75% response rate was therefore considered adequate for this study.

### 3.2 Customer Relationship Management

The study sought to examine the influence of customer relationship management on the performance of companies listed at the NSE. The findings are herein presented based on the specific measures of customer engagement which were customer data management, customer contact platform and lifecycle management. The respondents' views on general customer engagement metrics in their respective organizations were sought. The respondents were asked to indicate their levels of agreement on specific statements on customer engagement. The findings as shown in Table 1 revealed that on the first statement that customer engagement is a key source of competitive advantage for any business, majority of the respondents agreed with the statement as evidenced by a mean of 3.95 and a standard deviation of 0.72. The findings compare positively with those by Binsaeed et al. (2023) who established that through customer relationship management, organizations tend to engage customers and make them feel part of the firm thus

making them loyal. It also concurs with Vivek, Beatty, & Morgan, (2012), that customer engagement is a vital component of relationship marketing which helps intensify an individual's participation in and connection with an organization's offerings and/or organizational activities, which either the customer or the organization initiate. The findings imply that deep customer engagement creates a more sustainable business-to-customer relationship which translates to better firm performance

Table 1: General Customer Relationship

Statement	Mean	Std. Deviation
Customers engagement is a key source of competitive advantage for any business	3.95	0.73
Organisations that create a high level of engagement with their customers are more successful than those who do not	4.58	0.67

### 3.2.1 Expenditure on Customer Engagements

The study sought to found the expenditure of the firms to customer relationship practices. The respondents were required to indicate the previous expenditure, the present and the projected future expenditure on customer engagement related activities. The findings as shown on Table 2 revealed that the respondents indicated that their respective firms invested 12.4% of their customer engagement budgets in understanding customer behavior and needs 5 years prior to the study, 18% at the present time of the study and 15.2% in five years' time.

Table 2: Expenditure in Customer Engagement

Expenditure	5 Years Ago Mean	Present Mean	Percentage	5 Years to Mean
Understanding the customer behavior and needs: Expenditure on customer analytics capabilities, this includes customer data collection, data storage, CRM systems, analytics tools and technical staff to carry out customer analytics,	12.4%	8.0%	1	15.2%
Marketing & Promotion: Expenditure in marketing activities: advertisement, after sale services, promotions, engagement forums, research and development, customer rewards schemes	72.0%	9.6%	7	61.7%
Customer communication platforms: Customer engagement channels; digital/electronic channels, customer service officers, contact centers, service centers etc.	15.6%	.4%	2	23.1%

### 3.2.3 Level of Agreement with Customer Engagement Aspects

The study sought to find out the respondents' level of agreement on specific statements on the customer engagement and performance of their respective organizations. The findings are as shown in Table 3. The findings compare favorably with those by Bohling et al. who found that customer relationship was an aspect strongly upheld by leading organizations across the globe, a practice through which they continuously and sustainably met the needs of their customers thus creating high retention and customer citizenship. These findings also agree with the findings who established that as a result of customer engagement, customers were better attached to the firm through which they got committed and developed loyalty for the organization's products and services.

Table 31: Agreement with statements on Customer Relationship

Statement	Mean	Std. Dev.
Customers engagement applications systems help solve your business problems or make you understand your customers and improve your overall business performance	3.72	0.96
Centralized data storage improves customer services, increases sales thereby increasing organisational performance	4.24	0.87
Availing multiple customer touch points builds customer loyalty	4.12	0.93
Focusing on customer journey improves customer lifetime value and therefore contributes to organisational performance in the medium to long term	3.73	0.98
Investing in technology to acquire and manage real time customer information and feedback improves business performance	4.18	0.87
Relative to your competitors, the quality of your information technology resources dedicated to customer engagement gives your firm a competitive edge	3.83	1.03
In your firm, focusing on customer engagement is every employees responsibility	4.13	0.95

### 3.3 Performance of Firms Listed at the NSE

#### 3.3.1 Employee Satisfaction

The study assessed firm performance in terms of employee satisfaction, whereby the respondents were requested to give their opinion on staff turnover rate. The findings revealed that majority of the respondents indicated that their organizations had recorded turnover rate of between 15% to 20% with 34.4% of the total respondents, followed by those that indicated between 3% and 10% with 23.9%, 10-15% with 21.7%, less than 3% with 15% while those that had a turnover of more than 20% were 5% of the total respondents.

Table 4: Employee Turnover

Option	Frequency	Percent
Between 3% and 10%	43	23.9%
Above 10% but below 15%	39	21.7%
15% but below 20%	62	34.4%
20% and above	9	5.0%
<b>Total</b>	<b>180</b>	<b>100.0%</b>

#### 3.3.2 Customer Satisfaction

To measure firm performance of firms listed at the NSE based on ratings on customer satisfaction, the study sought opinion from respondents based on observable indicators of customer satisfaction that is; meeting customer needs, and customer growth rates. From the findings as shown in Table 5, it is evident that 6.7% of the respondents rated the customer satisfaction in their respective firms to be 2 to 4, 30% rated the satisfaction from 4 to 6, 58.3% rated it from 7 to 8 and 5% rated the satisfaction from 9 to 10.

Table 5: Customer Needs

Rating	Frequency	Percent
2-4	12	6.7%
4-6	54	30.0%
7-8	105	58.3%
9-10	9	5.0%
<b>Total</b>	<b>180</b>	<b>100.0%</b>

### 3.3.3 Annual Customer Growth Rate

The study sought to find out the average annual growth rate in the number of customers. The respondents were asked to indicate the range in percentages as indicated on the questionnaire. The findings as shown in Figure 2 revealed that 15% had less than 2% annual customer growth rate, 20.6% had between 2 and 5% growth rate, 23.3% had between 6 and 9% growth rate and 31.1% had between 10 and 15% customer growth rate.

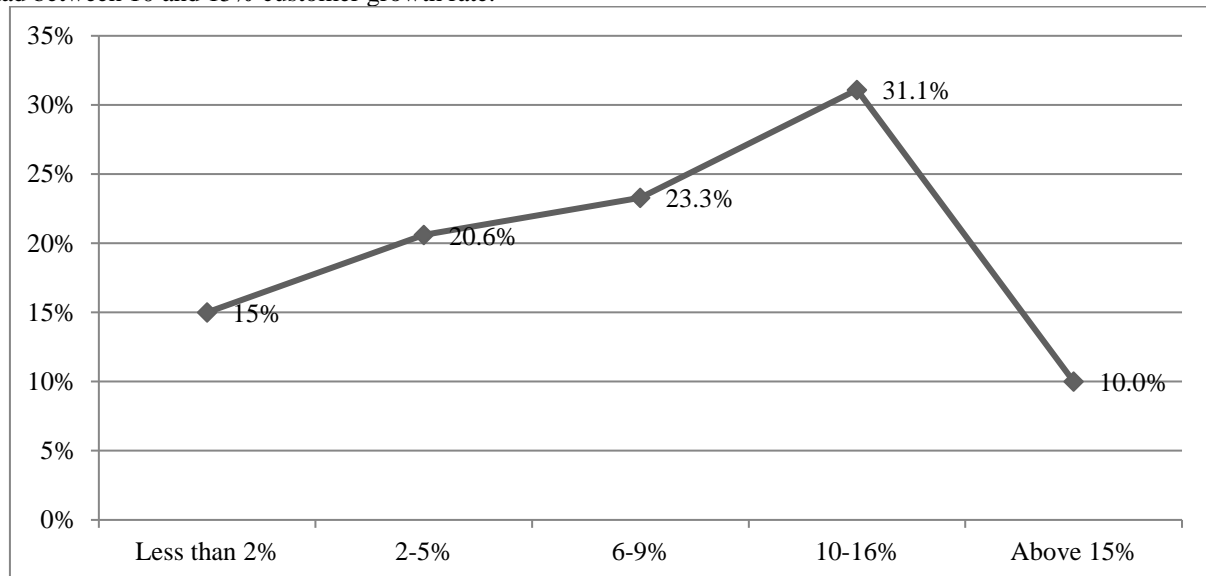


Figure 2: Rate of Customer Growth

### 3.3.4 Firm Profitability

The study sought views from respondents on various metrics traditionally used to measure firm profitability. The views were gathered regarding opinion on average return on assets and return on equity, average market growth and market capitalization. The study found that majority of the firms (43.3%) had more than 25% growth rate of the Return on Equity while 13.9% of the respondents had below 5% growth rate in the ROE. On the other hand, majority of the firms (56.7%) had between 5 and 10% growth rate in the Return on Assets while 7.2% of the firms had a growth rate on ROA below 5%.

Table 6: Average Return on Equity and Return on Assets

ROE			ROA		
	Frequency	Percentage		Frequency	Percentage
<b>Below 10%</b>	16	8.9%	<b>Below 5%</b>	13	7.2%
<b>10%-30%</b>	139	77.2%	<b>5-10%</b>	102	56.7%
<b>Above 30%</b>	25	13.9%	<b>Above 10%</b>	65	36.1%
<b>Total</b>	<b>180</b>	<b>100%</b>	<b>Total</b>	<b>180</b>	<b>100%</b>

### 3.4 Hypothesis Testing

The study sought to assess the influence of customer relationship management on performance of firms listed at the NSE. The relationship between customer relationship management and firm performance was sought using a simple regression model and a structural model as herein presented in Table 7 and Figure 3.

The model summary shown in Table 7 revealed that the R value for the model was 0.515 and the R<sup>2</sup> was 0.265, an indication that a variability of 26.5% in firm performance could be explained by a unit change in customer relationship management. The model thus was deemed appropriate to explain the relationship between customer engagement and the performance of firms listed at the NSE.



The ANOVA results are as shown in Table 7 which revealed that at the F-calculated value of 64.097 and the mean of 5.350 indicates the model was significant at a p-value of 0.000 less than the standard p-value of 0.05. This implies that the variable customer engagement was significant.

The coefficient results shown in Table 7 revealed that the  $\beta$  for the customer engagement was 0.353 thus the new model becoming  $Y = 1.556 + 0.353X_2$ . This implies that a unit change in customer engagement could explain up to 35.3% change in the performance of firms listed at the NSE. The P-value for the variable was  $0.000 < 0.05$ , an indication that customer engagement had a positive and significant influence on performance of firms listed at the NSE.

Table 7: Model Summary; Customer Engagement

Model	Mo	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1		.515 <sup>a</sup>	.265	.261	.28892	
ANOVA Results						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.350	1	5.350	64.097	.000 <sup>b</sup>
	Residual	14.858	17	.874		
	Total	20.209	18			
Regression Coefficients						
Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
		B	Beta			
	(Constant)	1.556	.180	8.637	.000	
	Customer engagement	.353	.515	8.006	.000	

a. Dependent Variable: Performance of firms listed at the NSE

b. Predictors: (Constant), Customer Relationship Management

### 3.5 Structural Model on Customer Relationship Management

To further establish the relationship between customer relationship management and performance of firms listed at the NSE, a Structural equation model was used. The results as shown in Figure 3 revealed that the average path coefficient beta ( $\beta$ ) value was 0.572 implying that a unit change in customer engagement explained up to 57.2% increase in performance of firms listed at the NSE.

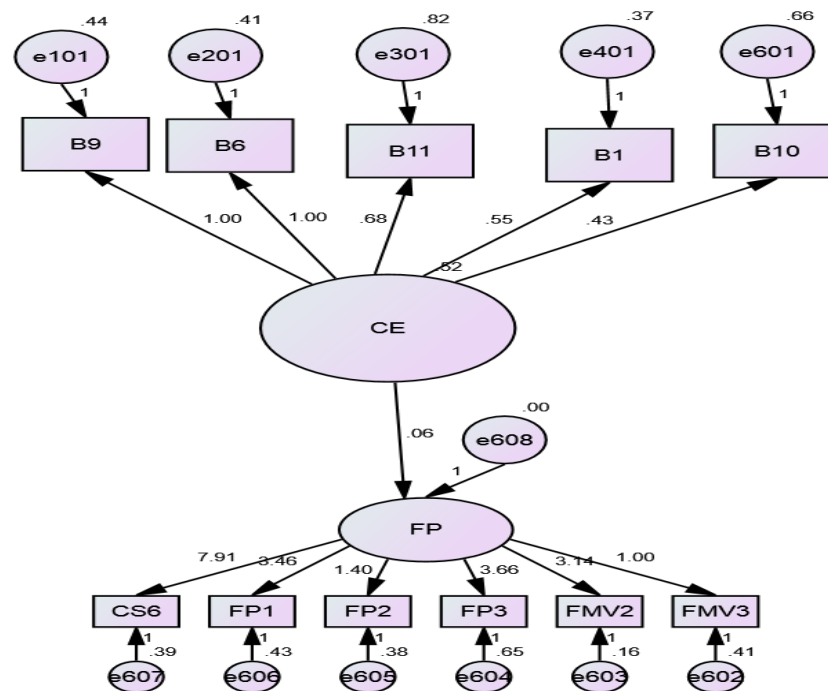


Figure 3: Structural Equation Model for Customer Relationship Management

From the findings, it can be derived that indeed customer engagement influences firm performance hence rejection of the null hypothesis that customer engagement has no significant influence on performance of firms listed at the NSE. The findings corroborate with the findings of Alshurideh et al. (2023) who posited that firms should consider the multitude of customer engagement moderators to develop comprehensive segmentation strategies with the goal of maximizing profitability and that customers can co-create value, co-create competitive strategy, collaborate in the firm's innovation process, and become endogenous to the firm. Another study by (Nuseir & Refae, 2022) concluded customer analytics – a key component of customer engagement, have a positive impact on firm performance. Meena and Sahu (2021) concluded that customer participation behavior has direct, positive effects on employee performance, satisfaction and commitment. From the same study, the results also indicated that customer citizenship behavior has direct, positive impacts on employee performance and commitment. In turn, these employee variables decrease turnover intention.

#### 4. CONCLUSION

The study concluded that engaging customers is an essential firm level factor that influences firm performance and competitiveness. Through allocation of sufficient resources to customer engagement approaches such as understanding customer behavior and needs, promotion and marketing as well as creation of customer communication platforms and multiple touch-points, the firms listed at the NSE invested on bonding their customers as a means of sustaining and improving firm performance. It is concluded that collecting, storing and analyzing customer data enhances the relationship between the firm and the customers which is a key aspect of firm performance.

Firms listed at the Nairobi Securities Exchange could enhance their performance through investing in customer relationship management and strengthening the relationship between the firm and the customers. Every organization exists with the main aim of enhancing shareholders' wealth and this can only happen through the customers. This behooves firms to invest in customer engagement practices that help deliver customer experience that ultimately builds brand loyalty and customer citizenship. The listed firms have though the management ought to consider customer relationship management as a driver towards their continued performance. The firms should embrace customer services and place the interests of the customers at the helm of the organization since these are the key reasons as to why the companies exist. Understanding the needs of the customers would be a major attribute towards gaining the access to better and wider markets hence the management of these companies should frequently emphasize on the need for customer relationship management.



## REFERENCES

- [1] A. Agatic, E. Tijan, S. Aksentijevic, and A. Pucihar, "Internet of Behavior - The Transformation of Customer Relationship Management in Logistics," in *2023 46th ICT and Electronics Convention, MIPRO 2023 - Proceedings*, 2023. doi: 10.23919/MIPRO57284.2023.10159983.
- [2] T. A. Rospricilia and Mudjahidin, "Goals of Customer Relationship Management in Hospitals based on the Customer Life Cycle: A systematic literature review," in *2022 International Seminar on Application for Technology of Information and Communication: Technology 4.0 for Smart Ecosystem: A New Way of Doing Digital Business, iSemantic 2022*, 2022. doi: 10.1109/iSemantic55962.2022.9920455.
- [3] I. P. Sinaga, A. Rholas Jonathan Situngkir, V. M. Henry Siahaan, and S. Heripracoyo, "Analysis and design of the customer relationship management system of umrah in pt. xyz tours travels indonesia," in *Proceedings of 2021 International Conference on Information Management and Technology, ICIMTech 2021*, 2021. doi: 10.1109/ICIMTech53080.2021.9535087.
- [4] D. Song and C. Liang, "Application research of data mining technology in customer relationship management," in *Proceedings - 2021 4th International Conference on Advanced Electronic Materials, Computers and Software Engineering, AEMCSE 2021*, 2021. doi: 10.1109/AEMCSE51986.2021.00244.
- [5] K. Krishnareddy, T. V. Aravinda, K. Nair, U. K. Patel, G. Sadvokasova, and V. Shyamala Susan, "AI-based Fuzzy Clustering System for Improving Customer Relationship Management," in *6th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), I-SMAC 2022 - Proceedings*, 2022. doi: 10.1109/I-SMAC55078.2022.9987262.
- [6] W. M. Wilda and L. Hanum, "Information System Application Alanysis And Design Web-Based Network Complaints Using Php And Bootsrap On Diskominfo," *J. Inf. Syst. Technol. Res.*, vol. 1, no. 2, pp. 68–78, May 2022, doi: 10.55537/jistr.v1i2.131.
- [7] R. C. Li and M. L. Tee, "Developing an Implementation Framework for Automated Customer Support Service in Collaborative Customer Relationship Management Systems," in *2021 IEEE International Conference on Industrial Engineering and Engineering Management, IEEM 2021*, 2021. doi: 10.1109/IEEM50564.2021.9672894.
- [8] S. Sharma, "Big Data Analytics for Customer Relationship Management: A Systematic Review and Research Agenda," in *Communications in Computer and Information Science*, 2020. doi: 10.1007/978-981-15-6634-9\_39.
- [9] M. Anshari, M. N. Almunawar, S. A. Lim, and A. Al-Mudimigh, "Customer relationship management and big data enabled: Personalization & customization of services," *Applied Computing and Informatics*, vol. 15, no. 2, 2019. doi: 10.1016/j.aci.2018.05.004.
- [10] Beni Frandian, R. D. Yudhanata, S. Samsudin, and S. Suendri, "Implementation of CRM (Customer Relationship Management) at UPT Public Health Center Perbaungan Web-Based," *J. Inf. Syst. Technol. Res.*, vol. 1, no. 2, pp. 51–57, May 2022, doi: 10.55537/jistr.v1i2.149.
- [11] S. S. Muhammad Syaifuddin, "The Effect of Organizational Commitment , Organizational Communication and Organizational Culture on Employee Performance Pengaruh," *Indones. J. Law Econ. Rev.*, vol. 17, pp. 1–15, 2022.
- [12] N. P. A. Widyawati, E. Sujana, and G. A. Yuniarta, "Pengaruh Kompetensi Sumber Daya Manusia, Whistleblowing System, dan Sistem Pengendalian Internal Terhadap Pencegahan Fraud Dalam Pengelolaan Dana BUMDES (Studi Empiris pada Badan Usaha Milik Desa di Kabupaten Buleleng)," *J. Ilm. Mhs. Akunt.*, vol. 10, no. 3, pp. 368–379, 2019, [Online]. Available: <https://ejournal.undiksha.ac.id/index.php/S1ak/article/view/22806>
- [13] C. Hai, "Construction and Application of Multiple Linear Regression Model for Construction Project Cost," in *Proceedings - 2021 International Conference on Advanced Enterprise Information System, AEIS 2021*, 2021. doi: 10.1109/AEIS53850.2021.00017.
- [14] M. S. El Ayoubi and M. Radmehr, "Green food supply chain management as a solution for the mitigation of food supply chain management risk for improving the environmental health level," *Heliyon*, vol. 9, no. 2, 2023, doi: 10.1016/j.heliyon.2023.e13264.
- [15] K. Maina and K. R. Riany, "Mass Media Target Audience and Mental Illness Stigmatization among Students of Kenya Medical Training College," *J. Inf. Syst. Technol. Res.*, vol. 2, no. 3, pp. 124–132, 2023, doi: 10.55537/jistr.v2i3.663.
- [16] A. B. Shah and M. G. Rao, "A study on factors affecting online shopping behaviour in gujarat," 2015.