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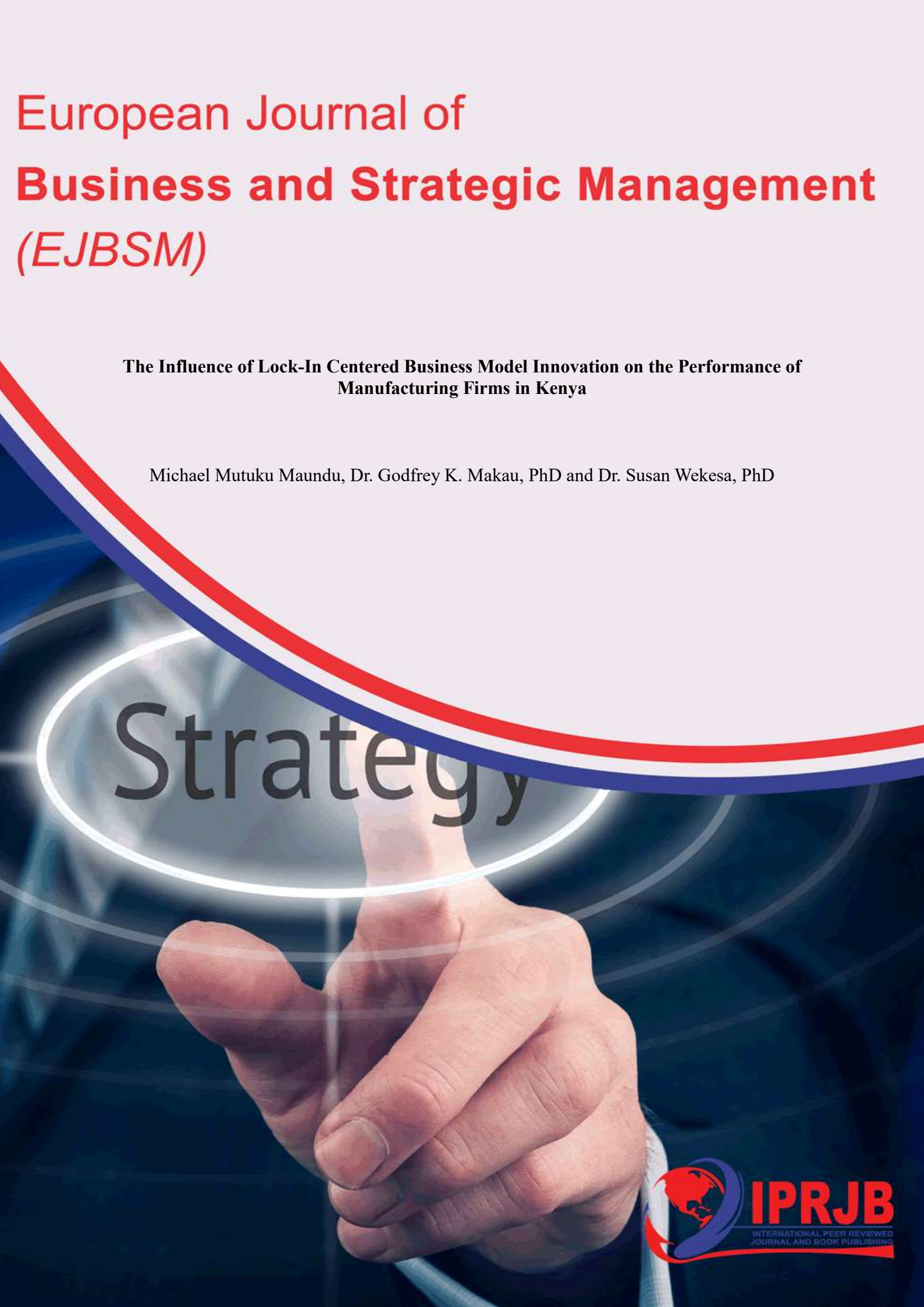


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# The Influence of Lock-In Centered Business Model Innovation on the Performance of Manufacturing Firms in Kenya

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**Abstract**

**Purpose:** Business model innovation is a fundamental catalyst for organizations to transform their value creation infrastructure in order to achieve superior long-term performance and pay off associated complex commercial risks. This study was designed to investigate the influence of lock-in centered business model innovation on the performance of manufacturing firms in Kenya.

**Methodology:** The study adopted the descriptive research design and positivism philosophy that was aligned to the classical scientific method of research inquiry. Multi-stage sampling method was adopted to collect data from top management team in the manufacturing sector using a semi-structured questionnaire. The data was analysed using descriptive analysis techniques such as mean, percentages and standard deviation. Inferential analysis using linear regression was undertaken to establish the relationship between the predictor variable and the outcome variable using Statistical Package for the Social Sciences software.

**Findings:** The study revealed that lock-in centered business model innovation ($\beta$=-0.47, p=0.001<0.05) negatively and significantly influences manufacturing firms' performance.

**Unique Contribution to Theory, Practice and Policy:** The study recommends that manufacturers should endeavour to innovate their business models in order to achieve superior long-term performance. The study contributes to manufacturing sector literature by providing empirical evidence on how managers can embed business model innovation practices to improve Kenyan manufacturing firms' performance in the highly volatile, uncertain, complex and ambiguous environment.

**Keywords:** *Innovation, Firm Performance, Organization, Production*

**JEL Codes:** *O31, L25, L20, L11*

## INTRODUCTION

Business model innovation (BMI) has gained significant attention globally, particularly since the 1990s, as firms face increasing challenges in maintaining competitive advantage in a dynamic, global environment (De Kluyver, 2012). One promising approach is lock-in centered business model innovation (LCBMI), which focuses on creating long-term customer retention by reducing switching costs. This strategy is becoming increasingly vital as firms shift from relying solely on product and service innovation to building customer loyalty and reducing churn (Foss & Saebi, 2018).

At the global level, multinational enterprises (MNEs) have leveraged lock-in strategies to sustain competitive performance through digital technologies such as IoT, AI, and blockchain, enhancing customer loyalty and creating high switching costs (Osiyevskyy & Zargarzadeh, 2015). Regionally, the manufacturing sector in Africa, including Kenya, faces slower growth rates compared to other regions like East Asia. Despite being the most advanced in East Africa, Kenya's manufacturing sector is hindered by low manufacturing value-added (MVA) per capita, limiting its competitiveness (Deloitte, 2020).

Locally, Kenya's manufacturing sector, crucial to Vision 2030, has underperformed, with low MVA contributions and limited productivity growth (KAM, 2019; ADB, 2019). The adoption of LCBMI can enhance competitiveness by focusing on customer retention and loyalty, enabling Kenyan manufacturing firms to overcome macroeconomic challenges and contribute more effectively to the nation's economic transformation goals. This study investigates the role of LCBMI in improving the performance of Kenyan manufacturing firms, aiming to fill gaps in the current literature and offer strategic insights for the sector's growth.

### Problem Statement

The Kenyan manufacturing sector, crucial for economic growth and employment, has consistently underperformed compared to the national GDP growth rate. In 2016, the sector contributed 9.2% to Kenya's GDP, but this decreased to 7.6% in 2020 (KNBS, 2020). Over the past decade, the sector's growth rate has slowed, from 4.4% in 2010 to 3.1% in 2012, remaining below the national growth rate of 5% (KIPPRA, 2013; KNBS, 2015). Kenya's manufacturing value-added (MVA) as a proportion of GDP has also declined from 11.3% in 2010 to 10.1% in 2017 (UNIDO, 2019c), hindering progress toward the United Nations' SDG goal to double MVA in LDCs by 2030. High production costs, counterfeits, and rising electricity costs have led to the closure of significant manufacturing plants, such as Procter and Gamble, GlaxoSmithKline Kenya, and Reckitt Benckiser (KAM, 2019).

Despite these challenges, many firms have turned to business model innovation (BMI) to enhance long-term performance. However, the impact of lock-in centered business model innovation (LCBMI), which focuses on customer retention and reducing switching costs has not been explored in the Kenyan manufacturing sector. LCBMI offers firms the potential to secure a competitive advantage and improve performance. Still, the limited research available on its application in Kenya and the conflicting global findings on BMI and performance highlight the need for further investigation.

Empirical studies, such as Rashidirad et al. (2017), Bornemann (2014), and Alawneh and Younis (2014), found positive relationships between LCBMI and firm performance in sectors like telecommunications and banking, but these findings cannot be generalized to Kenya's manufacturing context. Additionally, Zhao et al. (2021) explored technology lock-in's effect

on innovation performance, revealing that lock-in strategies have varying impacts depending on the context, yet the application to manufacturing firms remains underexplored.

Given the unique challenges faced by Kenyan manufacturing firms, this study aims to fill the gap in the literature by examining how lock-in centered business model innovation influences their performance. This research will contribute insights into how LCBMI can help Kenyan firms enhance competitive advantage, reduce customer churn, and improve overall performance, supporting Kenya's Vision 2030 objectives.

## Theoretical Framework

### Resource Based Theory (RBT)

The Resource-Based Theory (RBT), initially articulated by Edith Penrose in her 1959 book The Theory of the Growth of the Firm, and later advanced by Birger Wernerfelt in 1984, focuses on understanding the internal factors that drive a firm's performance (Barney, 2011). The central claim of RBT is that a firm's long-term superior performance stems from the exploitation of its distinctive resources that are valuable, rare, inimitable, and non-substitutable (VRIN) (Barney, 1991). These resources can be either tangible (e.g., capital, equipment) or intangible (e.g., human capital, organizational culture) (Barney et al., 2012). RBT assumes that firms possess heterogeneous resource bundles and that these resources are difficult to imitate or costly to acquire (Barney, 2011).

RBT's proponents, including Jay Barney and David Teece, argue that firms' competitive advantage arises from their ability to leverage these unique resources (Kraaijenbrink, Spender, & Groen, 2010). While RBT has faced criticism for its static view of resources, it is particularly relevant to Lock-In Centered Business Model Innovation (LCBMI), as it explains how firms can build long-term customer loyalty and sustain competitive advantage by creating and exploiting unique internal resources. By leveraging inimitable resources, firms can reduce customer churn, thereby enhancing their lock-in strategies and driving innovation that results in sustainable performance.

## Conceptual Framework

According to Kumar (2015) a conceptual framework is an analytical research tool that depicts the relationship between exogenous variables and the endogenous variable in an empirical study. The study conceptual framework is illustrated below:

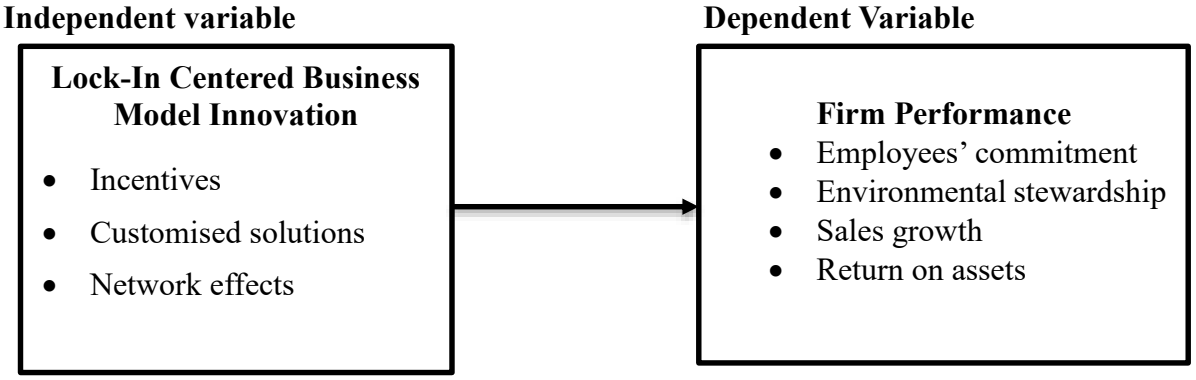


*Figure 1: Conceptual Framework*

**Lock-In Centered Business Model Innovation**

Lock-in centered business model innovation (LCBMI) refers to an activity system that is created at keeping customers attracted to the firm through repetitive transaction (Amit & Zott, 2024). The essence of LCMBI is to build and sustain long run strategic relationships with customers (Rashidirad, Salimian, Soltani & Fazeli, 2017). The manufacturers that engender long term customer loyalty achieve superior long run profitability by exploiting opportunities for cross selling products.

**Empirical Review**

Rashidirad, Salimian, Soltani and Fazeli (2017) sought to investigate the relationship between LCBMI and business performance in the UK telecommunication firms. The study concluded that LCBMI is positively related to firm performance. A key weakness of the study is the failure to undertake the CLRM diagnostic tests. Another weakness of the study is the failure to consider non-financial indicators of business performance. The study offered valuable insights concerning the role of LCBMI. However, the findings cannot be generalized to the Kenya manufacturing firms' context and this leaves room for the proposed study.

Bornemann (2014) examined the relationship between LCBMI and firm performance in Germany. The study concluded that LCBMI is directly related to firm performance. The study findings are limited to the extent that no pilot testing was undertaken before embarking on the main study and the CLRM diagnostic tests were not conducted before data analysis. This leaves room for the proposed study. Alawneh and Younis (2014) undertook a study to investigate the relationship between LCBMI and firm performance in Jordanian banking sectorThe study concluded that LCBMI is positively related to business performance. However, the Jordanian banks study findings cannot be generalized to the Kenyan manufacturing sector context. This leaves room to the proposed study.

Zhao, et.al., (2021) reviewed the effects of different types of technology lock-in on enterprise innovation performance. The findings of the study revealed that Different types of technology lock-in had different effects on enterprise innovation performance. Initiative lock-in and passive lock-in showed an inverted U-shaped relationship with innovation performance. Further, it was revealed that economies of scale were positively correlated with innovation performance, while self-lock-in was negatively correlated with it.

**METHODOLOGY**

This research study adopted the descriptive research design because it enabled the investigator to gather answers as to the what of the research problem in an objective and neutral manner using detailed information concerning the study variables (Blumberg, *et al*, 2014). This research study was anchored on positivism research philosophy. The target population of this study comprised of all manufacturing firms located in Nairobi County which is 586 firms as per the published data on manufacturers in Kenya (KAM, 2021). Nairobi county was found to be suitable for the study as it hosts approximately 80% of all the manufacturing firms in Kenya. The robustness and diversification of the industries in Nairobi County helped the researcher to spread the research to covering all the manufacturing sectors in the Country thus providing enhanced results. Manufacturing firms formed the unit of analysis for the study. The study respondents were head of sales or equivalent role holders in manufacturing firms in Kenya. Thus, the head of sales in Kenyan manufacturing firms represented the unit of observation in the study. The top managers were targeted as key informants due to their inherent attributes of being responsible for crafting and implementing business model innovation decisions. For the

purpose of this study, the sampling frame consisted of 586 Nairobi county-based manufacturing firms as registered in KAM membership directory as at end of 2021 in Kenya.

This study adopted multi-stage sampling technique. This sampling technique is justified by the fact that Nyokabi (2019) in their empirical studies and achieved successful results. This study adopted a 3-phased approach in employing multistage sampling design. Firstly, the proportionate stratified random sampling was utilized to divide the targeted population into distinct strata that have homogeneous attributes. Secondly, simple random sampling was used to select participants firms in each manufacturing sectors stratum. Thirdly, purposive sampling was adopted in the choice of one participant per firm. The target respondents for this study were the head of sales who directly report to the CEO and were purposively selected as one participant per firm. The targeting of top managers was informed by their position in the upper echelons of the organization as being key informants who are responsible for making business model renewal and transformation decisions in their respective organizations. This study adopts Cochran (1963) sample size determination formula therefore; this study targeted 138 chief strategy officers in Nairobi County-based manufacturing firms.

Primary data was collected using a structured questionnaire in order to gather facts for revealing answers to the research problem from targeted respondents. Secondary data was reviewed from Kenyan manufacturing firms' published annual reports as well as manufacturing sector published reports. The researcher was assisted by trained research assistants using the drop and pick method of questionnaire deployment in order to assure verifiability, reliability and validity of research findings through elimination of interviewer bias. The collected data was cleansed and then analyzed using Statistical Package for Social Science (SPSS) software program version 23.

In order to improve the response rate of questionnaire deployment, the researcher provided respondents the assurance of their confidentiality. Secondly, the research followed up with participants on completion status as well as book appointments for collecting completed questionnaire from their premises. A pilot study of 20 study respondents was undertaken in order to pretest the questionnaire. This study adopted simple linear regression analytical technique for data analysis. This study adopted the ANOVA table testing technique for linearity test.

**Table 1: Sample Size**

| Sector (Strata) | Target population | membership contribution | Sample |
|---|---|---|---|
| Building, mining and construction | 25 | 4% | 5 |
| Chemical and allied | 61 | 9% | 14 |
| Energy, electricals and electronics | 36 | 6% | 8 |
| Food and beverages | 156 | 23% | 35 |
| Leather and footwear | 8 | 1% | 2 |
| Metal and allied | 63 | 9% | 14 |
| Motor vehicle assemblers and accessories | 38 | 6% | 8 |
| Paper and board | 53 | 8% | 12 |
| Pharmaceutical and equipment | 20 | 3% | 4 |
| Plastic and rubber | 62 | 9% | 14 |
| Textile and apparels | 44 | 7% | 10 |
| Timber, wood and furniture | 20 | 3% | 4 |
| **Total** | **586** | **100%** | **138** |

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## RESULTS

### Response Rate

During the fieldwork, a total of 138 questionnaires were distributed, but only 130 questionnaires were returned having been dully filled. This translated to 94.2% response rate. A response rate of 70% and above is regarded excellent according to Mugenda and Mugenda (2019). Further, Baruch and Holton (2008) observed that the average survey response rates from top organization managers was 36% with a standard deviation of 19%. Hence, the study response rate was considered as appropriate for data analysis.

**Table 2: Response Rate**

| Questionnaires | Frequency | Percent |
|---|---|---|
| Responded | 130 | 94.2% |
| Un-responded | 8 | 5.8% |
| **Total** | **138** | **100.0%** |

### Descriptive Statistics

### Lock-In Centered Business Model Innovation

This section presents the results of descriptive analysis. The study respondents were asked to rate their agreement with statements regarding to the influence of LCBMI on the performance of manufacturing firms in Kenya. The participants opinions were captured using a five-point Likert scale where: 1 = Very little extent, 2 = Little extent, 3 = Moderate extent, 4 = Large extent and 5 = Very large extent. The descriptive results are presented in percentages, mean and standard deviation. The standard deviation and mean were also used.

Table 3.5 shows the results of the analysis. The study findings illustrated that the respondents agreed (Mean = 3.38; Standard deviation = 1.43) with the statements that our firm offers incentives to business partners to engage in repeat transactions. Respondents also agreed that manufacturing firms offer loyalty programs to customers in order to take part in repeat transactions (Mean = 3.56; Standard deviation = 1.15). The respondents indicated (Mean = 3.81; Standard deviation = 1.10) that our firm offers customized products to customers. The participants further agreed (Mean = 3.79; Standard deviation = 1.07) that their firms had implemented specific measures for maintaining customers.The study findings revealed that the average mean was 3.64. This implies that most respondents agreed to the statements, however the answers were varied as depicted by the standard deviation of 1.19. The findings suggest the existence of customer loyalty practices (i.e. a key characteristic of LCBMI) among Kenyan manufacturers.

The study found out (Mean = 3.66; Standard deviation = 1.09) that most of the firms' customers were regular users of their personalized solutions. Respondents further agreed (Mean = 3.74; Standard deviation = 0.868) that their firm's personalization was effective in attracting and maintaining participants. In addition, participants agreed (Mean = 3.69; Standard deviation = 1.04) that their firm utilizes virtual community in the way of conducting their business. Similarly, respondents agreed (Mean = 3.52; Standard deviation = 1.08) that their firm had a dominant design. The study findings revealed that the average mean was 3.65. This implies that most respondents agreed to the statements, however the answers were varied as depicted by the standard deviation of 1.02. The findings suggest the existence of customised solutions practices (i.e. a key characteristic of LCBMI) among Kenyan manufacturers. The findings indicated that participants were in agreement (Mean = 3.55; Standard deviation = 0.932) with

the statement our firm's affiliate programs, which are designed to enable transactions originating from the company's partners, play an important role in the business. The findings revealed (Mean = 3.60; Standard deviation = 0.822) that the firm's participants benefit from the increasing number of other participants that are engaged in their firm's transactions. The respondents agreed (Mean = 3.51; Standard deviation = 0.707) that the firms' participants from one group benefit from increasing number of participants from another group engaged in their organization's transactions. The study findings based on a five - point scale revealed that the average mean was 3.65. This implies that most respondents agreed to the statements, however the answers were varied as depicted by the standard deviation of 0.819. The findings suggest the existence of network effects practices (i.e. a key characteristic of LCBMI) among Kenyan manufacturers.

Finally, respondents agreed (Mean = 3.94; Standard deviation = 0.814) that the adoption of identified aspects of lock-in centered business model innovation had improved performance in the organization. In summary, majority of respondents agreed (Mean = 3.65; Standard deviation = 1.01) with statements pertaining their influence of lock-in centered business model innovation on the performance of manufacturing firms in Kenya. The high mean recorded from the study findings attest that LCBMI influences the performance of Kenyan manufacturing firms. This means that implementing LCBMI practices will lead to improvement in organizational performance. Based on the study findings, the results indicate that LCBMI in Kenyan manufacturing firms was to a large extent manifested through incentives, customised solutions and network effects. Therefore, the results affirm the existence of LCBMI practices amongst Kenyan manufacturing firms

**Table 3: Lock-In Centered Business Model Innovation**

| Statements | Very Little extent (%) | Little extent (%) | Moderate extent (%) | Large extent (%) | Very Large extent (%) | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| Our firms offers incentives to business partners to engage in repeat transactions | 8.1 | 24.2 | 11.5 | 42.2 | 14.1 | 3.38 | 1.43 |
| Our firms offers loyalty programs to customers in order to take part in repeat transactions | 5.8 | 17.3 | 14.6 | 46.7 | 15.6 | 3.56 | 1.15 |
| Our firm offers customized products to customers | 3.3 | 9.8 | 30 | 42.7 | 14.2 | 3.81 | 1.10 |
| We have implemented specific measures for maintaining customers | 2.3 | 6.9 | 26.2 | 48.5 | 16.2 | 3.79 | 1.07 |
| Most of our customers are regular users of our personalized solutions | 4.8 | 14.4 | 20 | 45.6 | 15.2 | 3.66 | 1.09 |
| Our firm's personalization is effective in attracting and maintaining participants | 1.4 | 4.1 | 35.4 | 44.4 | 14.8 | 3.74 | .868 |
| Our firm utilizes virtual community in the way of conducting its business | 3.5 | 10.4 | 18.5 | 50.8 | 16.9 | 3.69 | 1.04 |
| Our firm has a dominant design | 4.2 | 12.7 | 22.3 | 45.6 | 15.2 | 3.52 | 1.08 |
| Our firm's affiliate programs, which are designed to enable transactions originating from the company's partners, play an important role in the business model | 3.9 | 11.6 | 26.9 | 43.3 | 14.4 | 3.55 | .932 |
| The firm's participants benefit from the increasing number of other participants that are engaged in the firm's transactions | 3.7 | 11 | 41.5 | 32.9 | 11 | 3.60 | .822 |
| The firm's participants from one group benefit from increasing number of participants from another group engaged in the organization's transactions | 3.3 | 9.8 | 22.3 | 48.5 | 16.2 | 3.51 | .707 |
| The adoption of identified aspects of lock-in Centred business model innovation have improved performance in this organization | 2.3 | 6.9 | 31.5 | 44.4 | 14.8 | 3.94 | .814 |
| **Average percentages** | **3.9** | **11.6** | **25.1** | **44.6** | **14.9** | **3.65** | **1.01** |

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**LCBMI Performance Impact in the Last 5 years**

The respondents' opinion on the impact of lock centred business model was sought and the findings were presented in the figure 2 below.

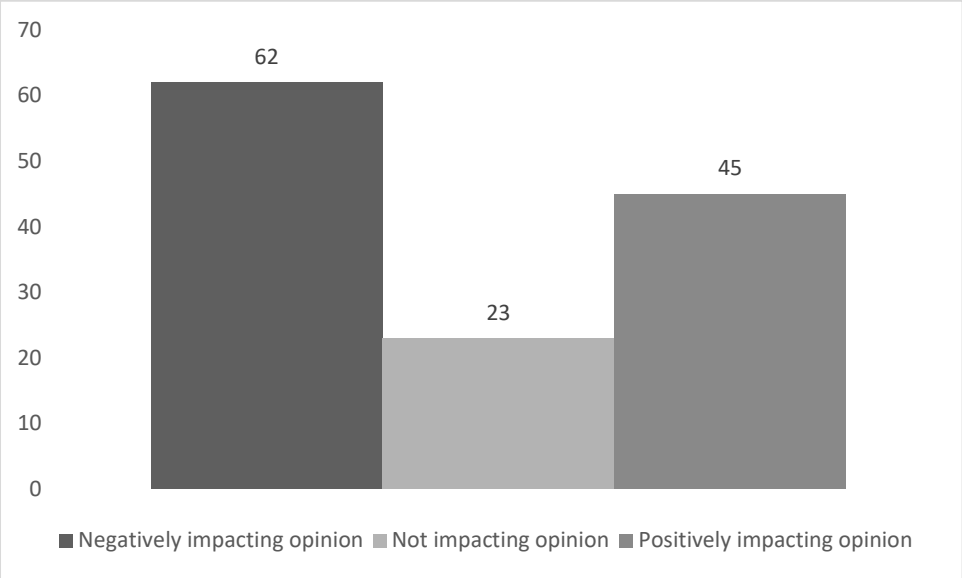


*Figure 2: LCBMI Impact for the Last 5 Years*

Majority of respondents confirmed that LCBMI had substantial impact on the performance of Kenyan manufacturing firms. 47.7% of the respodents noted that LCBMI has a negative impact, 34.6 showed that it has positive impact and 17.7% indicted that it has no impact.

The results attest that LCBMI has substantial impact on the performance of Kenyan manufacturing firms. The study's conclusions are consistent with an empirical study conducted by Rashidirad *et al.* (2017), which indicated that lock-in focused business model innovation is strongly correlated to company success. The results were also consistent with the findings of Alawneh and Younis (2014), who discovered that LCBMI is positively connected to company success. Similarly, Ratemo, Mairura, and Nyamboga (2022) found a favorable and substantial association between lock in business models and hotel performance in Kisumu. Furthermore, the data supported Bornemann's (2014) conclusion that LCBMI is directly associated to company performance. Zhao *et al.* (2021) observed that initiative lock-in and passive lock-in have an inverted U-shaped association with innovation performance.

**Firm Performance**

The empirical study sought to reveal the performance of manufacturing firms in Kenya. The study respondents were asked to indicate the extent to which they agreed to statements in relation to the state of performance of Kenya manufacturing firms. The respondents' opinions were captured using a five-point Likert scale where: 1 = Very little extent, 2 = Little extent, 3 = Moderate extent, 4 = Large extent and 5 = Very large extent. The descriptive results are presented in percentages, mean and standard deviation. The findings are presented in Table 3.6.

The study findings revealed that respondents were in agreement (Mean = 4.37; Standard deviation = 1.043) with the statement that employees feel a strong sense of belonging to their organization. Respondents also agreed (Mean = 4.22; Standard deviation = 0.956) that employees were proud working for their company. In addition, study participants agreed (Mean

= 4.28; Standard deviation = 0.800) that employees worked beyond their duties to ensure the prosperity of their company. Moreover, respondents concurred (Mean = 4.15; Standard deviation = 1.023) that team spirit dominated in their organization. The study findings based on a five - point scale revealed that the average mean was 4.26. This implies that most respondents agreed to the statements, however the answers were varied as depicted by the standard deviation of 0.956. The findings suggest the existence of employee commitment practices (i.e. a key characteristic of firm performance) among Kenyan manufacturers.

The findings revealed (Mean = 3.88; Standard deviation = 0.886) that manufacturing firms regularly introduced energy saving initiatives. Respondents also agreed (Mean = 4.10; Standard deviation = 0.947) that manufacturing firms regularly encouraged the use of recyclable resources. Additionally, study participants concurred (Mean = 3.72; Standard deviation = 0.881) that manufacturing firms regularly invested in social programs that benefitted communities where they operated. Furthermore, respondents agreed (Mean = 4.25; Standard deviation = 0.881) that manufacturing firms allocated expenditure on solid waste disposal. The study findings established (Mean = 3.98; Standard deviation = 0.682) that manufacturing firms allocated budgets on corporate social responsibility programs. The study findings based on a five - point scale revealed that the average mean was 3.99. This implies that most respondents agreed to the statements, however the answers were varied as depicted by the standard deviation of 0.855. The findings suggest the existence of environmental stewardship practices (i.e. a key characteristic of firm performance) among Kenyan manufacturers.

Respondents also agreed (Mean = 3.92; Standard deviation = 0.932) that manufacturing firms' sales had been increasing in the long run. The study participants further agreed (Mean = 4.05; Standard deviation = 0.888) that manufacturers' return on assets had been increasing in the long run. Finally, respondents agreed (Mean = 4.07; Standard deviation = 0.739) that manufacturing firms' profitability had been increasing in the long run. Generally, respondents agreed (Mean = 4.08; Standard deviation = 0.89) with statements pertaining to the state of affairs of Kenyan manufacturing firms' performance. These findings are in tandem with Kitenga's (2020) empirical study results.

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**Table 4: Firm Performance**

| Statement | Very Little extent (%) | Little extent (%) | Moderate extent (%) | Large extent (%) | Very Large extent (%) | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| Employees feel a strong sense of belonging to this organization. | 7.5 | 2.5 | 10 | 60 | 20 | 4.37 | 1.043 |
| Employees are proud working for this company. | 4.1 | 1.4 | 4.6 | 67.5 | 22.5 | 4.22 | .956 |
| Employees work beyond their duties to ensure the prosperity of the company. | 0.6 | 0.2 | 19.2 | 60 | 20 | 4.28 | .800 |
| Team spirit dominates in our company. | 4.1 | 1.4 | 15.4 | 59.4 | 19.8 | 4.15 | 1.023 |
| Our firm regularly introduces energy saving initiatives | 5.2 | 1.7 | 8.5 | 63.5 | 21.2 | 3.88 | .886 |
| Our organization regularly encourages the use of recyclable resources. | 5.8 | 1.9 | 12.3 | 60 | 20 | 4.10 | .947 |
| Our firm regularly invests in social programs that benefit communities where we operate. | 5.8 | 1.9 | 16.9 | 56.6 | 18.9 | 3.72 | .881 |
| Our firm allocates expenditure on solid waste disposal. | 2.9 | 1 | 17.7 | 58.9 | 19.6 | 4.25 | .881 |
| Our firm allocates budgets on CSR programs | 1.7 | 0.6 | 17.7 | 57.7 | 19.2 | 3.98 | .682 |
| Sales of our business have increased in the last three years. | 4.1 | 1.4 | 17.7 | 57.7 | 19.2 | 3.92 | .932 |
| Return on assets (ROA) has increased in the last three years. | 4.7 | 1.6 | 18.5 | 56.6 | 18.9 | 4.05 | .888 |
| Profitability has increased in the last three years. | 4.1 | 1.4 | 7.7 | 65.2 | 21.7 | 4.07 | .739 |
| **Average Percentage** | **4.2** | **1.4** | **13.9** | **60.2** | **20.1** | **4.08** | **0.89** |

## Inferential findings

### Correlation Analysis

Correlation analysis refers to a statistical technique that depicts the relationship between two or more quantitative variables (Gogtay & Thatte 2017). The authors observe that correlation coefficient variables normally range from -1 to +1. Pearson correlation coefficient was adopted in this study to establish the influence of LCBMI variable on the performance of manufacturing firms in Kenya. A Pearson correlation coefficient of -1 indicates that the two variables are perfectly, negatively related in a linear manner while a Pearson correlation coefficient of +1 indicates that the two variables are perfectly, positively related in a linear manner. Besides, the authors opine that a zero-correlation coefficient indicates that there is no linear relationship between the two variables. The correlation analysis are presented in Table 5.

**Table 5: Correlation Analysis**

| Factors | Lock-In Centered Business Model Innovation | Firm Performance |
|---|---|---|
| Lock-In Centered Business Model Innovation | 1 | .278**<br>P = 0.020 |
| Firm Performance | .278**<br>P = 0.020 | 1 |

** **Correlation significant at 0.05 level (2- tailed)**

The findings in the Table 5 shows that a significant ($p<0.05$) positive relationship ($r=-0.278$) existed between Lock-In Centred Business Model Innovation and firm performance. Generally, it can be observed that the factors had positive and significant relationship with each other.

**Regression Analysis**

The research study sought to test the hypothesis on whether or not there was a statistically significant relationship between lock-in centered BMI and the performance of manufacturing firms in Kenya. The null hypothesis of the study was stated as follows: there is no significant influence of lock-in centered BMI on the performance of manufacturing firms in Kenya. The regression model summary is shown in Table 6.

**Table 6: Model Summary for Lock-in Centered Business Innovation**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .278[a] | .077 | .070 | .63364 |

The study findings coefficient of determination indicated that 7.7% of variation in manufacturing firms' performance was explained by a unit change in LCBMI. The study results imply that lock-in centered BMI predicts 7.7% of variation in firm performance of the Kenyan manufacturing firms and the remaining 92.3% of variation is the Kenyan manufacturing firms' performance is attributed to other external factors outside this model.

Furthermore, the study undertook ANOVA test to determine whether or not the regression model was suitable for predicting Kenyan manufacturing firms' performance. The ANOVA test results are presented in Table 7.

**Table 7: ANOVA for Lock-in Centered Business Innovation**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4.295 | 1 | 4.295 | 10.698 | .001[b] |
| | Residual | 51.392 | 128 | .402 | | |
| | Total | 55.687 | 129 | | | |

a. Dependent Variable: Firm Performance

b. Predictors: (Constant), Lock-in centered business model innovation

The ANOVA test results in Table 7 indicates that the F-statistic value at 1,128 degrees of freedom and 0.05 significance level was 10.698. The results imply that the model has a high degree of goodness of fit and Lock-in centered BMI is a good predictor of the Kenyan manufacturing firms' performance. Therefore, the study concluded that the model was suitable for predicting firm performance in the Kenyan manufacturing sector. The study also sought to establish if the regressed relationship between lock-in centered BMI and the Kenyan

manufacturing firms' performance was significant by conducting a t-test on the coefficient of LCBMI. The regression coefficients of the model are presented in Table 8.

**Table 8: Coefficients for Lock-in Centered Business Innovation**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 3.075 | .313 | | 9.822 | .000 |
| | Lock-in centered business model innovation | -.47 | .047 | .278 | 3.271 | .001 |

The study results in Table 8 show that the constant has unstandardized beta coefficients of 3.075. This implies that holding all other factors constant and LCBMI at zero, firm performance in the Kenyan manufacturing sector would be equal to 3.075 units. The study findings further revealed that the unstandardized beta coefficient for LCBMI was -0.47. This implies that a unit change in LCBMI would lead to a decrease in the performance of Kenyan manufacturing firms by 0.47 units. The P-value of the model was $0.001 < 0.05$. This suggests that the relationship between lock-in centered BMI and the performance of Kenyan manufacturing firms was statistically significant. Therefore, the alternate hypothesis that states that there is significant relationship between lock-in centered BMI and the performance of manufacturing firms in Kenya is supported.

In summary, the study concludes that lock-in centered BMI negatively and significantly influence firm performance of Kenyan manufacturing firms. The regression model equation for the results presented in Table 3.15 is summarized as;

$Y = 3.075 – 0.47 \text{ LCBMI} + \varepsilon$

Where:

Y = Firm performance

LCBMI = Lock-in centered business model innovation.

$\varepsilon$ = Stochastic disturbance term.

The study findings concur with empirical study by Weking, et.al., (2019) which noted that subscription model helps the vendor lock in consumers so as to increase profit when there is great uncertainty associated with the next version software. This is because the subscription model seeks for continual income sources. This also promotes survival and a solid foundation for future growth. Additionally, freemiums offered in the lock-in strategy contributes highly to the performance of the business.

According to Chiu, Dai & Chi (2023) companies can use tangible or intangible resources by sharing or storing operations to create servitization value. The study adduces an innovative servitization strategy matrix of customer lock-in, concerning communion, intellectual, existential and insubstantial strategies. Zhao, et.al., (2021) notes that different types of technology lock-in have different effects on enterprise innovation performance. Initiative lock-in and passive lock-in have an inverted U-shaped relationship with innovation performance. Economies of scale show positively correlation with innovation performance, while self-lock-in was negatively correlated with it. A lock-in-centered business model for innovation supports the transfer of knowledge and core technologies inside a firm or among industry businesses, as well as the transmission of advanced information across enterprises (Zhao, et.al., 2021).

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusion

The study concludes that lock-in centered BMI has a negative and significant influence on the performance of manufacturing firms in Kenya.

### Recommendation

According to the study findings, discussions and conclusions, further research is recommended in order to advance knowledge on the contribution of Lock-in centred business model innovation on firm performance. The study offers recommendations for the manufacturing industry in terms of managerial recommendations. Firstly, management of manufacturing firms should seek to pursue new geographical markets' expansion in order to achieve sustainable business performance. Secondly, manufacturing firms' managers should implement loyalty programs and network effects projects as long as they are able to break even and achieve incremental margins. Lastly, managers should collaborate and form strategic partnerships through: Joint ventures and alliances, partner with other companies to access new markets, share resources and innovate collaboratively and ecosystem development- i.e. build an ecosystem of partners, suppliers, and customers to create more value and enhance competitiveness.

### Contribution to New Knowledge

This study makes contribution to new knowledge by conceptualizing how lock-in centered BMI, influences the performance of manufacturing firms in Kenya.

### Recommendations for Further Research

This study was conducted as a cross-sectional study in the year 2023. Thus, this study recommends a longitudinal study in order to gather more comprehensive insights on the influence of lock-in centred business model innovation on the performance of Kenyan manufacturers.

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