

## **INFLUENCE OF TECHNOLOGY INNOVATION STRATEGY ON PERFORMANCE OF LARGE MANUFACTURING FIRMS IN KENYA**

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### **ABSTRACT**

The manufacturing sector in Kenya faces significant technology adoption challenges that hinder optimal performance and contribution to national economic development, with growth consistently lagging behind the broader economy. This study examined the influence of technology innovation strategy on performance of large manufacturing firms in Kenya, utilizing the Technology Acceptance Model theory as the theoretical foundation. A descriptive survey and correlational research design was employed, targeting 50 large manufacturing firms listed by the Kenya Association of Manufacturers, with a sample of 109 management level employees selected through stratified random sampling. Primary data was collected using structured questionnaires, achieving a 90% response rate with 98 usable responses. Data analysis employed descriptive statistics, Pearson correlation analysis, and simple linear regression using SPSS version 23. The findings revealed that technology innovation strategy has a significant positive influence on firm performance ( $\beta = 0.336$ ,  $p < 0.05$ ), with the model explaining 60.7% of the variance in organizational performance ( $R^2 = 0.607$ ). The correlation analysis confirmed the strongest relationship among innovation strategies ( $r = .779$ ,  $p = 0.007$ ), indicating that manufacturing firms investing in new technologies for marketing, advertisement, and distribution achieve superior performance outcomes. The study concluded that technology innovation strategy involving implementation of advanced marketing technologies, advertisement systems, and automated distribution methods significantly enhances operational efficiency, customer engagement, and competitive positioning. The research recommends that management prioritize strategic technology investments, government develop supportive technology policies, and academic institutions incorporate technology innovation modules to enhance manufacturing sector competitiveness and support Kenya's economic development objectives.

**Keywords:** *Technology innovation strategy, organizational performance, manufacturing firms, Kenya, digital transformation, competitive advantage.*

### **1.1 Introduction**

Manufacturing serves as a critical pillar of economic development globally, with technology innovation strategy emerging as a fundamental determinant of organizational competitiveness and sustainable growth in the contemporary business environment. Technology innovation strategy encompasses the systematic implementation of new technologies across various organizational functions, including marketing, advertisement, and distribution systems, designed to enhance operational efficiency, customer engagement, and market positioning (Subramanian & Nilakanta, 2021). This strategic approach involves the adoption of advanced technological solutions that fundamentally transform how organizations execute their core operations, from customer relationship management systems to automated production processes and real-time distribution networks. The primary objectives of technology innovation strategy include improving operational efficiency, enhancing customer satisfaction, gaining competitive advantages, and achieving superior organizational performance through the strategic deployment of technological capabilities that align with organizational goals and market demands.

From a global perspective, technology innovation has proven to be a cornerstone of manufacturing excellence and economic prosperity across developed and emerging economies. Advanced manufacturing nations have demonstrated that strategic technology adoption drives significant improvements in productivity, quality, and competitiveness, with organizations investing heavily in digital transformation initiatives to maintain their market leadership positions. Malaysian banking sector studies have revealed that technological advancement significantly impacts employee performance through enhanced motivation and training capabilities, while also establishing strong relationships between technological adoption and overall organizational performance (Imran, 2022). South African research has demonstrated that information technology integration at management levels creates improved alignment between technological capabilities and organizational strategy, enabling more flexible business models that respond effectively to empowered consumer demands (Sibanda, 2022). These global experiences underscore the critical importance of technology innovation strategy in creating sustainable competitive advantages and driving organizational transformation across various industrial sectors.

At the regional level, African manufacturing sectors have increasingly recognized technology innovation as a catalyst for industrial transformation and economic development, though implementation challenges and infrastructure constraints continue to influence adoption patterns. Regional studies have demonstrated that technology adoption by manufacturing and service organizations shows high capability for performance enhancement, yielding expanded returns for investors and stakeholders through improved operational efficiency and customer service delivery (Ndunga, Njati & Rukangu, 2021). The flexibility and adaptability of technological innovations have contributed to increased adoption rates among organizations and their customers, with internet and mobile channels demonstrating superior transaction processing capabilities compared to conventional manual processes. However, African manufacturing firms face unique challenges related to infrastructure development, skill availability, and financial constraints that influence the pace and effectiveness of technology innovation strategy implementation, requiring contextualized approaches that consider local operational environments and resource availability.

Within the Kenyan manufacturing context, technology innovation strategy has gained increasing prominence as firms seek to enhance their competitive positioning and operational efficiency in response to global market pressures and domestic economic development objectives. Kenya's manufacturing sector, which contributes 10.3% to the national GDP with

governmental aspirations to reach 15% by 2030, faces significant performance challenges that technology innovation can potentially address through enhanced operational capabilities and market competitiveness (KNBS, 2021). The sector's growth has consistently lagged behind the broader economy, with manufacturing growing by only 3.5% in 2022 while the overall economy expanded by 5.6%, indicating substantial opportunities for performance improvement through strategic technology adoption. Contemporary research suggests that manufacturing firms implementing new technologies in marketing, advertisement, and distribution systems achieve superior performance outcomes compared to those maintaining traditional operational approaches, though the specific mechanisms through which technology innovation strategy influences organizational performance in Kenya's unique manufacturing environment require comprehensive empirical investigation to inform strategic decision-making and policy development initiatives.

### **1.2 Statement of the Problem**

The manufacturing sector in Kenya faces significant technology adoption challenges that hinder its ability to achieve optimal performance and contribute effectively to national economic development goals, with many firms struggling to leverage technological innovations for competitive advantage and operational efficiency. Despite the sector's importance in contributing 10.3% to Kenya's GDP and providing substantial employment opportunities, manufacturing growth has consistently underperformed relative to the broader economy, growing by only 3.5% in 2022 compared to the economy's 5.6% expansion, indicating systemic challenges in operational efficiency and competitive positioning that technology innovation could potentially address (KNBS, 2021). The sector faces increasing pressure from global competitors who have successfully implemented advanced technologies in marketing, advertisement, and distribution systems, while Kenyan manufacturers often rely on traditional operational approaches that limit their ability to respond effectively to changing market demands and customer expectations. This technological gap has resulted in reduced market competitiveness, inefficient operational processes, and suboptimal performance outcomes that prevent the sector from achieving its full potential contribution to Kenya's economic transformation agenda under Vision 2030 and the Big Four development strategy. Therefore, this study sought to determine the influence of technology innovation strategy on performance of large manufacturing firms in Kenya.

### **1.3 Objectives of the Study**

To determine the influence of technology innovation strategy on performance of large manufacturing firms in Kenya.

### **1.4 Research Hypotheses**

**H<sub>0</sub>** Technology innovation strategy does not have a significant influence on performance of large manufacturing firms in Kenya.

## **2.1 Literature Review**

### **2.1.1 Theoretical Review**

#### **Technology Acceptance Model Theory**

The theory was corroborated by Davis (1993). This theory elaborates the phenomenon that can affect and shape users' acceptance of new information technology. It is comprised of two specific variables that are vital determinants of users' attitude toward using technology and actual use of the system. These two variables are PU and PEOU with reference to the innovative technology that the user ought to adopt (Cheung, & Vogel, 2022). These two variables consider

the utility and the simplicity of the new technology to the prospective users, in matters innovation.

The perceived usefulness explains the degree to which how much somebody trusts that utilizing a framework will improve their execution (Park, Nam, & Cha, 2021). The clients ought to understand the level in which task utility is uncovered by development and framework. PEOU refers to the level to which user believes that benefits of systems' use outweigh the efforts for using it. The simplicity and the understandable nature of the innovation and system are the properties that involve ease of use. In the process of technology adoption, individuals have to assess their attitudes towards this new information technology, in order to prevent a failure in implementation, waste of resources and sustainability (Kim, & Shin, 2022). The theory informs the technological innovation strategy which allows efficiency in execution of operation. The users need to have a positive attitude towards the use of technology for innovation. With this, they can be able to use the new technology with ease as they execute their duties. Technology adoption by the manufacturing firm cannot only bring ease with which operations are executed but a competitive advantage in favor of technology adopting firm. This theory explains the influence of technology innovation strategy on performance of large manufacturing firms in Kenya.

### **2.1.2 Empirical Review**

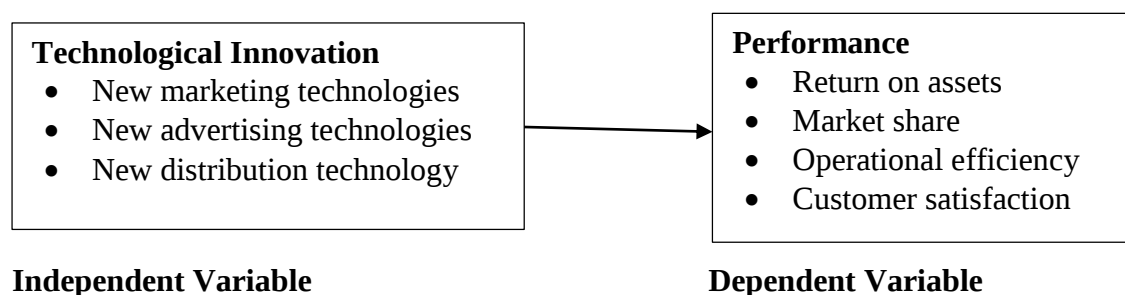
Imran (2022) study checked on the impact of technological advancement on employee performance in banking sector in Malaysia. A total of 140 questionnaires were distributed among different banks and out of which 100 were completed and returned. It was established that technological advancement had noteworthy effect on inspiration and training of employees. Inspiration had noteworthy effect on worker execution however; training had no significant effect on employee performance. Moreover, as the concerned for technological advancement and employee performance, there was significant relationship among them.

A study by Sibanda (2022) focused on the influence of information technology on organization strategy in South Africa. The study used hermeneutic phenomenology to conduct 12 in-depth interviews within IBM South Africa to determine real-life drivers that helped create the alignment. It was revealed that consumers are becoming more empowered; therefore, organizations need to be more flexible in their business models and strategies. Furthermore, the integration of cross-functional roles in the organization at the management level allow for improved alignment between information technology and strategy as better integrated roles bring a combination of these two elements.

In their study Ndunga, Njati and Rukangu (2021) determined the impact of technological advancement on organization's performance. It was established that money related execution of business banks' branches in Meru town is decidedly impacted by development. Innovation selection by business banks shows a high capability of financial performance enhancement in this manner yielding expanded returns for the investors. Innovation's flexibility has come about to their expanded reception rate among the banks and their clients with the take-up additionally quickened by the way that the appropriation is from both the banks and their clients. The recommendations of the study were that banks can manage their costs better in continuing to invest in technology innovation as opposed to continued investment in brick and motor branches. The internet and mobile channels can process a higher volume of transactions compared to the use of the conventional manual processes.

## 2.2 Conceptual Framework

Conceptual framework helps the reader to quickly see proposed relationships between the variables in the study and shows the interaction of variables diagrammatically (Kothari, 2022). The variables together with their indicators/measures are shown on Figure 1.



**Figure 1: Conceptual Framework**

A key component in organizational innovation is technological innovation and is considered to be the process whereby new ideas are adopted and these ideas relate with products/services and introduction of new elements in organizations operations and the process of production (Subramanian & Nilakanta, 1996). Furthermore, Subramanian and Nilakanta (2021) added that it mainly takes place in the operation component and it influences organization's technical system via techniques and equipment that are applied in transforming raw material or information into finished products or services. Conclusion reached was that technical innovation drives efficiency in business, competitive advantage and success of corporations. This is the case because it was found to greatly affect the productivity of work, competitive environment and competitive advantage and general organizational performance (Subramanian & Nilakanta, 2021). According to Armbruster and Lay (2024) innovation in technology have significant effects on routine, process and organizations operations. Also, they insisted that transformation applies new procedures and processes and initiates new products as well as services in the current turbulent market environment which also affects speed, flexibility and production quality.

Zawislak, Tello-Gamarra, Barbieux and Reichert (2021) explained that there is need for companies to accumulate resources as well as competencies allowing them to develop technological capacity more than their rivals. According to Ruffoni et al. (2021) the process where an organization absorbs technology so that it allows them to reach technical-economic efficiency is said to be the process of technological capability. Zawislak et al. (2021) explained that company's innovation can result from learning which has a great effect on performance. Aragón- Correa, García-Morales and Córdón-Pozo (2023) insisted that learning by organizations is through its response a stimulus-response model. They added that organizations embrace learning trajectory for transforming itself and therefore attain competitive advantage.

Based on a report by World Bank (2020), it is necessary for businesses that are knowledge oriented to be innovative technologically in order to promote the welfare of their enterprise and also enhance economic competitiveness country wide. Griffith and Rubera (2022) explained that designs as well as technological innovation allow customers to have new markets as well as markets. In addition, they added that innovations surpass the technological standards and therefore customers are provided with chances for enhancing their capabilities so that they can be able to attain their set standards and offer their clients with chances of accomplishing tasks and enhancing their social status. Additionally, when there is transfer of information regarding product innovation between inventors and imitators, there is a decrease in perceived risk since there is diffusion in product innovation to consumers in the society (Van den Bulte & Stremersch, 2022). This study used new technologies marketing, technologies advertisement

and technologies in distribution measures in establishing the relationship between technological innovation and firm performance.

### **3.1 Research Methodology**

This study adopted a descriptive survey and correlational research design to examine the relationship between technology innovation strategy and performance of large manufacturing firms in Kenya, employing a positivism philosophical approach that emphasizes structured methodology for hypothesis testing and data collection based on observed social entities (Saunders, Lewis & Thornhill, 2021). The target population comprised 50 large manufacturing firms in Kenya as listed by the Kenya Association of Manufacturers (KAM, 2024), with the unit of observation being management level employees including senior managers, middle level managers, and supervisors from each firm, totaling 150 respondents from which a sample size of 109 respondents was determined using Yamane (1967) formula and selected through stratified random sampling technique to ensure proportional representation across different management levels.

Primary data was collected using structured questionnaires administered through the drop and pick up later technique. Data analysis was conducted using SPSS version 23, employing descriptive statistics to analyze numerical data from closed-ended questions, Pearson correlation analysis to determine the strength and direction of relationships between variables, and simple linear regression analysis to establish the causal relationship between technology innovation strategy and organizational performance, with all statistical tests conducted at a 95% confidence level ( $p \leq 0.05$ ) to determine statistical significance.

### **4.1 Findings and Discussion**

The researcher administered 109 questionnaires to management level employees across large manufacturing firms in Kenya, achieving a response rate of 90% with 98 questionnaires correctly filled and returned. This response rate exceeded the threshold recommended by Lynn, Roel, Johanna and Martin (2020), who contend that when 50% of sampled target population participate in a study, it represents satisfactory representation, and surpassed Kothari's (2022) guideline that a response rate of 70% is appropriate for data analysis. The high response rate of 90% demonstrates strong engagement from manufacturing sector management and provides a robust foundation for reliable data analysis and generalization of findings to the target population of large manufacturing firms in Kenya.

### **4.2 Demographic Statistics**

The demographic characteristics of the 98 respondents revealed a predominantly male workforce (62.2%) compared to females (37.8%), with the majority aged between 30-39 years (41.8%) and 40-49 years (31.6%), indicating a mature and experienced management cadre in Kenya's large manufacturing firms. Educational qualifications were notably high, with 42.9% holding bachelor's degrees and 26.5% possessing master's degrees, while organizational positions were fairly distributed among middle level managers (38.8%), senior managers (32.7%), and supervisors (28.5%). Work experience demonstrated significant organizational tenure, with 45.9% of respondents having 5-10 years of experience and 30.6% possessing over 11 years of experience within their respective organizations. This demographic profile suggests a well-educated, experienced, and professionally mature workforce managing large manufacturing firms in Kenya, providing credible perspectives on technology innovation strategies and organizational performance given their substantial industry knowledge and operational experience.

### 4.3 Descriptive Statistics

#### 4.3.1 Descriptive Statistics for Technology Innovation Strategy

The objective was to evaluate the influence of Technology Innovation Strategy on performance of large manufacturing firms in Kenya. The results for Technology Innovation Strategy are as depicted in table 1.

**Table 1: Descriptive Statistics for Technology Innovation Strategy**

| Statement                                                                                                                                                         | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean       | S.D        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|-------|----------------|------------|------------|
| In our organization new technology in marketing has increased enhanced the organization performance                                                               | 2.6%              | 12.5%    | 26.8%   | 43.8% | 14.3%          | 3.6        | 1.0        |
| In our organization new technology in marketing has enhanced marketing of our products                                                                            | 2.6%              | 21.0%    | 40.1%   | 27.2% | 9.2%           | 3.2        | 1.0        |
| In our organization customer relationship management system helps to give timely feedback to clients' inquiries on the money transactions and up to date billings | 0.4%              | 2.2%     | 10.0%   | 71.0% | 16.4%          | 4.0        | 0.6        |
| In our organization new technologies in advertisement has enhanced the organization profitability                                                                 | 1.1%              | 8.2%     | 18.2%   | 57.2% | 15.2%          | 3.8        | 0.8        |
| In our organization new technology in advertisement has brought about competitive advantage                                                                       | 0.4%              | 7.4%     | 11.4%   | 62.0% | 18.8%          | 3.9        | 0.8        |
| Implementation of new technologies in advertisement has improved the organization market share                                                                    | 0.4%              | 1.8%     | 9.2%    | 63.7% | 24.9%          | 4.1        | 0.7        |
| In our organization automation of services and operation enhances efficiency distribution of our products                                                         | 0.0%              | 3.7%     | 4.4%    | 71.3% | 20.6%          | 4.1        | 0.6        |
| In organization real time production has been aided by technology which in turn improves distribution                                                             | 0.0%              | 3.3%     | 7.3%    | 66.3% | 23.1%          | 4.1        | 0.7        |
| Our organization has implemented new improved delivery method which has enhanced product distribution                                                             | 0.0%              | 2.9%     | 4.8%    | 70.2% | 22.1%          | 4.1        | 0.6        |
| <b>Average</b>                                                                                                                                                    |                   |          |         |       |                | <b>4.0</b> | <b>0.7</b> |

Focusing initially on the impact of new technology in marketing on organizational performance, the mean response of 3.6 with a standard deviation of 1.0 suggests a moderately positive view. While a notable proportion of respondents agree or strongly agree that this technology has enhanced performance, there's still a significant segment that remains neutral or disagrees. This indicates variability in the perceived effectiveness of new marketing technologies across different firms.

Similarly, the effect of new technology in marketing on product promotion shows a mean of 3.2 and a standard deviation of 1.0. This lower mean, compared to the previous statement, reflects a more cautious optimism about the role of technology in enhancing marketing efforts.

A considerable percentage of respondents remain neutral or disagree, indicating potential challenges or inconsistencies in the implementation and impact of these technologies.

Customer relationship management systems, critical for client feedback and transaction updates, show a more robust positive response with a mean of 4.0 and a lower standard deviation of 0.6. This strong agreement among respondents suggests a general consensus on the effectiveness of these systems in enhancing client relations and operational efficiency. The influence of new technologies in advertisement on profitability and competitive advantage presents means of 3.8 and 3.9, respectively, both with standard deviations around 0.8. These figures indicate a positive perception but with some variability among respondents. It suggests that while many firms find these technologies beneficial for profitability and gaining a competitive edge, the extent of these benefits varies.

Regarding market share, the implementation of new advertising technologies reflects a high mean of 4.1 with a standard deviation of 0.7. This strong positive response indicates a widely held belief that these technologies significantly contribute to expanding market share. In terms of operational aspects, automation of services and operations, real-time production aiding technology, and new improved delivery methods all show a mean of 4.1 with low standard deviations (0.6, 0.7, and 0.6, respectively). These responses underscore a strong agreement on the efficiency and productivity gains from implementing new technologies in operations and distribution.

The overall average of these responses stands at 4.0 with a standard deviation of 0.7. This high average mean indicates a general consensus among large manufacturing firms in Kenya about the positive impact of Technology Innovation Strategy on their performance. The relatively low standard deviation points to a consistent agreement across different organizations, underscoring the strategic importance of adopting and integrating new technologies for enhancing organizational performance, market competitiveness, and operational efficiency. This consensus highlights the critical role of technology innovation as a key driver of success in the competitive landscape of large manufacturing in Kenya.

#### **4.3.2 Descriptive Analysis of Performance**

The dependent variable was performance of large manufacturing firms in Kenya. The results for performance are as depicted in Table 2.

**Table 2: Descriptive Statistics for Performance**

| Statement                                                                                                                     | Strongly Disagree | Disagree    | Undecided    | Agree        | Strongly Agree | Mean       | S.D         |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|--------------|--------------|----------------|------------|-------------|
| Our organization has experienced an increased corporate profitability over the last five years                                | 0.7%              | 0.7%        | 13.3%        | 59.8%        | 25.5%          | 3.9        | 0.7         |
| In our organization, there has been improvement in return on assets over the last five years                                  | 0.4%              | 1.5%        | 9.6%         | 65.4%        | 23.2%          | 4.1        | 0.6         |
| In our organization, return on assets is used to show prior achievements that are used as a basis for future high performance | 0.4%              | 1.1%        | 10.7%        | 63.6%        | 24.3%          | 4.0        | 0.6         |
| Our organization has experienced an increased market share over the last five years                                           | 0.0%              | 1.8%        | 9.6%         | 64.7%        | 23.9%          | 4.2        | 0.6         |
| Our organization has experienced an increased customer base over the last five years                                          | 0.4%              | 1.1%        | 14.3%        | 58.6%        | 25.6%          | 4.1        | 0.7         |
| Our organization has experienced improved customer service delivery over the last five years                                  | 0.4%              | 1.1%        | 16.3%        | 64.1%        | 18.1%          | 4.0        | 0.7         |
| Our products consistently meet customer expectations in terms of quality and reliability                                      | 0.3%              | 1.3%        | 12.5%        | 62.8%        | 23.1%          | 4.3        | 0.6         |
| Our firm actively seeks and incorporates customer feedback to improve our products and services                               | 0.5%              | 1.0%        | 13.0%        | 61.7%        | 23.8%          | 4.4        | 0.7         |
| <b>Average</b>                                                                                                                | <b>0.4%</b>       | <b>1.2%</b> | <b>12.4%</b> | <b>62.8%</b> | <b>23.2%</b>   | <b>4.1</b> | <b>0.67</b> |

Firstly, the statement regarding increased corporate profitability over the last five years had a mean score of 3.9 with a standard deviation of 0.7. This indicates that respondents generally agreed that corporate profitability has increased, though there was some variability in their responses. Regarding improvement in return on assets over the last five years, the mean score was 4.1, with a standard deviation of 0.6. This suggests a strong agreement among respondents, with relatively low variability, indicating that the majority of respondents observed significant improvement in this area.

The use of return on assets to showcase prior achievements as a basis for future high performance also received a high mean score of 4.0 and a standard deviation of 0.6, reflecting a strong consensus among the respondents that this metric is crucial for setting future performance benchmarks. When it comes to increased market share over the last five years, the mean was 4.2 with a standard deviation of 0.6, highlighting a strong agreement that the organization has successfully captured a larger portion of the market, with consistent responses across the board.

The statement concerning an increased customer base over the last five years had a mean score of 4.1 and a standard deviation of 0.7, indicating that respondents largely agreed that customer numbers have grown, though there was slightly more variability in their responses. In terms of improved customer service delivery over the last five years, the mean was 4.0 with a standard deviation of 0.7, showing a general agreement among respondents, albeit with some differences in opinion.

The statement about consistently meeting customer expectations in terms of quality and reliability had a higher mean of 4.3 and a standard deviation of 0.6, suggesting that respondents strongly agree that the organization's products are reliable and of high quality, with minimal variability in their responses. Finally, the statement on actively seeking and incorporating customer feedback to improve products and services received the highest mean score of 4.4 with a standard deviation of 0.7. This indicates that respondents strongly agreed that their organization prioritizes customer feedback in enhancing their offerings, with slightly more variation in responses. On average, across all the statements, the mean score was 4.1 with a standard deviation of 0.67, indicating that respondents generally agreed with the positive trends in organizational performance, with moderate consistency in their responses.

#### 4.4 Correlation Analysis

Correlation analysis helps assess the strength and direction of relationships between variables before conducting regression analysis. The correlation matrix is presented in Table 3.

**Table 3: Correlation Coefficients Matrix**

| Variables             | Performance      | Technology Innovation |
|-----------------------|------------------|-----------------------|
| Performance           | 1.000            |                       |
| Technology Innovation | .779** (p=0.007) | 1.000                 |

Technology innovation strategy shows the strongest correlation with organizational performance ( $r = .779$ ,  $p = 0.007$ ), highlighting its critical role as a performance driver in large manufacturing firms. This robust relationship underscores the findings of Sun and Lee (2022), who emphasize that technological innovation enables companies to gain competitive advantages in global markets through improved marketing capabilities, enhanced customer relationship management, and efficient distribution systems. The strong correlation suggests that manufacturing firms investing in new technologies for marketing, advertisement, and distribution achieve superior performance outcomes compared to those with limited technological adoption.

#### 4.5 Regression Analysis

The simple linear regression analysis examining the relationship between technology innovation strategy and firm performance is presented in Table 4. The model demonstrates a strong relationship with an R-squared value of 0.607, indicating that technology innovation strategy accounts for 60.7% of the variance in firm performance. The adjusted R-squared value of 0.601 confirms the model's robustness when accounting for sample size.

**Table 4: Regression Results for Technology Innovation Strategy**

| Model                 | R                           | R Square   | Adjusted R Square         | Std. Error of the Estimate |        |       |
|-----------------------|-----------------------------|------------|---------------------------|----------------------------|--------|-------|
| 1                     | .779                        | 0.607      | 0.601                     | 0.28978                    |        |       |
| Source                | Sum of Squares              |            | df                        | Mean Square                | F      | Sig.  |
| Regression            | 25.823                      |            | 1                         | 25.823                     | 220.98 | 0.000 |
| Residual              | 16.683                      |            | 96                        | 0.174                      |        |       |
| Total                 | 42.506                      |            | 97                        |                            |        |       |
| Variables             | Unstandardized Coefficients |            | Standardized Coefficients |                            |        |       |
|                       | B                           | Std. Error | Beta                      | t                          | Sig.   |       |
| (Constant)            | 2.302                       | 0.085      |                           | 27.082                     | 0.000  |       |
| Technology Innovation | 0.336                       | 0.023      | 0.779                     | 14.869                     | 0.000  |       |

The regression results show that technology innovation strategy has a significant positive influence on firm performance ( $\beta = 0.336$ ,  $p < 0.05$ ). The F-statistic of 220.98 with a p-value less than 0.05 indicates that the model is statistically significant at the 0.05 level. The t-value of 14.869 further confirms the statistical significance of the relationship. These findings provide strong evidence that technology innovation strategy is a significant predictor of performance in large manufacturing firms in Kenya. The fitted model was;

Organizational Performance =  $2.302 + 0.336 \times \text{Technology Innovation Strategy}$ .

The regression results show that technology innovation strategy has a significant positive influence on firm performance ( $\beta = 0.336$ ,  $p < 0.05$ ), with the F-statistic of 220.98 and p-value less than 0.05 indicating statistical significance at the 0.05 level, while the t-value of 14.869 further confirms the statistical significance of the relationship. These findings align with Subramanian and Nilakanta's (2021) assertion that technical innovation drives efficiency in business, competitive advantage, and corporate success by significantly affecting work productivity, competitive environment, and general organizational performance. The results corroborate Armbruster and Lay's (2024) research demonstrating that technology innovation has significant effects on routine processes and organizational operations, applying new procedures that initiate new products and services in turbulent market environments while affecting speed, flexibility, and production quality. Similarly, the findings support Zawislak, Tello-Gamarra, Barbieux and Reichert's (2021) argument that companies need to accumulate resources and competencies to develop technological capacity superior to their rivals, with organizational learning from innovation having great effects on performance. The World Bank (2020) emphasizes that knowledge-oriented businesses must be technologically innovative to promote enterprise welfare and enhance economic competitiveness countrywide, while Griffith and Rubera (2022) demonstrate that technological innovation allows customers access to new markets and enhances their capabilities to attain set standards. The fitted model, Organizational Performance =  $2.302 + 0.336 \times \text{Technology Innovation Strategy}$ , provides strong evidence that technology innovation strategy is a significant predictor of performance in large manufacturing firms in Kenya, supporting the Technology Acceptance Model theory which emphasizes that perceived usefulness and ease of use drive technology adoption and subsequent performance improvements (Davis, 1993; Cheung & Vogel, 2022).

## 5.1 Conclusions

Based on the findings, the study concluded that technology innovation strategy positively affects performance of large manufacturing firms in Kenya. The average adoption of technology innovation strategies has been strong as indicated in the descriptive results, showing the highest correlation among all innovation strategies. Technological capabilities have been significantly enhanced over the years, and advanced forms of marketing technologies, advertisement systems, and distribution methods are being explored and implemented to meet the demands of digital transformation. Technology innovation strategy is very fundamental and responsible for competitive advantage and will determine market positioning. Technology innovation strategy involves implementing new technologies in marketing, enhancing advertisement capabilities, and automating distribution systems with the aim of improving operational efficiency and customer engagement. The outcome of technology innovation adoption is more effective market reach and progressively streamlined operations. Implementing technology innovation strategies is geared towards leveraging technological advancements while improving on service delivery and organizational competitiveness.

## 6.1 Recommendations

The study recommends that management of large manufacturing firms in Kenya should prioritize strategic investment in advanced technologies for marketing, advertisement, and distribution systems while conducting comprehensive technology assessments to ensure optimal returns on technological investments. Organizations should implement customer relationship management systems and automation technologies alongside adequate employee training to facilitate successful technology adoption. Government policy makers should develop technology-supportive policies including tax incentives for technological innovations and establish infrastructure frameworks that support manufacturing sector digital transformation. Academic institutions should incorporate technology innovation modules in curricula and establish research centers focused on manufacturing technology innovation to advance understanding of effective implementation strategies. Manufacturing firms should leverage their organizational characteristics to maximize technology innovation effectiveness, recognizing that strategic technology adoption creates sustainable competitive advantages and significantly enhances organizational performance in Kenya's dynamic manufacturing environment.

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