

## TECHNOLOGICAL INNOVATIONS AND PERFORMANCE OF HIGHER INSTITUTIONS OF LEARNING: PERSPECTIVES FROM PUBLIC UNIVERSITIES IN KENYA

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### ABSTRACT

Despite the important place that research on strategic innovations has in the literature on strategic management, little is known about the relationship between strategic innovations and university performance. The limitations of measuring the strategic innovation constructs, methodological ambiguities, and contentious findings from earlier studies served as the foundation for this study. This study set out to look into how technology advancements affected the performance of Kenya's public universities. This study made use of the balanced scorecard paradigm, disruptive innovation based on resources, and both. The research design used was cross-sectional. This study's target audience consisted of Kenya's 31 public universities. This study's sample frame consisted of 10 public universities. The population's 100 respondents were picked. Using a stratified random sample method, respondents from Kenya's 10 public universities were selected. The Israel (2009) formula was used to establish the sample size for the 80 respondents. Structured questionnaires with both closed- and open-ended questions were used to collect primary data. A Likert-type scale was used to evaluate the questionnaire items. The administration and administrative staff of Kenya's public universities served as the study's respondents. The deputy vice chancellors, directors, deputy directors, managers, and senior administrators were among the respondents to the survey. While Cronbach Alpha coefficients were used to test the reliability of the research instrument, the validity of the research instrument was evaluated by academic researchers and business specialists. Descriptive statistics and the linear regression approach were used to examine the data, and the results were presented as tables and figures. The study found a strong correlation between technical advancements and the performance of Kenya's public universities ( $F, 54.0 = 49.3, p 0.000$ ). The study concluded that technology advancements like virtual learning, e-learning tools, and digital records can effectively explain the performance of public universities. Rethinking technological breakthroughs is crucial, the research advises, if public universities in Kenya are to perform better. It is inferred that the findings of this study will have a substantial impact on theory, management practice, and decision-makers like the Commission for University Education and the Kenyan Ministry of Education.

**Keywords:** Technological Innovations and Performance of Higher Institutions of Learning

## 1.0 BACKGROUND OF THE STUDY

Universities in particular are thinking about strategic innovations to maintain their relevance in the higher education service industry in the dynamic and unpredictably changing business environment (Allen & Seaman, 2013). Organizations all across the world are doing the same. Strategic innovation is the process of redefining corporate, business, strategic, and operational techniques within the firm to generate greater performance (Aswani, 2013). Strategic innovation, according to Brynjolfsson and McAfee (2011), may be regarded from multiple angles, including the use of appropriate technology and significant advancements in service delivery procedures. Strategic innovations are procedures that result in the creation of new products as well as ongoing improvements to existing ones in order to satisfy customers (Guday & Kilic, 2011). Strategic innovations are techniques that improve new customer service methods and digitize processes to increase corporate performance and efficiency (Gupta & Malhotra, 2013). According to Jakovljevic (2020), a number of initiatives aimed at enhancing the total customer service delivery experience can be linked to strategic innovations in the university setting. In addition to forcing a reevaluation of strategic innovations, the globalization of higher education services has also forced the development of fresh approaches to increasing customer lifetime value (King'oo, 2014).

Innovation is regarded as an essential part of carrying out a strategy. It is also regarded as the sole tool that businesses, and particularly universities, may use to achieve their objectives in the challenging business environment (Kiptoo & Koech, 2019). According to Odhiambo (2013), innovations in higher education institutions are viewed as methods for creating new economic prospects with specific risk mitigation strategies, value addition, and reduction. Any higher education institution's ability to compete globally depends on technical advancements (Nikolai, 2017). According to Selwyn et al. (2014), strategic innovations can assist public organizations—and universities in particular—deliver services more effectively and efficiently. Technological advancements are unavoidable for improving university performance (Valentina, Olga, & Boris, 2017). According to the strategic management literature, any firm that successfully adopts technological advancements would perform better (Upadhaya, Munir, & Blount, 2014).

Researchers from the USA have evaluated how technological advancements have affected higher education institutions' performance globally (Brynjolfsson & McAfee, 2011; Christensen & Eyring, 2011; Allen & Seaman, 2013; Brunner, 2013). Similar to this, academics from the region think that universities can accomplish their goals more quickly and successfully if they automate their service delivery models, train staff in computer skills, digitize documents, integrate technology into teaching, and provide financial services (Jakovljevic, 2020). Further, a 2019 research from Egypt's National Management Institute shows that the success of higher education institutions differs depending on how well technology innovations are adopted. The technological initiatives mentioned in the reports include the university's access to the internet, its ability to create new academic programs that are responsive to shifting labor trends, and its use of ICT tools like projectors and laptops in the classroom. According to local academics in Kenya, strategic innovations embraced by universities can boost their performance (Shisia, Sang, Matoke & Omwario, 2014). Likewise, Mbuchi (2013) argues that universities can improve customer service delivery by embracing cutting-edge projects like digital learning and e-electronic resource management.

In contrast to universities that employ traditional models of service delivery deemed inefficient and ineffective, those that continuously improve their models of service delivery to adapt to shifting consumer trends in the turbulent business environment are more likely to achieve global competitiveness (King'oo, 2014). Organizational strategic innovation research is important because it drives global competitiveness (Najmaei, 2010). However, it has been found in the literature on strategic management that research on strategic innovation in the university setting is underrepresented. As a result, there is a need for a study to clarify how the performance of universities can be assessed using the three strategic innovation indicators chosen—organizational, market, and product innovations. A company's creation of entirely new products and services not only boosts sales but also improves the company's reputation in the marketplace (Polder, Leeuwen, Mohnen & Raymond, 2013).

According to Najmaei (2010), organizations can increase consumer loyalty by creating new items and raising the standards of their existing ones. Companies could think about creating new goods or services to break into a new market or compete with rival branding (Nybakk & Jenssen, 2012). To keep customers loyal, innovative product development is being funded by competitive businesses functioning in a dynamic business environment (Namusonge, Muturi, & Olaniran, 2016). Systemic inertia is the failure of the company to produce goods that meet the needs and desires of customers. Product innovation is a necessary practice for the strategic survival of competitive organizations (Micheline & Reinhilde, 2012). According to Sawhney, Wolcott, and Arroniz (2016), an organization's innovations can be assessed in terms of restructuring, retraining employees, re-engineering service delivery models, and fostering bottom-up and top-down communication mechanisms. According to Polder, Leeuwen, Mohnen, and Raymond (2013), organizations can substitute innovative approaches for traditional ones by creating an environment that encourages employee creativity and innovation. In order to enter new markets, increase client base in the current market, and provide the company a competitive edge, one of the main elements of growth strategies is strategic innovation (Nybakk & Jenssen, 2012).

According to Polder et al. (2013), firms are starting to understand the need of strategic innovation in light of the growing competitiveness on global marketplaces. Technology change has made businesses appreciate lean manufacturing methods and enhanced consumer experiences. Without implementing strategic innovations, business strategies cannot succeed (Valentina et al., 2017). In order to increase productivity, quality, and competitiveness, a company must be able to entirely or partially replace outdated technology with newer technology (Verma & Jayasimha, 2014). If properly adopted, technology is regarded as a driver of organizational performance (Guinan, Parise, & Langowitz, 2019). Effective technology use in enterprises can lead to lower operational costs, improved service delivery, and increased employee motivation (Sawhney et al., 2016). Many businesses that use the right technology are likely to have lower operating expenses (Micheline & Reinhilde, 2012), improved customer service delivery in terms of service dependability, and higher profitability (Gupta et al., 2016). The different financial measures that operationalize the multidimensional concept of organizational performance include sales, net asset value, and profit, to name just a few. Additionally, customer satisfaction, market share, and employee morale are non-financial criteria used to evaluate organizational effectiveness. Organizational performance cannot be accurately evaluated unless both financial and non-financial measures are taken into account (Zahra, 1993). Despite the relevance of technical advancements, there is a dearth of

technological research in the academic setting, necessitating more study to fill in the knowledge gaps.

According to the Commission for University Education's 2018 report, public universities are regarded as institutions of higher learning that were created by the University Act and wholly governed by the government. All Kenyans must have access to education, research, and training under the universities' mandate. The higher education services industry has undergone enormous growth since the country's declaration of independence in 1963. The demand for higher education has caused a significant expansion in the number of universities. 31 public universities have been founded, but there are still 6 universities operating as constituent colleges under interim letters, making Nairobi University College the only institution in Kenya that offers higher education services (Waithaka, 2014). The rise in the number of students enrolling in various academic programs is blamed for the expansion of the higher education services industry.

The Kenyan government has established quality assurance regulatory organizations like the Commission for University Education (CUE) to ensure that services are delivered effectively at institutions (Inter-University Council for East Africa (IUCEA), 2014). According to Wambui (2011), the higher education system is undergoing significant changes due to fierce competition from private universities and overseas universities. Universities have also reconsidered alternate strategies for raising performance as a result of changes in technology, industry restrictions made by the ministry of education, and student demands. Investment in innovations is viewed as a driver of global competitiveness for the relevance of any institution of higher learning, and universities in particular (Shisia, Sang, Matoke & Omwario, 2014).

Public universities' current situation is related to financial limitations, and their inability to offer courses that are driven by the market is linked to their unwillingness to innovate (Melchorita, 2013). Graduates lack the requisite skills as a result of universities' aversion to modern technologies and slow economic growth (CUE, 2018). The adoption of strategic innovations is regarded to be a stimulant for university performance if adequately managed for the strategic survival of universities in the globalized higher education industry (Melchorita, 2013). Additionally, a practice ingrained in a culture of transformative leadership that prioritizes strategic innovations as a means of attaining university objectives more effectively and efficiently is what makes the institution's vision a reality, not the number of years it has been in existence.

## 1.2 Statement of the Problem

Despite the crucial role that public universities play in the development of higher education services in Kenya through teaching, research, and training (Nikolai, 2017), these institutions face a variety of difficulties that have a negative impact on their performance (King'oo, 2014). Stakeholders are concerned about challenges such as financial limitations, service gaps, a sluggish response time to shifting business trends, and the inability to execute Commission for University standards (Mbuchi, 2013). Aware of these obstacles, universities can not only enhance their performance but also their level of global competition in the higher education services market by rethinking technology advancements (Aswani, 2013).

Numerous studies have shown that, when properly adopted, technological advances can have a favorable impact on an organization's performance (Guday & Kilic, 2011; Aswani, 2013; Jin, Hewitt & Thompson, 2013). Despite the studies' conclusions, there are still gaps in the evidence about the relationship between technical advancements and organizational effectiveness, prompting future academic research to close these gaps. As a result, some studies have established differences in the relationship between the variable and technological innovations (Shisia, Sang, Matoke & Omwario, 2014; Namusonge, Muturi & Olaniran, 2016), while others have shown a strong connection between the two (Jin et al., 2013; Kiptoo & Koech, 2019). In light of the conflicting findings of the prior studies, it is crucial for a study to examine how technological innovations affect universities. However, a number of studies have only adequately and separately addressed the study's factors (White & Bruton, 2011; Zhou & Wu, 2010 & Slivko, 2013), necessitating additional research to evaluate the variables in a comprehensive way. Furthermore, varied operationalizations of the study's variables by academics urge for additional research to clarify conceptual restraints and to reconsider how strategic innovations might help institutions become more competitive globally.

Gaps in contextual research are clear from earlier empirical studies. The scope of a study by Namusonge et al. (2016) was restricted to Nigerian stock exchange companies. A different study by Kiptoo and Koech (2019) was restricted to Kenyan manufacturing companies. Kirabo, Gregory, and Mike (2020) investigated the strategic performance and innovation of Rwandan telecommunications businesses. Jin (2014) investigated the relationship between manufacturing companies' performance and innovation, whereas Simiyu (2013)'s study focused only on Kenyan commercial banks. The present study, which concentrated on the university context in Kenya, filled the geographic and socioeconomic research gaps identified by previous studies. Additionally, it is evident from the empirical studies described that several research approaches were employed. For instance, Kirabo et al. (2020) used questionnaires and interview schedules in their study. A study by Jin et al., 2013, used an exploratory research design, whereas Maroa and Namusonge (2019) used a case study research approach. There is a need for additional research employing a cross-sectional research design, stratified random sampling approach, and inferential statistics to assess the coherence of the results in light of these methodological research gaps. In this study, it was determined how technology advancements may affect how well Kenya's public universities perform.

### **1.3 Research Objectives**

To evaluate the impact of technological innovations and performance public universities in Kenya.

## **2.0 THEORETICAL REVIEW**

### **2.1 Balanced Scorecard Model**

This model was postulated by Norton and Kaplan in 1997. The four perspectives proposed by the scholars used to measure performance in organizations include internal company operations, financial perspectives, innovation and learning, and customer perspective. Customer perspective is the ability of the business to provide goods and services that meet consumer demands and desires. It entails the capability of the company to develop products



and service centred on customer expectations. Financial perspective is the ability of the business to produce sufficient money in the form of earnings and dividends to shareholders. Furthermore, the financial perspective entails the extent to which an organization can maximize its revenue by embracing appropriate strategies which are more efficient and effective. Internal business processes involve the degree to which an organization can utilize the suitable technology to increase effectiveness and efficiency overall. It entails the level to which an organization leverage new technologies and re-invents its. This theory was utilized in this study as it explains the role of

## 2.2 Empirical Review

### 2.2.1 Technological Innovations and Organizational Performance

Tallon, Queiroz, Coltman, and Sharma (2018) in the United States of America revealed that, if appropriately embraced, technological advancements can assist a company in enhancing performance. In South Korea, Shin, Lee, Kim, and Rhim (2015) note that technological advancements can boost organizational productivity. The authors argue that process automation and giving employees computer training can lead to increased productivity. Although there is a strong correlation between technical advancements and performance, little is known about how technological advancements can be employed to account for performance in a university setting. On the same subject, it has been noted that the majority of research have a bias in favor of manufacturing and commercial banks (Guyo, 2014; Yusufu, 2013).

Guyo (2014) found a statistically significant relationship between technological advancements and the performance of commercial banks using the regression approach. However, it should be highlighted that the study only examined technical advancements as a single element, failing to demonstrate how technology might alter how effectively commercial banks work when combined with other factors. In addition, it should be highlighted that the study's environment was different from this one in that it dealt with commercial banks. The study's findings are ambiguous in light of the contextual limitations, prompting further investigation to fill in the information gaps. It was discovered that there is a statistically significant relationship between technical innovation and organizational performance using a sample of 384 respondents, stratified random sampling, and regression method of data analysis. Process improvements, new products, and the market all improved how well public sector organizations performed (Wangira, 2018). In contrast to the current study, theories such the innovation cycle model, the theory of disruptive innovation, the theory of innovation-decision process, and the technical push and market pull theory were used to guide the study, placing restrictions on generalizing the findings. The current study was inspired by the knowledge-based theory, the technological acceptance theory, and the transformational theory of leadership to fill these theoretical knowledge gaps.

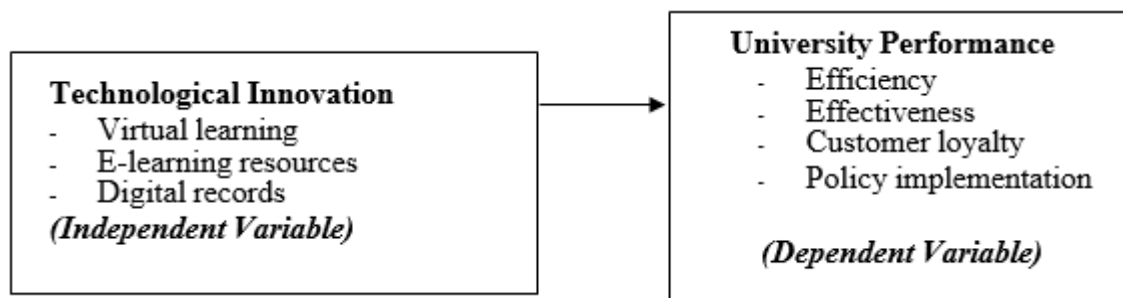
Technological advancements are credited with increasing organizational performance and efficiency (Queiroz et al., 2018; Shin et al., 2015). Research on technical advancements is, however, scarce in the academic setting. Concern exists regarding Kenya's state universities' inability to surpass patron expectations. Public colleges need to reevaluate their technological endeavors because of concerns about managing student information (Doz and Kosonen, 2010). The relationship between technical advancements and operational success has generated debate

among academics (Kale, Aknar & Başar, 2019; Kumkale, 2016; Shisia, Sang; Matoke, Omwario, 2014; Wangira, 2018; Rotich & Chebet, 2018). These investigations revealed both favorable and negative outcomes, necessitating additional research to clarify the conflicts.

Furthermore, several research (Shisia, Sang; Matoke & Omwario, 2014) examined both direct and indirect links; as a result, the current study was required to determine whether there is a direct correlation between technological advancements and the success of public institutions. It is appropriate to use resource-based theory, disruptive innovation theory, transformative leadership theory, system theory, and the balanced scorecard model to elaborate the relationship between technological innovations and performance of public universities given that the studies operationalized the constructs of this study using various metrics. It was challenging to generalize the findings of the current investigation because the studies by (Kale, Aknar & Başar, 2019 & Kumkale, 2016) were limited to specific circumstances and employed different methodologies. The current is oriented toward establishing the impact of technological, organizational, product, and market innovations on performance of public universities in Kenya in order to address the conceptual, theoretical, and methodological research gaps of the studies.

### 2.3 Conceptual Framework

It was hypothesized that technology advancements had an impact on university performance, as shown in Figure 1. Virtual learning, e-learning tools, and digital records are indicators used to gauge technological developments. Last but not least, the dependent variable, or university performance, is assessed using four metrics: efficacy, customer loyalty, efficiency, and implementation of policies.



**Figure 1: Conceptual Framework**

### 3.0 RESEARCH METHODOLOGY

In this study, a cross-sectional research design was used. 31 public universities operating in Kenya were the study's target population. The examination was limited to public universities that had been in existence for at least 15 years. The sample frame was composed of 10 public colleges due to the magnitude of the target group. Ten participants were chosen by the researcher from each public university. Deputy vice chancellors, directors, deputy directors, managers, and senior administrators were among the responders. Depending on the type of investigation, probability and non-probability sampling approaches can both be used. This study used 10 public universities that are currently operating in Kenya as its sample frame. A stratified random sampling procedure was used to choose respondents from among the 10

public universities that are active in Kenya. The study's respondents were the administrative employees of Kenya's state universities. The method from Israel (2009) was used to estimate the suitable sample size out of the total population of 100 respondents received from the 10 public universities. In the sampled public universities, 80 management staff members were chosen as the study's sample size. The questionnaires were used to collect first-hand information. There were both closed-ended and open-ended questions. While Cronbach Alpha coefficients were used to test the reliability of the research instrument, the validity of the research instrument was evaluated by academic researchers and business specialists. The data was input into the computer system to allow for quantitative data analysis. In order to analyze the data, SPSS version 21 was used. Descriptive statistics including percentages, mean scores, and standard deviations were employed to evaluate the overall pattern of the data. The linear regression techniques were employed to determine the statistical association between the predictor variables and the dependant variable. R-square was used to evaluate the statistical significance between the variables. T-tests and F-tests with a 95% level of confidence. Tables and Figures were used to show and analyze data. This study used a regression model that has the following structure:

$$Y = \beta_0 + \beta_1 X_1 + \dots + \epsilon$$

Where;

Y = Performance of Public Universities in Kenya

$\beta_0$  = Y-intercept

$\beta_1$  = regression coefficients

$X_1$  = Technological Innovations

$\epsilon$  = Other factors not included in the model (Error Term)

#### 4.0 DATA ANALYSIS AND PRESENTATION

Deputy vice chancellors, directors, deputy directors, managers, and senior administrators from Kenyan public institutions served as the study's respondents. 80 participants were chosen for the study's sample from a total of 100 participants. Only 73 of the 80 surveys that were distributed to respondents were actually returned. Two questions were not returned, while five questionnaires were filled out improperly. A total of 73 questionnaires were employed in the research, yielding a 91% response rate, exceeding Fisher (2010)'s proposed cutoff point of 50%.

**Table 4.1: Technological Innovation**

Statements	Mean	S.D
Staff can access the internet while at the university	4.52	.320
Students can access the internet while at the university	4.61	.301



My university has virtual learning mode	4.58	.371
My university has distance learning mode	3.35	.456
My university has digital record management systems	3.89	.457
Students can access e-resources in the library	4.94	.174
My university has human resource management information systems	1.78	.939
My university prioritize digital marketing in promoting its academic programs	1.47	.834
My university has financial management systems	4.17	.245
My university has electronic procurement management systems	1.68	.991
My university has biometric systems for students	1.01	.967
My university has biometric systems for employees	1.45	.851
Projectors are installed in lecture halls	4.67	.124
CCTV cameras are installed in lecture halls	1.23	.237
<b>Average Mean Score</b>	<b>3.096</b>	

#### Source: Research data (2023)

The respondents were questioned about how much technology advancements affected the success of their individual colleges. The findings in Table 4.1 show that the average mean score for the 14 assertions was above 3.00, indicating that the statements were generally agreed upon by the respondents. The average score for the eight claims was greater than 3, indicating that both staff and students had access to the internet on university property, that distance learning options were available, that digital record management systems and electronic resources were accessible on campus. Additionally, it was stated that projectors had been installed in lecture rooms to aid in learning activities and that financial management systems were accessible. The average score for the six statements was less than 1:00, indicating that some employees did not agree with the availability of systems for electronic procurement management and human resource management information, the embracement of digital marketing, the availability of biometric systems for both staff and students, and the installation of CCTV cameras for security in lecture halls.

These findings are corroborated by Kumkale (2016), Shisia (2014), Ogolla (2020), Wangira, (2018), Rotich and Chebet (2018) who shown that, when used effectively, technology may have a major impact on an organization's performance. The investigations concluded that businesses who are devoted to automating their operations can benefit from increased efficacy and efficiency. Despite the organizational constraints caused by technology, the authors

concluded that technology is the primary force behind organizational competitiveness in the always shifting business environment.

**Table 4.2: Correlations Coefficients on the Relationship between Technological Innovations and Performance of Public Universities in Kenya**

Variable	Pearson Statistics	1	Technological Innovations	Performance of Public Universities in Kenya
Technological Innovations	Pearson Correlation	.152**		
	Significance (2-tailed)	0.000		
	Sample size	21		
Performance of Public Universities in Kenya	Pearson Correlation	0.032	.481**	1
	Significance (2-tailed)	0.000	0.000	73
	Sample size	73	73	
**Correlation is significant at the 0.01 level (2-tailed).				
*Correlation is significant at the 0.05 level (2-tailed).				

**Source: Research Data (2023)**

According to the findings in Table 4.2, there is a strong correlation between technical advancements and the performance of Kenya's public universities ( $r = .481, p 0.000$ ) at the 0.05 level in a two-tailed test. These results imply that technical advancements and the performance of Kenya's public universities are strongly positively correlated.

**Table 4.3: Regression Coefficients on the Relationship between Technological Innovations and Performance of Public Universities in Kenya**

**Table 4.3 a: Model Summary**

Model	Change Statistics								
4	R	R Square	Adjusted R Square	Std. Error of Estimate	R Square Change	F Change	df1	df2	Sig. F Change
	.344 <sup>a</sup>	.201	.203	.69181	.204	53.973	1	.247	.000
<sup>a</sup> Predictors: (Constant), X4									

**Source: Research Data (2023)**

**Table 4.3 b: ANOVA<sup>b</sup>**

Model		Sum of Square	Df	Mean Square	F	Sig
4	Regression	38.115	1	41.115	53.983	.000 <sup>a</sup>
	Residue	44.779	247	667		
	Total	55.013	248			

Predictors: (Constant), X4

b. Dependent Variable: Performance of Public Universities in Kenya

**Source: Research Data (2023)**

**Table 4.3 c: Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
4	Constant	.734	.263		3.443	.000		
	X4	.493	.065	.354	6.889	.000	1.000	1.000

a. Dependent Variable: Performance of Public Universities in Kenya

**Source: Research Data (2023)**

The results of regression analysis on technical advancements in connection to performance of public universities in Kenya are shown in Table 4.3. The F-test with the ANOVA method was used to see whether there was a relationship between technical advancements and the performance of public universities in Kenya. The findings revealed a substantial positive relationship between technical advancements and the performance of Kenya's public universities (F, 54.0 = 49.3, p 0.000) at the 5% level of significance. The resulting goodness of fit value was R<sup>2</sup> = 0.201, which means that R=45.4% and 20.1% of the variance in Y are both explained by the innovation index. This suggests that technical advancements and the success of Kenya's public universities are positively and significantly correlated.

## 5.0 SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The study found a strong correlation between technical advancements and the performance of Kenya's public universities. However, it was found that Kenya's public universities lacked computerized procurement management systems and information on human resource management. Additionally, it was highlighted that state universities in Kenya did not embrace digital marketing and lacked CCTV cameras as well as biometric systems.

### 5.1 Conclusion

Public universities in Kenya's success can also be evaluated using technological innovation metrics including virtual learning, e-learning tools, and record digitalization. Finally, the study

concluded that technological advancements may adequately explain the performance of public universities in Kenya in terms of efficiency, effectiveness, customer loyalty, and policy execution.

### **5.2 Recommendations**

This study advises management of public universities to support training of academic staff by increasing training resources in order to improve the performance of public universities in Kenya. Public university administrators should adopt a participative leadership style, inspire staff, and encourage a culture of delegating responsibilities.

In order to improve university research and worldwide competitiveness, public university administrations should also support inter-university exchange programs. The administration of public institutions should also start developing new academic programs that give students the necessary information and abilities to function in a globalized and industrialized economy. Universities should prioritize the newest educational tools to improve student learning. Public universities must reconsider lean concepts in order to be efficient and effective through benchmarking with top-tier institutions. In order to succeed in the unpredictably changing higher education market, universities should reevaluate functional strategic alliances with industrial participants.

Given that this study focused on the direct relationship between technological advancements and the performance of Kenya's public universities, other researchers can also investigate the indirect relationship between these two factors by including corporate governance as a moderating variable to determine whether the findings are converging or diverging. In the setting of a university, researchers can examine the technological innovation variable using various indicators and theories to determine whether the results are repeatable. Comparative research should be done between nations to see whether different outcomes may be obtained.

### **5.3 Suggestions for Further Research**

Given that this study focused on the direct relationship between technological advancements and the performance of Kenya's public universities, other researchers can also investigate the indirect relationship between these two factors by including corporate governance as a moderating variable to determine whether the findings are converging or diverging. In the setting of a university, researchers can examine the technological innovation variable using various indicators and theories to determine whether the results are repeatable. Comparative research should be done between nations to see whether different outcomes may be obtained.

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