Business Model Innovation and Performance of Public Universities: Evidence from Kenya

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Abstract: *Public universities in Kenya are under increasing financial strain due to reduced government funding and rising expectations for academic and institutional performance. This study explored the role of business model innovation in enhancing university performance, focusing on three key areas: value creation innovation, value proposition innovation, and revenue stream innovation. Data from senior administrators at 32 public universities were analysed using descriptive statistics, correlation, and regression techniques. The findings showed that revenue stream innovation had the most significant positive impact on performance ($\beta = 0.449$, $p = 0.004$), while value proposition innovation had a modest but insignificant effect ($\beta = 0.138$, $p = 0.458$). Value creation innovation showed a negative influence ($\beta = -0.062$, $p = 0.638$). The study concluded that universities should prioritise revenue diversification and external funding to improve financial sustainability and competitiveness while continuing to refine academic and strategic value.*

Keywords: Business model, university performance, revenue streams, value proposition, value creation, Kenya.

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Introduction

Business model innovation is a proven strategic tool that many enterprises in different industries use to strengthen their competitive positions and keep up with market trends (Amit & Zott, 2020). The innovative business being an integrated part of higher education, particularly public universities, is now very necessary within the world of changing educational systems, globalisation, and technology. Globally, universities encounter several unique challenges and opportunities that are provoked by technological progress, population shifts, and the changing values of students nowadays. Business model innovation is no doubt one of the main drivers that help universities to structure efficient exploitation of their intellectual assets and research skills (Zambon, 2017). Universities can be in a strategic position in terms of their effectiveness by commercialising their intellectual property, creating collaborations with business partners, and diversifying their revenue streams from traditional tuition and government financing.

In Africa, the university sector is going through tremendous growth and evolution as a result of population growth, economic development, and the increase in labour skills. Nevertheless, Africa has experienced many challenges related to its institutions, such as limited funding, insufficient infrastructure, and a deficit of expertise. Thus, business model innovation as a strategy would offer African universities a chance to deal with these problems to improve their performance. Business model innovation's importance in African universities is underlined because of its impact on access, quality, and relevance of higher education (Iqbal, 2021). The forum, therefore, gave a highlight into the areas such as online learning platforms, industry partnerships, and alternative revenue streams that have been adopted in many universities across the continent to expand their market reach, advance student outcomes, and strengthen their financial position. These breakthroughs are what demonstrate the reality of business model innovation in being an efficient force of good and change in the African higher education sector. Sometimes in Kenya, public universities are determinants of socioeconomic growth in the country since they prepare graduates with skills, conduct research, and promote innovations. Nevertheless, Kenyan universities bear several challenges such as funding constraints and infrastructural shortfalls together with poor quality. The business innovation model captures the strategic requirement of Kenyan institutions that are aimed at improving their performance and relevance in the highly competitive higher education environment. The Kenyan economic institutions are being encouraged to use new economic strategies to tackle these challenges by current research. Such are among the approaches like public-private partnerships, entrepreneurial ventures, and online learning platforms, which are used to vary funding streams, enhance infrastructure, and ensure a captivating student experience (Hughes & Mustafa, 2017). Some of these creative initiatives have shown positive impacts by improving university performance and competitiveness, focusing on the importance of designing models that use the change for the good of the country's future.

A well-structured business model should feature a harmonious balance of the additional value given by consumers and the mechanism by which the firm absorbs this value. The various components of the business model should be adaptable, allowing for tweaks and refinements as needed. One key component is the value proposition, which pertains to the products and

services that respond to the specific demands of consumers within a certain geographic area. Introducing innovations to either the industry or the business itself should be exploited to enable continuous value capture. Hence, emphasising revenue maximisation should be a core component in the business strategy, rather than an afterthought (Teece & Linden, 2017).

The components that significantly shape the business model include the features of value propositions, value creation, value delivery, and the activities made for value capture by the company. A value proposition comprises the full set of product and service features, as well as brand consistency and distinctiveness adjusted to coincide with consumer preferences. On the other hand, value capture indicates the effectiveness of the cost system and profit model within the company context. The business model acts as a strategic picture of what works well for the corporation within a competitive industry (Migol et al., 2018). Furthermore, it serves as a means of optimising revenue, while business model innovation involves altering the business model to generate value for consumers by modifying one or more of its elements (Bashir & Verma, 2017).

According to recent research, businesses worldwide are becoming more aware of the importance of adopting innovative business models to achieve performance metrics like revenue, market share, and consumer contentment (Pedersen et al., 2018). Globalisation has amplified the rate of business model innovation in which firms try to adjust themselves to a new market and technology (Petricevic & Teece, 2019). Thus, every business that aspires to thrive in the existing competitive business environments must know the global business model innovations landscape.

In Kenya, performance optimisation through business model innovation is mandatory for companies that are aiming at sustainable growth as well as competitive advantage. Research has shown that there is a need for organisations to develop business models that are customised to meet certain needs and issues of the Kenyan market (Ciambotti et al., 2020). In Kenya, the performance of business model innovation projects is driven by aspects such as technology improvements, legal frameworks, and market dynamics that influence the innovation projects' efficacy (Chege et al., 2020). Hence, understanding the Kenyan concept of performance within the scope of business model innovation is a crucial element for companies operating in the Kenyan market.

Public universities in Kenya are facing significant challenges in translating their academic research and innovative ideas into viable commercial ventures. Statistics from the Ministry of Education reveal that over 80% of public universities rely heavily on government subsidies, which often fall short of covering their operational expenses (Adam, 2020). This financial constraint impedes their ability to invest in research commercialisation initiatives. Furthermore, a study by Kahangi (2017) highlights that only a handful of public universities, such as Jomo Kenyatta University of Agriculture and Technology, have had notable successes in commercialising their research findings, while the majority struggle to bridge the gap between scientific discoveries and sustainable enterprises (Kahangi, 2017). Despite the growing recognition of the importance of research commercialisation and innovative business models in academia, there is a lack of empirical evidence on how universities in Kenya can effectively

utilise business model innovations to enhance their overall performance, financial sustainability, and contribution to societal needs (Gachie, 2020). This study aims to address this research gap by providing empirical insights into the impact of business model innovation on the performance of public universities in Kenya.

According to a study conducted by Kahangi (2017), only a few public universities in Kenya have successfully commercialised their research outputs, while the majority struggle to bridge the gap between scientific discoveries and sustainable enterprise. This demonstrates how urgently a study into the connection between business model innovation and academic achievement in Kenya is needed. Despite the growing recognition of the importance of commercialisation in academia, there is a lack of empirical evidence on how universities can effectively utilise innovative business models to enhance their overall performance and financial sustainability (Maresova et al., 2019). In light of these challenges, this study aims to fill the existing research gap by providing empirical insights into the relationship between business model innovation and the performance of public universities in Kenya. The study was guided by the following hypotheses:

H_{o1}: Value creation innovation has no significant effect on the performance of public universities in Kenya.
H_{o2}: Value proposition innovation has no significant effect on the performance of public universities in Kenya.
H_{o3}: Revenue stream innovation has no significant effect on the performance of public universities in Kenya.

Theoretical Review

This study is anchored on three theories that explain the adoption and acceptance of innovation in institutional settings: Innovation Diffusion Theory (IDT), Stakeholder Theory, and the Technology Acceptance Model (TAM). According to Rogers (2003), IDT outlines the stages through which innovations spread—knowledge, persuasion, decision, implementation, and confirmation (Rodgers, 2003). The concept is pertinent to the research because it helps explain how public universities in Kenya adopt innovative business models in response to financial and operational pressures. Demir (2006) emphasises the significance of knowledge dissemination and internal communication in facilitating innovation uptake (Cetin et al., 2021), which aligns with how university administrators evaluate and implement strategic changes.

Stakeholder Theory, as introduced by Freeman (1984), highlights the importance of considering the expectations and influence of all organisational stakeholders (Freeman, 1984). In public universities, administrators play a key role in aligning institutional strategies with the needs of diverse groups, including students, government agencies, and industry partners (Parmar et al., 2010). The TAM (Davis, 1989) further supports this study by explaining how perceived usefulness and ease of use influence the adoption of innovations. Since university administrators are responsible for implementing change, TAM is useful in assessing how their perceptions affect the integration of business model innovations.

Research methodology

Research Design

This study used a cross-sectional research design to explore how business model innovation affects the performance of public universities in Kenya. This design is used since it facilitates the collection of primary data from a substantial population, hence assuring the precision of study outcomes.

Target population

This study surveyed all 32 public chartered universities in Kenya to collect quantitative data. Data was gathered from each university using a census approach due to the manageable size of the public universities. Key informants, including Deputy Vice Chancellors, Directors, Managers, and Senior Administrators was surveyed to gather insights into how their institutions adopt business model innovations and how these innovations affect performance. Conducting a census ensures thorough and reliable data collection, providing a comprehensive understanding of the research issue.

Data Collection procedure

Structured questionnaires were utilized to collect quantitative data. The questionnaires were designed to measure variables linked to value creation innovation, value proposition innovation, and revenue stream innovation. They included Likert-scale questions and were administered electronically to the selected universities.

Pretesting of Research Instruments

Validity and reliability are critical aspects of research methodology, as they ensure that research instruments measure what they are intended to measure and produce consistent results. To enhance validity, the questionnaires and interview protocols underwent expert review to assess content relevance and clarity. Feedback from the experts was incorporated, strengthening the instruments' ability to capture accurate data. Regarding reliability, a pilot study was conducted on a sample similar to the target population before the actual data collection. The study examined the internal consistency of the scales using Cronbach's alpha, which ranges from 0 to 1, with values closer to 1 reflecting higher reliability. A coefficient of 0.7 or above was considered acceptable, confirming the instruments' consistency and suitability for the study (Bryman & Cramer, 2012).

Data Analysis

The data were cleaned and entered into Microsoft Excel for analysis. Descriptive statistics, such as means, standard deviations, and frequencies, summarised the quantitative data clearly. Multiple regression analysis then explored how value creation innovation, value proposition innovation, and revenue stream innovation impacted university performance, testing the formulated hypotheses. This analytical approach assessed the strength and direction of variable relationships. Pearson correlation coefficients examined associations between variables, identifying significant links between components of business model innovation and performance indicators. The impacts of numerous variables on university achievement were

concurrently examined using a multiple hierarchical regression model. The model was presented as follows;

$\mathbf{Y_{1-3} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon}$

Where $\mathbf{Y_{1-3}}$= Indicators of Organizational performance (dependent variable).

$\boldsymbol{\beta_0}$= Constant which defines performance without inclusion of independent variables

$\boldsymbol{\beta_{1, 2, 3}}$ = Coefficient of $\mathbf{X_1}$, $\mathbf{X_2}$ and $\mathbf{X_3}$

$\mathbf{X_{1-K}}$= Independent variables are,

$\mathbf{X_1}$ = Value Creation Innovation (VCI)

$\mathbf{X_2}$ = Value Preposition Innovation (VPI)

$\mathbf{X_3}$ = Revenue Streams Innovation (RSI)

$\boldsymbol{\varepsilon}$= Error Term

Diagnostic Tests

Diagnostic tests were performed to assess the robustness and correctness of the regression analysis. Multicollinearity was evaluated using the Variance Inflation Factor (VIF), with all values remaining within the crucial threshold of 10. This signified the lack of significant multicollinearity among the independent variables: value creation innovation, value proposition innovation, and revenue stream innovation. The findings verified that each variable individually contributed to the model, hence improving the reliability and validity of the regression results.

Research findings and discussion

Demographic characteristics

The research aimed to analyse the demographic characteristics of respondents, including their gender, age, educational attainment, and professional experience. The results were analyzed and are summarised in **Table 4.1**.

Table 4.1 Sociodemographic characteristics

Variable	Category	Frequency	Percentage (%)
Gender	Male	18	56.2
	Female	14	43.8
Age	31-40 years	10	31.2
	41-50 years	14	43.8
	Above 50 years	8	25.0
Education	PhD	10	31.2
	Masters	16	50.0
	Bachelor's Degree	6	18.8
Work Experience	2-4 years	4	12.5
	5-6 years	3	9.3
	7 years and above	25	78.1

The results in Table 4.1 present the sociodemographic characteristics of the study respondents, offering insight into the distribution of gender, age, education level, and work experience. The sample consists of 56.2% males and 43.8% females, indicating a balanced representation with a slight male majority. This aligns with reports by the Commission for University Education

(CUE) that have observed gradual improvements in gender parity in senior university management, though disparities persist (CUE, 2022). In terms of age distribution, most respondents (43.8%) fall within the 41–50 years bracket, followed by 31.2% in the 31–40 years category and 25.0% above 50 years. This distribution suggests that the majority of participants possess substantial professional and academic experience. With regard to education, 50.0% of respondents hold a master's degree, 31.2% have a PhD, and 18.8% possess a bachelor's degree, indicating a highly educated sample suitable for evaluating business model innovation in higher education. In terms of work experience, 78.1% of the participants reported having more than seven years of professional expertise, while 12.5% had 2–4 years, and 9.3% had 5–6 years, reflecting extensive exposure to university management and operations.

Reliability analysis

The reliability of the measurement scale used in the study was evaluated to determine the internal consistency of the research instrument. **Table 4.2** presents the results of the reliability analysis using Cronbach's Alpha.

Table 4.2 Reliability statistics

Statistic	Value
Cronbach's Alpha	0.846
N of Items	20.0

The results in Table 4.2 indicate that the measurement instrument demonstrated a high level of internal consistency, as evidenced by a Cronbach's Alpha value of 0.846. This exceeds the commonly accepted threshold of 0.7, which confirms that the items used in the study were reliable and suitable for measuring the constructs related to business model innovation and university performance. According to Tavakol & Dennick (2011), a Cronbach's Alpha value of 0.70 or higher is considered acceptable for internal consistency, while values above 0.80 indicate good reliability, suggesting that the instrument effectively captured consistent responses across related items (Tavakol & Dennick, 2011). The robustness of the instrument enhances the credibility of the data collected and supports the validity of subsequent statistical analyses.

Descriptive Statistics

Descriptive Statistics for Demographic Variables

The study analysed key demographic variables to understand the general profile of the respondents. The results are summarised in Table 4.3.

Table 4.3 Descriptive Statistics for Demographic Variables

Variable	N	Mean	Std. Error	Std. Deviation
Gender	32	1.44	0.089	0.504
Age Bracket	32	2.94	0.134	0.759
Highest Level of Education	32	1.87	0.125	0.707
Work Experience	32	3.66	0.124	0.701

The results in Table 4.3 show that the gender variable had a mean of 1.44 and a standard deviation of 0.504, reflecting a relatively balanced distribution between male and female respondents. The age bracket had a mean of 2.94 (SD = 0.759), indicating that most respondents were within the middle-aged category. The mean score for the highest level of education was 1.87 (SD = 0.707), which corresponds to the predominance of postgraduate qualifications among participants. Work experience had the highest mean of 3.66 (SD = 0.701), suggesting that the majority of respondents had significant experience within university settings. Overall, the low standard deviations across all variables demonstrate that responses were tightly clustered around the means, reinforcing the consistency and representativeness of the demographic profile.

Value Creation Innovation

The study sought to assess the extent to which public universities implement value creation innovation in their operations. Participants were asked to express their agreement with many statements, including data-driven decision-making, cooperation, information sharing, technological acceptance, and multidisciplinary research. The results are presented in Table 4.4.

Table 4.4 Frequency Distribution for Value Creation Innovation

Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std Deviation
The university utilizes data-driven decision-making processes for strategic planning and operations.	6.3	6.3	31.3	31.3	25.0	3.56	1.12
The university has established effective collaborations and partnerships with other academic institutions.	6.3	3.1	15.6	46.9	28.1	3.84	1.02
The university has implemented innovative processes for knowledge creation and dissemination.	6.3	3.1	25.0	46.9	18.8	3.63	1.08
The university has adopted advanced technologies to enhance the teaching and learning experience.	6.3	15.6	31.3	28.1	18.8	3.39	1.14
The university encourages and supports interdisciplinary research and projects.	3.1	12.5	40.6	21.9	21.9	3.50	1.07

Note: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree; N = 32

The results in Table 4.4 indicate that public universities moderately apply value creation innovations across various domains. The research results reveal that 31.3% of participants

agreed that their university utilises data-driven decision-making for strategic planning, while 25.0% strongly agreed. The mean score of 3.56 (SD = 1.12) suggests a moderate level of data-driven innovation. Collaboration and partnership development emerged as a strong area of innovation, with 46.9% agreeing and 28.1% strongly agreeing that their universities have effective collaborations with other institutions. This resulted in a high mean score of 3.84 (SD = 1.02), suggesting that partnerships play a crucial role in academic development. Knowledge creation and dissemination were also rated positively, with 46.9% agreeing and 18.8% strongly agreeing that their university implements innovative knowledge-sharing processes. The adoption of advanced technologies to enhance teaching, however, had a lower mean score of 3.39 (SD = 1.14), suggesting that technological integration remains an area for improvement.
The findings reveal that public universities moderately apply data-driven decision-making for strategic planning. This moderate application suggests that universities recognise the importance of using data to guide their strategies but may still face challenges in fully integrating these practices. Supporting this, Chigbu & Makapela (2025) emphasise that data-driven leadership enhances institutional effectiveness by enabling evidence-based decisions that improve resource allocation and academic alignment. Their study highlights how universities employing data analytics benefit from more responsive and inclusive governance structures, which directly contribute to improved performance outcomes (Chigbu & Makapela, 2025).

Collaboration and partnership development emerged as a strong area of innovation within public universities, indicating active engagement with external entities to foster academic growth and knowledge exchange. This finding aligns with Ankrah & Omar (2015), who identified trust, effective communication, and shared goals as key facilitators of successful university-industry collaborations, while also recognising challenges such as misaligned incentives and cultural differences that must be addressed to enhance partnership effectiveness (Ankrah & Omar, 2015). Similarly, Mgonja (2017) emphasised that in developing countries, university-industry collaborations are essential for addressing innovation market failures and maximising the social returns of research and development investments, which in turn accelerate economic growth and innovation (Mgonja, 2017). Collectively, these studies confirm the crucial role of collaboration and partnership development in driving innovation within public universities and underscore the need for strategic management and capacity enhancement to overcome barriers and fully realise the benefits of such partnerships.

The study found that universities implement innovative processes for knowledge creation and dissemination, reflecting an emphasis on not just producing research but actively sharing it to enhance academic and societal value. This aligns with Al-Kurdi et al. (2018), who conducted a systematic review of 73 peer-reviewed papers and identified knowledge sharing as a critical process in higher education institutions (HEIs). Their study highlights that fostering a culture of knowledge sharing among academics can significantly enhance institutional performance by facilitating the exchange of ideas and collaborative research efforts (Al-Kurdi et al., 2018). These insights suggest that universities' focus on knowledge dissemination is crucial for translating research into societal impact and advancing academic excellence. Finally, the adoption of advanced technologies to enhance teaching was found to be relatively low compared to other domains of innovation. This suggests that technological integration in

pedagogy is still developing and requires more attention. Olusegun (2024) confirms that while technology adoption positively influences academic performance, its impact depends on effective integration, infrastructure availability, and user competence (Olusegun, 2024).

Value Proposition Innovation

The study sought to examine the extent to which public universities implement value proposition innovations aimed at improving educational quality and stakeholder alignment. Participants were asked to evaluate their degree of agreement with various statements regarding curriculum development, stakeholder engagement, market responsiveness, and brand differentiation. The results are summarized in Table 4.5

Table 4.5 Frequency distribution for value proposition innovation

Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std Deviation
The university has introduced innovative teaching methods and curricula to improve educational quality.	3.1	15.6	25.0	31.3	25.0	3.66	1.06
The university actively engages with stakeholders (students, industry, and community) to align educational offerings with their needs.	0.0	3.1	28.1	50.0	18.8	3.75	1.03
The university conducts regular market research to identify emerging trends and adapt its value proposition accordingly.	3.1	28.1	34.4	25.0	9.4	3.25	1.15
The university has a strong and differentiated brand image that sets it apart from competitors.	0.0	12.5	21.9	34.4	31.3	3.81	1.08
Our university continuously seeks ways to enhance the overall value proposition for its stakeholders.	15.6	15.6	31.3	31.3	21.9	3.53	1.10

Note: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree; N = 32

The results in Table 4.5 indicate that public universities are making considerable efforts in value proposition innovation. The study found that 31.3% of respondents and 25.0% strongly agreed that their universities have introduced innovative teaching methods and curricula. The mean score of 3.66 (SD = 1.06) suggests moderate implementation of curriculum innovation. Stakeholder engagement was reported to be relatively strong, with 50.0% and 18.8% strongly agreeing that their universities actively involve students, industry, and the community in

shaping educational offerings. Similarly, universities were found to be focusing on building strong brand differentiation, as evidenced by a mean score of 3.81 (SD = 1.08).

The results indicate that public universities are making considerable efforts in value proposition innovation, particularly through the introduction of innovative teaching methods and curricula, active stakeholder engagement, and efforts to build strong brand differentiation. This finding aligns with the work of Shalgimbekova et al. (2024), who emphasise that higher education institutions adopting innovative curricula and teaching approaches enhance the quality of education and better meet the evolving needs of students and industries, and communities, is recognised. Their study highlights that curriculum innovation enables universities to remain competitive and relevant in rapidly changing knowledge economies by integrating interdisciplinary and practical learning experiences (Shalgimbekova et al., 2024). Additionally, stakeholder engagement, especially involving students, industry, and communities, is recognised as vital for aligning educational offerings with market demands and societal expectations, which drives institutional relevance and responsiveness (Crocco et al., 2022). Strong brand differentiation further supports universities in establishing a unique identity and competitive advantage, as noted by Mbango (2022), who found that institutions with clear and distinctive value propositions tend to attract and retain students more effectively by delivering superior perceived value (Mbango, 2022).

Revenue Stream Innovation

The research investigated the degree to which public universities have embraced income stream innovations to improve financial sustainability. Participants were asked to express their degree of agreement with statements concerning revenue diversity, the commercial use of research, collaborations with industry, the acquisition of grants, and quantifying cost efficiency. The results are summarised in Table 4.6.

Table 4.6 Frequency Distribution for Revenue Stream Innovation

Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std deviation
The university has diversified its revenue streams through various income-generating initiatives.	0.0	6.3	31.3	37.5	25.0	3.72	1.07
The university has successfully commercialized innovative products or services developed through research.	15.6	15.6	31.3	31.3	21.9	3.56	1.12
The university has established strategic partnerships with industry or private entities to generate additional revenue.	15.6	28.1	25.0	15.6	15.6	3.10	1.18

The university actively pursues grant opportunities and external funding sources.	6.3	6.3	25.0	28.1	34.4	3.81	1.05
The university has implemented cost-effective measures to optimize resource allocation and financial sustainability.	6.3	3.1	21.9	40.6	28.1	3.75	1.09

Note: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree; N = 32

The results in Table 4.6 indicate that 37.5% agreed and 25.0% strongly agreed that their institutions have diversified revenue streams, yielding a mean score of 3.72 (SD = 1.07). Grant applications and external funding pursuits were found to be active, with a mean score of 3.81 (SD = 1.05), showing that universities seek external financial support. However, commercialisation of research outcomes had a relatively lower mean of 3.56 (SD = 1.12), while industry partnerships for revenue generation had the lowest mean of 3.10 (SD = 1.18). This suggests that universities need to strengthen their industry linkages to generate additional revenue.

The findings from the indicators of revenue stream innovation suggest that while public universities in Kenya are actively pursuing external grants and funding, their efforts to diversify income sources remain moderate, with notable weaknesses in commercialising research outputs and forming industry partnerships. This is in line with the work of Kimathi & Irungu (2023), who emphasised that revenue diversification is essential for enhancing financial sustainability in public universities and recommended that institutions develop alternative income-generating ventures beyond government subventions and tuition fees (Kimathi & Irungu, 2024). Further, Siringi (2022) observed that although many public universities in Kenya have established technology transfer or intellectual property management offices, their capacity to facilitate commercialisation remains limited due to institutional, regulatory, and resource-related constraints. These limitations hinder the effective translation of research into marketable innovations that can generate additional income streams (Siringi, 2022). Furthermore, Mongerwa (2023) underscores that strategic innovation, including the establishment of industry linkages and diversification of funding sources, is essential for improving institutional performance and achieving long-term financial resilience (Mongerwa, 2023). These perspectives reinforce the need for Kenyan public universities to adopt a proactive and innovation-driven approach to revenue generation, one that prioritises robust engagement with industry and the strategic utilisation of research outcomes.

University Performance

The study also sought to evaluate the overall performance of universities in terms of academic achievement, financial sustainability, societal contributions, institutional recognition, and the impact of business model innovation. Respondents provided their perceptions on various indicators of performance, and the results are summarised in Table 4.7.

Table 4.7 Frequency distribution for university performance

Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std deviation
The university has achieved significant academic excellence, as evidenced by high-quality teaching, research output, and graduate outcomes.	3.1	3.1	15.6	37.5	40.6	3.88	1.02
The university has a strong financial position, with sustainable revenue streams and efficient resource management.	12.5	12.5	31.3	31.3	12.5	3.53	1.10
The university has made significant contributions to society through knowledge transfer, community engagement, and public service initiatives.	3.1	3.1	28.1	34.4	31.3	3.75	1.05
The university is highly regarded and recognized for its achievements, both nationally and internationally.	3.1	3.1	15.6	40.6	37.5	3.81	1.07
The university has experienced overall improvements in performance as a result of implementing business model innovations.	3.1	3.1	18.8	43.8	31.3	3.72	1.08

Note: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree; N = 32

The results in Table 4.7 show that 40.6% strongly agreed that their university had achieved significant academic excellence, leading to a high mean of 3.88 (SD = 1.02). Similarly, strong recognition and reputation were noted, with a mean of 3.81 (SD = 1.07). Financial sustainability was rated moderately, with a mean of 3.53 (SD = 1.10), indicating room for improvement. Moreover, business model innovation was found to have a positive effect, with 43.8% agreeing that their university had experienced improvements due to innovation strategies.

The findings from the indicators of university performance suggest that while public universities in Kenya have achieved notable success in academic excellence and institutional reputation, financial sustainability remains moderate, indicating a need for improvement. Additionally, the positive perception of business model innovation highlights its role in enhancing institutional performance. This is in line with Osei-Kuffour et al. (2021), who found that academic branding significantly predicts financial sustainability in private educational institutions, explaining up to 55.2% of the variance in institutional financial outcomes (Osei-Kuffour et al., 2021). Similarly, a study by Kasim & Noh (2012) on Malaysian private universities demonstrated a strong positive relationship between organisational innovativeness and university performance, suggesting that innovation strategies are crucial in enhancing institutional effectiveness (Kasim & Noh, 2012). Cyrus et al. (2022) add that organisational

innovations significantly improve institutional performance, particularly through enhanced efficiency and policy implementation (Cyrus et al., 2024). These studies reinforce the present findings and highlight the strategic importance of academic quality, institutional reputation, financial resilience, and innovation in driving university performance.

Inferential statistics

Correlation

The study examined the relationships between the components of business model innovation, namely value creation, value proposition, and revenue streams, and the performance of public universities in Kenya. Pearson correlation analysis was used to assess the strength and direction of these relationships. The results are presented in Table 4.8.

Table 4.8 Pearson Correlation Results for Business Model Innovations and the Performance of Public Universities

Variable	Value Creation	Value Proposition	Revenue Stream	Performance of Universities
Value Creation	1.00			
Value Proposition	0.686** (p < 0.01)	1.00		
Revenue Stream	0.299* (p < 0.05)	0.649** (p < 0.01)	1.00	
Performance of Universities	0.210* (p < 0.05)	0.503** (p < 0.01)	0.682** (p < 0.01)	1.000

The findings presented in Table 4.8 reveal differing levels of significant relationships between business model innovations—specifically value creation, value proposition, and revenue streams—and the performance of public universities in Kenya, with all correlations demonstrating statistical significance at the 0.05 level. The relationship between value creation and university performance is notably weak ($r = 0.210$, $p < 0.05$), indicating a minor positive association. While the p-value is statistically significant, this represents the lowest effect identified in the study. This finding aligns with the research conducted by Acosta-Prado et al. (2023), which indicated that sustainable value creation, especially its economic aspect, moderately impacted organisational performance ($\beta = 0.323$). In contrast, the environmental element demonstrated a significantly weaker effect ($\beta = 0.069$) within Colombian industrial manufacturing firms. This underscores the differences in the impact of value creation across various organisational settings (Acosta-Prado et al., 2023).

Furthermore, the value proposition and performance of universities' correlation are moderate ($r = 0.503$, $p < 0.01$), suggesting that improvements in value proposition are positively associated with better university performance, and the relationship is statistically significant with a p-value less than 0.01. This finding is in line with Khaddam et al. (2021), who examined how value proposition innovation influences organisational performance in the context of business model innovation. Their study found that improvements in the value proposition had a significant

positive effect on overall performance, underscoring the importance of delivering clear and differentiated value to stakeholders (Khaddam et al., 2021).

The strongest relationship is observed between revenue streams and performance of universities, with a strong positive correlation ($r = 0.682$, $p < 0.01$) and a p-value indicating strong statistical significance, confirming that universities with diversified and increased revenue streams perform significantly better. These results align with the study by Gitau et al. (2020), which examined the influence of diversification innovation on revenue streams in public universities in Kenya. Their research found that universities employing strategic innovation in revenue generation experienced increased financial inflows and a reduced reliance on traditional funding sources such as government allocations and tuition fees (Gitau et al., 2020).

Regression results

The regression analysis was conducted to assess the impact of business model innovations (value creation, value proposition, and revenue streams) on the performance of public universities in Kenya. The dependent variable in this analysis is the performance of universities, while the independent variables are the value creation innovation, value proposition innovation, and revenue stream innovation. This analysis was based on a multiple regression model.

Collinearity Diagnostics: The overall fit of the regression model is evaluated for multicollinearity using the Variance Inflation Factor (VIF) and Tolerance statistics, as shown in Table 4.9.

Table 4.9 Collinearity diagnostics

Variable	Tolerance	VIF
Value Creation	0.493	2.029
Value Proposition	0.313	3.192
Revenue Stream	0.539	1.857

The results in Table 4.9 show that multicollinearity is not an issue, as all VIF values are well below 10 and Tolerance values exceed 0.1. This indicates that the independent variables are not highly correlated and contribute uniquely to the regression model.

Model Summary: The overall fit of the regression model is evaluated using R, R Square, Adjusted R Square, and the Standard Error of the Estimate, as shown in **Table 4.10.**

Table 4.10 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.690	0.476	0.420	0.39930

Table 4.10 shows that the regression model explains 47.6% of the variance in university performance ($R^2 = 0.476$), with a moderate to strong correlation ($R = 0.690$). The adjusted R^2

of 0.420 confirms the model's relevance after accounting for predictor complexity, and the standard error of 0.3993 indicates a reasonable fit.

Analysis of Variance (ANOVA): The overall significance of the regression model is evaluated using the Analysis of Variance (ANOVA), as shown in **Table 4.11.**

Table 4.11 Analysis of Variance (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.051	3	1.350	8.469	0.000
Residual	4.464	28	0.159		
Total	8.515	31			

Table 4.11 indicates that the regression model is statistically significant (F = 8.469, p = 0.000), confirming that Revenue Stream, Value Creation, and Value Proposition innovations collectively explain a significant portion of the variance in university performance.

Regression Coefficients: The overall effect of the business model innovation variables on university performance is assessed through the regression coefficients, as shown in **Table 4.12**

Table 4.12 Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% CI for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	1.957	0.443		4.416	0.000	1.049	2.865
Value creation	-0.062	0.130	-0.093	-0.476	0.638	-0.329	0.205
Value preposition	0.138	0.184	0.184	0.752	0.458	-0.239	0.516
Revenue stream	0.449	0.142	0.590	3.167	**0.004***	0.159	0.740

The results in Table 4.12 indicate that the regression model for university performance. The multiple regression model is represented by the following formula:

$\mathbf{Y_{1\text{-}3} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon}$……. **Equation 4.1**

Based on the regression results, the model can be written as:

$Y_{1\text{-}3} = 1.957 + 0.449$ (RSI) + (-0.062) (VCI) + 0.138 (VPI)……..**Equation 4.2**

This equation expresses the predicted performance of universities based on the values of the business innovation components. The coefficient of 1.957 represents the constant term, which reflects the expected performance of universities when all independent variables are zero.

The coefficient of the revenue stream is 0.449, which suggests a positive relationship with university performance. Specifically, for each unit increase in the revenue stream, university performance is expected to increase by 0.449, assuming all other factors remain constant. This positive relationship is statistically significant, as indicated by the t-value of 3.167 and the Sig.

value of 0.004. This value is well below the threshold of 0.05, confirming that the relationship between revenue stream and university performance is meaningful. Therefore, the findings from the regression analysis suggest that increasing or diversifying revenue streams has a direct, positive impact on the performance of universities. This is in line with a study by Liu and Kim (2022), which examined the impact of benefit-based revenue strategies on the financial health of arts and cultural non-profit organisations. The study highlighted that such benefits only emerged when revenue from benefit-based strategies exceeded a certain threshold, emphasising the importance of context and organisational capacity (Liu & Kim, 2022). Similarly, Mathuva (2016) adds that revenue diversification can affect institutional performance, though the relationship is characterised by increased variability. An analysis of deposit-taking savings and credit cooperatives (SACCOs) in Kenya revealed that diversified revenue structures were associated with greater fluctuations in returns (Mathuva, 2016). These findings collectively reinforce the view that while revenue diversification can be beneficial, its success depends on how it is implemented relative to institutional characteristics and external conditions.

In contrast, the coefficient for Value Creation is −0.062, indicating a weak negative relationship with university performance. However, this relationship is not statistically significant, as shown by a t-value of −0.476 and a p-value of 0.638, which exceeds the 0.05 threshold. This suggests that value creation does not have a statistically meaningful effect on university performance in this model. This contrasts the study by Muthaa (2018), which found that strategic values significantly improved institutional performance in technical training institutions in Meru County, Kenya, suggesting a positive role of value creation. Similarly, Rhoda et al. (2018) reported a strong positive effect of human capital initiatives on value creation and university performance in Kenyan public universities. Additionally, Yusuf (2023) demonstrated a significant direct effect of value creation on organisational performance through adaptive capacity in higher education institutions. Furthermore, Mindruta (2013) found that value creation within university-firm collaborations leads to increased innovative performance, highlighting its importance in enhancing university outcomes. These studies collectively suggest that value creation generally supports improved university performance, but differences in context and implementation may explain why the current study found no statistically meaningful effect.

Similarly, the coefficient for value proposition is 0.138, indicating a small positive relationship with university performance. However, the t-value of 0.752 and the Sig. value of 0.458 suggest that this relationship is not statistically significant, as the p-value exceeds the threshold of 0.05. Despite the positive direction, the lack of significance implies that the value proposition does not have a substantial or meaningful impact on university performance in the context of this study. It could be that the value proposition alone is not a sufficient driver of performance, or the specific elements of this variable may need to be further explored or operationalised differently in future studies. This finding contrasts a study by Wandiga (2019), which reported a significant positive effect of value proposition strategy on the performance of management consultancy firms in Nairobi City County. While the consultancy sector showed a strong relationship between value proposition and performance, the current study found only a small, non-significant effect in the university context (Wandiga, 2019). This discrepancy may be due

to differences in organisational environments, with consultancy firms potentially translating value proposition strategies more directly into performance gains, whereas universities face more complex and multifaceted performance determinants that dilute this relationship. Methodological differences may also contribute to the divergent results.

Conclusion and Recommendations

This study examined the effect of business model innovation, conceptualised through value creation, value proposition, and revenue stream innovations, on the performance of public universities in Kenya. The findings revealed that while value creation and value proposition innovations are moderately practised and positively associated with performance, only revenue stream innovation had a statistically significant and strong impact. This highlights the essential role of financial innovation in enhancing academic quality, institutional reputation, and financial sustainability. The regression model showed that business model innovation accounts for 47.6 percent of the variance in university performance, underscoring the need for an integrated approach. Based on these results, it is recommended that universities strengthen value creation by enhancing data-driven decision-making, interdisciplinary collaboration, and technological adoption; improve value proposition by aligning curricula with stakeholder needs, increasing engagement, and reinforcing institutional branding; and intensify revenue generation through research commercialisation, consultancy, partnerships, and competitive grant acquisition. Furthermore, a supportive policy environment from the Ministry of Education and continuous evaluation of innovation performance are crucial. Innovation must be positioned as a core strategic priority for the long-term growth and resilience of public universities in Kenya.

Authors' Declarations

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used ChatGPT to support language refinement and improve readability. The tool was not employed for generating academic content, data analysis, or interpretation. All substantive content, arguments, and conclusions were developed by the authors.

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