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Strategic Leadership and Commercialization of Research Output: Evidence from Universities in Nairobi County, Kenya

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Abstract:

Purpose: *This study aimed to determine the effect of strategic leadership on the commercialization of research outputs among universities in Nairobi County, Kenya. The study was anchored on the Dynamic Capability Theory.*

Material/methods: *The study adopted a positivist research philosophy and an explanatory survey research design. The target population comprised 4,166 academic staff drawn from eleven universities in Nairobi County, Kenya, including four public universities and seven private universities. Cluster sampling and simple random sampling were used to select a sample of 356 academic staff. Primary data were collected using structured closed-ended questionnaires. Data were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations. Inferential statistics, including Pearson correlation analysis and multiple linear regression analysis, were used to establish the relationship between strategic leadership and commercialization of research outputs.*

Findings: *The findings revealed that strategic leadership had a significant effect on the commercialization of research outputs among universities in Nairobi County. The results indicate that universities with stronger strategic leadership practices are better positioned to transform research outputs into marketable products, services, and innovations.*

Conclusion*: The study concluded that strategic leadership is essential for successful research commercialization in universities. Effective strategic leadership provides clear institutional direction, supports innovation, strengthens capacity building, and promotes collaboration with external partners.*

Value: *This study provides empirical evidence on the role of strategic leadership in enhancing the commercialization of research outputs among universities in Nairobi County, Kenya. The findings contribute to policy and management practice by demonstrating how strategic leadership can support the transformation of academic research into innovations that contribute to economic and societal development.*

Keywords*: Strategic Leadership, Commercialization, Research Output, Universities*

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1. Introduction

The commercialization of university research outputs is essential for transforming academic knowledge into practical innovations that contribute to economic and societal development (Compagnucci & Spigarelli, 2020). Universities generate wealth by converting research ideas and technologies into marketable products and services through mechanisms such as patenting, licensing, spin-offs, consultancy, and research collaborations (Kenzhaliyev et al., 2020; Tweheyo et al., 2022). Globally, universities are recognized as key drivers of innovation and competitiveness because they produce knowledge and technologies that address societal challenges (Duderstadt, 2017; Pieiro-Chousa et al., 2020). However, despite the importance of research commercialization, many universities generate large volumes of research outputs that are rarely commercialized, leading to low returns on investment (Gu, 2023; Ravi & Janodia, 2022). This challenge is more pronounced in African universities, which are often criticized for weak engagement with industry and society and limited commercialization of research innovations (Ateka, 2021; Tamrat, 2020; Burg et al., 2021; OECD, 2014). As a result, strengthening institutional mechanisms and industry collaboration is necessary to enhance the commercialization of research outputs in universities (Ukwuoma et al., 2013; Ayisi et al., 2016).

Strategic leadership has been widely recognized in strategic management literature as a critical factor in guiding organizations in uncertain and competitive environments (Samimi et al., 2020). Strategic leadership refers to a leader's ability to communicate a clear strategic direction, align organizational resources, and motivate employees toward the achievement of institutional goals (Mulyono et al., 2020). In the context of universities, strategic leadership enables academic institutions to effectively manage research activities, identify market opportunities for research outputs, and support the transformation of research findings into commercially viable products and services (Muchtar & Qamariah, 2021). Strategic leaders therefore play a vital role in promoting innovation, encouraging entrepreneurial activities among researchers, and ensuring that research outputs contribute to economic and societal development (Ismail et al., 2021).

Strategic leadership is also essential in facilitating the commercialization of research outputs by ensuring the effective identification, acquisition, and utilization of critical resources such as funding, industry partnerships, and market access (Abdul Razak & Murray, 2017). Through strategic direction and collaboration, leaders are able to align university research capabilities with market demands, coordinate multidisciplinary teams, and promote knowledge transfer between universities and industry (Samimi et al., 2020). In addition, strategic leadership enhances human capital development, motivates researchers, and supports technological innovation within universities, which collectively contribute to improved research productivity and commercialization outcomes (Gupta, 2018).

Empirical evidence highlights the importance of strategic leadership in enhancing research commercialization. For example, Leitner et al. (2021) found that strong leadership capabilities positively influence the ability of academic departments to secure third-party funding and increase patent output. Similarly, Bryndin (2021) observed that weak strategic leadership capabilities can hinder the commercialization of research due to limited innovation strategies, inadequate investment, outdated technology, and insufficiently skilled personnel. Other studies also emphasize the importance of strategic alliances and collaboration with external partners in improving commercialization outcomes and product development (Wang et al., 2021; Sompong et al., 2014). Abdulmalik (2020) further argues that effective collaboration between academia,

industry, and government through strategic leadership is essential for strengthening national innovation systems and promoting research commercialization).

Despite increased research activities, the commercialization of research outputs in Kenyan universities remains significantly low. For instance, the Commission for University Education (2023) reported over 6,000 research outputs in 2023/2024, yet only one patent was registered, indicating a large gap between research production and intellectual property commercialization. Similarly, reports by KIPI and NACOSTI reveal that universities contribute very few patent applications despite significant investment in research and innovation systems (KIPI, 2022; NACOSTI, 2023). These challenges are linked to weak commercialization frameworks, poorly resourced technology transfer offices, limited intellectual property awareness, and inadequate institutional incentives for commercialization (Ayisi et al., 2016; Organisation of African, Caribbean and Pacific States, 2023). Consequently, strategic leadership is increasingly viewed as essential in fostering innovation culture, strengthening university–industry collaboration, mobilizing resources, and guiding commercialization initiatives within universities (Shestakovska et al., 2019). However, empirical evidence on how strategic leadership influences research commercialization in Kenyan universities remains limited, highlighting the need for studies examining the effect of strategic leadership on commercialization of research outputs among universities in Nairobi County, Kenya.

2. Theoretical Review

The theory of dynamic capabilities, as proposed by Teece and Shuen (1997) and further developed by Teece (2017), emphasizes the importance of a company's ability to adapt and transform its resources to gain a competitive advantage in a rapidly changing environment. The theory suggests that dynamic capabilities, such as seizing opportunities, sensing market changes, and reconfiguring resources, are essential for successful adaptation and transformation strategies. In the context of the study on the "effect of strategic leadership on commercialization of research output," the theory of dynamic capabilities is highly relevant. Strategic leadership is critical in developing and cultivating dynamic talents inside an organization, particularly when changing or reorganizing the company's resource pool. In promoting dynamic capabilities, strategic leaders enable their institutions to be more responsive, adaptable, and innovative in the face of market changes, technological breakthroughs, and emerging opportunities.

Leaders who possess strategic agility, as defined by Cai, Liu, Huang, and Wang (2018), are capable of swiftly and effectively responding to and adjusting to change, driving positive transformations within the organization. This strategic agility serves as a facilitator for organizational competitive advantage, according to Carvalho, Rebentisch, Sampaio, and Saraiva (2017). In essence, strategic leaders with agility can identify and exploit opportunities and changes in the environment by aligning and modifying resources to address risks effectively. The theory of dynamic capabilities, with its emphasis on resource alignment, change adaptation, and implementation, provides a suitable perspective for examining the methods of leader agility in this study. It helps in understanding how strategic leaders can foster a flexible work environment that can adjust to sudden and rapid developments in the business context. However, it is essential to acknowledge that the dynamic capabilities theory has faced criticism for lacking empirical clarification and challenges in defining initial circumstances (Hallberg & Felin, 2020). Despite these criticisms, the theory remains pertinent to the study, as

it offers valuable insights into how strategic leaders can facilitate research commercialization efforts by promoting dynamic capabilities within their organizations.

3. Empirical Review (Hypothesis Development)

Strategic leaders are responsible for setting clear institutional goals, aligning research activities with market opportunities, and encouraging academic staff to pursue innovative research with commercial potential. According to Sima et al. (2020), strategic leaders in universities can develop approaches that capitalize on emerging opportunities while promoting a culture of continuous learning and innovation. By strengthening human capital and encouraging the adoption of new technologies and knowledge, universities can improve research outcomes and build partnerships with industry stakeholders that facilitate the transformation of research findings into commercially viable products and services.

Kryvovyazyuk et al. (2023) found that the formation of strategic alliances significantly enhances innovation capabilities and accelerates the development and commercialization of innovations. In the context of universities, partnerships with industry, government agencies, and other research institutions allow for the sharing of expertise, financial resources, and technological capabilities. Such collaborations help universities bridge the gap between academic research and market needs. Similarly, Sompong et al. (2014) demonstrated that effective collaboration within strategic alliances improves both partnership performance and technology commercialization outcomes, highlighting the importance of strong collaboration frameworks in transforming research discoveries into marketable products and technologies.

Wang et al. (2023) found that knowledge sharing, supported by appropriate technological infrastructure and collaborative environments, significantly improves innovation outcomes and the integration of new knowledge. These findings suggest that universities can enhance the commercialization of research outputs by establishing systems that encourage knowledge exchange between researchers, industry experts, and other stakeholders. Strategic leadership plays a key role in facilitating such collaboration by promoting open communication, strengthening research networks, and creating institutional structures that support innovation and commercialization processes.

Papa et al. (2020) found that knowledge acquisition positively influences innovation performance, especially when supported by effective human resource management practices. Similarly, Hamadamin and Atan (2019) emphasize that human capital development and employee commitment significantly enhance organizational performance. Within universities, strategic leaders can promote commercialization by investing in researcher training, encouraging interdisciplinary collaboration, and supporting entrepreneurial initiatives that enable researchers to translate academic discoveries into practical applications that benefit society and the economy.

Bongiovanni et al. (2023) and Ismail et al. (2020) emphasize that universities must establish clear commercialization strategies, strengthen intellectual property management systems, and build strong partnerships with industry stakeholders in order to effectively transform research findings into marketable innovations. Strategic leaders play a critical role in aligning research priorities with industry needs, allocating resources for commercialization activities, and fostering an institutional culture that supports innovation and entrepreneurship. Despite increasing research output in many universities, the level of commercialization remains relatively low, particularly in developing countries. Therefore, examining the role of strategic leadership in promoting commercialization of research outputs is essential for improving the

impact of university research on economic and societal development. Based on this argument, the study proposes the following hypothesis:

Hhypotheses 1: *Strategic leadership has significant effect on commercialization of research output*

The study in Figure 1, to examine the relationship between strategic leadership and the commercialization of research outputs among universities in Nairobi County, Kenya. In this framework, strategic leadership is treated as the independent variable and is operationalized through key dimensions including strategic alliances, human capital development, and strategic direction. These components emphasize the importance of establishing collaborative partnerships, developing the skills and competencies of researchers, and providing clear strategic guidance to support innovation and commercialization initiatives within universities. The dependent variable is commercialization of research outputs, which is reflected through indicators such as the number of licensed inventions bought or sold, research contracts awarded, and scientific conferences or trainings sponsored. In addition, the framework incorporates control variables, including gender, age, education, tenure, rank, and institutional type, to account for variations that may influence commercialization outcomes. The model illustrates how effective strategic leadership can facilitate the translation of academic research into marketable innovations and practical applications that contribute to economic and societal development.

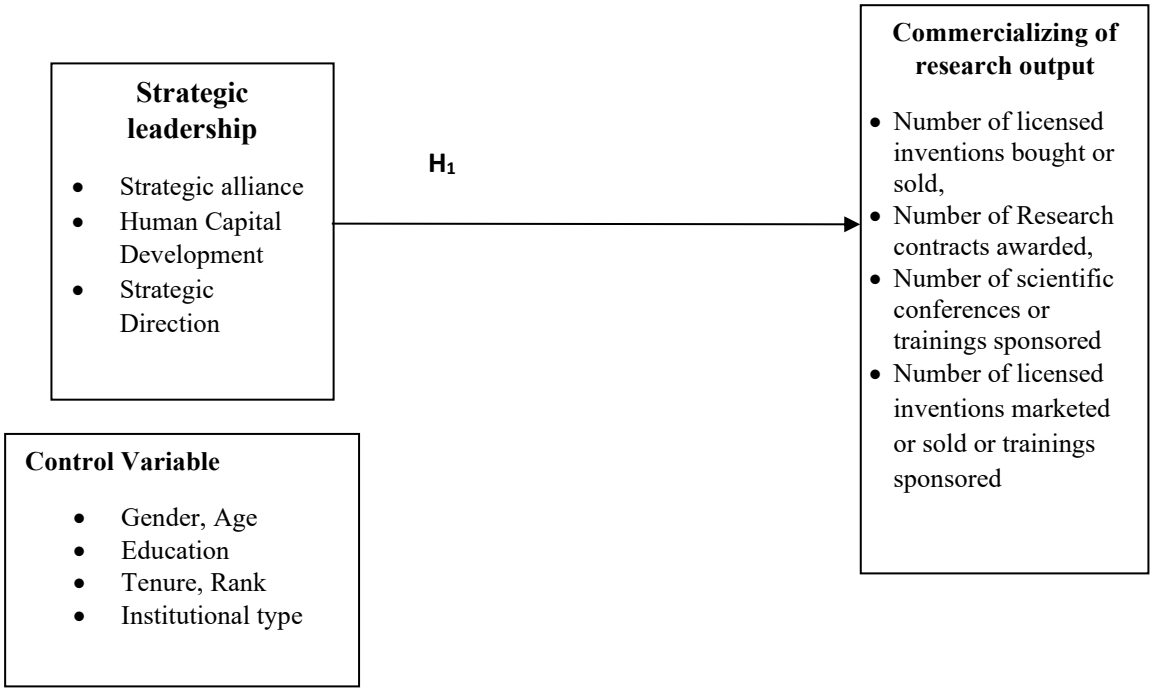

Figure 1 : Conceptual Framework

4. Research Methodology

This study was guided by the positivist research philosophy and adopted an explanatory survey research design. Positivist philosophy assumes that reality is objective and can be measured through empirical observation and statistical analysis, making it appropriate for studies that rely on quantitative data to test relationships between variables (Saunders et al., 2016). Under this approach, the researcher remains independent and focuses on collecting and analyzing data objectively to test hypotheses. The explanatory survey design was appropriate because the study sought to examine the causal relationships between strategic leadership and commercialization of research output among universities in Nairobi County, Kenya. This design allows the researcher to gather quantitative data from a large population, test theoretical relationships, and establish statistical associations between variables using regression analysis. Additionally, explanatory research design enhances the generalizability of findings by enabling the use of probability sampling techniques and systematic data collection from respondents within their natural organizational settings.

Sampling

The target population of the study consisted of 4,166 academic staff drawn from eleven universities located in Nairobi County, including four public and seven private universities. These academic staff members included professors, associate professors, senior lecturers, lecturers, assistant lecturers, tutorial fellows, and chief technicians who are directly involved in research and knowledge generation within universities. Academic staff were considered appropriate respondents because they play a critical role in research production and are therefore well positioned to provide information regarding the commercialization of research outputs. To determine the sample size, the study used Slovin's formula (Yamane, 1967), which resulted in a sample size of 365 respondents. This sample size was considered adequate for testing the study hypotheses and ensuring statistical representativeness. The study applied proportionate stratified sampling to ensure that each university contributed respondents proportional to its size within the overall population. Each university formed a stratum, and the number of respondents selected from each institution was determined proportionately. After allocating the sample to each university, simple random sampling was used to select individual respondents within each stratum. This sampling approach enhanced representativeness, minimized sampling bias, and ensured that all members of the population had an equal chance of being selected.

Data Collection, Measurement of Variables, Reliability and Validity Tests

Data for the study were collected using structured questionnaires administered to academic staff in the selected universities. The questionnaire consisted of closed-ended questions designed to capture respondents' perceptions regarding the study variables using a five-point Likert scale ranging from strongly disagree to strongly agree. Questionnaires were chosen because they allow efficient collection of standardized quantitative data from a large number of respondents within a short period of time. The measurement of variables was based on previously validated instruments drawn from existing empirical studies. For example, commercialization of research output was measured using indicators such as academic publications, patents, licenses, spin-offs, industry collaborations, research funding, and income generated from intellectual property. Strategic leadership was measured using indicators related to strategic direction, strategic thinking, human capital development, and strategic alliances. To ensure the quality of the research instrument, both validity and reliability tests were conducted. Validity of the instrument was assessed using face validity, criterion validity, content validity, and construct

validity. Face validity was achieved through expert review and supervisor evaluation of the questionnaire items. Content validity was assessed using the Content Validity Index (CVI), where experts evaluated the relevance of questionnaire items. Criterion validity was ensured by adapting measurement items from previous empirical studies. Construct validity was tested using factor analysis to confirm that questionnaire items loaded appropriately on their respective constructs. Reliability of the instrument was evaluated using Cronbach's Alpha coefficient, with a threshold value of 0.7 considered acceptable for internal consistency. Values above this threshold indicated that the questionnaire items consistently measured the intended constructs.

Data Analysis and Model Specification

Data analysis began with data preparation procedures including editing, coding, and entry of collected data into Microsoft Excel and subsequently into SPSS statistical software for analysis. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize respondents' characteristics and describe the main variables of the study. Factor analysis using Principal Component Analysis (PCA) was performed to identify underlying dimensions of the study constructs and confirm factor structure. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity were used to assess sampling adequacy and factorability of the data. Eigenvalues greater than one were used as the criterion for retaining factors, while oblique rotation (Direct Oblimin) was applied because the study constructs were theoretically interrelated. Inferential analysis was conducted using multiple linear regression to test the hypothesized relationships between strategic leadership and commercialization of research output among universities in Nairobi County. Thus, in this study the following models was used to test the following hypotheses:

Hypothesis 1: *Strategic leadership has significant effect on commercialization of research output among universities in Nairobi County, Kenya.*

$$Y = \beta_0 + \beta_1 x_1 + \varepsilon_1$$

Where

Y is commercialization of research output among universities; β0 = constant (coefficient of intercept); X1= Strategic leadership,

5. Results

This section presents the results of data analysis and hypothesis testing examining the influence of strategic leadership on the commercialization of research output among universities in Nairobi County, Kenya. A total of 365 questionnaires were distributed, of which 320 were returned, representing a response rate of 87.7%. After data screening and cleaning, 13 questionnaires were excluded due to significant outliers and missing values, resulting in 307 usable responses and a valid response rate of 84.1%, which was considered adequate for statistical analysis. Data screening procedures were conducted to ensure the accuracy and reliability of the dataset. Cases with substantial missing values were removed, while minor missing data were treated using mean substitution as recommended in quantitative research. Additionally, multivariate outliers were detected using the Mahalanobis D^2 statistic in SPSS, with cases falling below the significance threshold of $p < 0.001$ being excluded from the

analysis. The removal of these outliers strengthened the integrity of the dataset and ensured that subsequent statistical analyses produced reliable and valid findings.

Sample Characteristics

In this study, demographic data were collected on gender, age, work experience in the university, and years served within departments. The results in Table 1 indicate a relatively balanced gender distribution, with 53.4% male and 46.6% female respondents, suggesting that both gender perspectives were adequately represented. In terms of age, the majority of respondents (44.3%) were between 41–50 years, followed by 24.1% aged 31–40 years, indicating a predominantly mature workforce with significant professional experience. Regarding work experience in the university, most respondents (59.6%) had served for more than 10 years, while 21.8% had worked for 6–10 years, demonstrating that the majority possessed extensive institutional knowledge. Similarly, departmental tenure showed that 46.9% had worked in their departments for more than 10 years and 27% for 6–10 years, indicating strong departmental stability and experience. The demographic profile reflects a well-balanced and experienced workforce, enhancing the reliability and credibility of the responses concerning strategic leadership, organizational agility, digitalization, and commercialization of research output in universities in Nairobi County.

Table 1: Sample Characteristics

		Frequency	Percent
Gender	Male	164	53.4
	Female	143	46.6
	Total	307	100
Age bracket	Below 30	35	11.4
	31-40 Years	74	24.1
	41-50 years	136	44.3
	51-60 years	51	16.6
	Above 60 years	11	3.6
	Total	307	100
Years worked in the university	Less Than 1	23	7.5
	1 to 5	34	11.1
	6 to 10	67	21.8
	Above 10	183	59.6
	Total	307	100
Years worked in department	Less Than 1	23	7.5
	1 to 5	57	18.6
	6 to 10	83	27
	Above 10	144	46.9
	Total	307	100

Descriptive and Factor Analysis

Prior to descriptive and inferential statistical analyses, exploratory factor analysis was performed. The Principal Component Method with varimax rotation was used to simplify the factor structure. The results showed a KMO value of 0.907, indicating excellent sampling adequacy, while Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 3223.351$, $p < 0.05$), confirming that the variables were sufficiently correlated for factor analysis. The analysis

revealed one dominant factor with an eigenvalue of 6.784 explaining 75.379% of the total variance, indicating that the items measuring commercialization of research output were highly interrelated and captured a single underlying construct. Items with factor loadings below 0.50 were removed, while the retained items demonstrated strong loadings, confirming the reliability and validity of the measurement scale for subsequent statistical analysis.

Descriptive statistics were computed to assess the level of commercialization of research output among universities in Nairobi County. The results revealed generally low levels of commercialization activities across institutions. Most indicators such as income from licensed inventions, research contracts, patenting activities, consultancy services, and collaboration with industry partners recorded relatively low mean scores. The composite mean for commercialization of research output was 2.38 (SD = 1.33) on a five-point scale, indicating that commercialization practices are still at a relatively early stage among universities. This finding suggests that although universities are actively engaged in research and knowledge creation, the translation of research outputs into commercially viable products, patents, partnerships, and revenue streams remains limited. The results highlight the need for stronger institutional frameworks, improved industry collaboration, and strategic initiatives to enhance commercialization of research outputs within universities.

Table 2: Descriptive and Factor Analysis for Commercialization of Research Output Among Universities

n=307	Mean	Std. Dev	loading
I have earned income or royalties from a university-based invention that was licensed or sold.	2.14	1.37	0.639
I have developed research outputs that generated revenue for the university or my department.	2.28	1.43	0.735
I have been awarded research contracts that included direct financial benefits for the university.	2.40	1.51	0.909
I have collaborated with industry partners in projects that resulted in income-generating products or services.	2.51	1.58	0.899
I have secured funding or investment for commercializing a research-based innovation.	2.40	1.54	0.922
I have participated in patenting a research idea with the intention of generating commercial returns.	2.35	1.59	0.905
I have engaged in consultancy services related to my research that generated income for me or the university.	2.47	1.59	0.922
I have presented monetizable research outcomes at sponsored scientific conferences or innovation expos.	2.50	1.65	0.922
I have received payment or honoraria for publishing research findings in revenue-sharing journals or commercial outlets.	2.34	1.55	0.913
Commercialization of Research Output (KM0=0.907, Cumulative % total variance explained, Cronbach's Alpha = 0.958)	**2.38**	**1.33**	

Exploratory factor analysis was conducted on the strategic leadership construct using PCA. The results showed a KMO value of 0.944, indicating excellent sampling adequacy and confirming that the sample was appropriate for factor analysis (Hair et al., 2010). Bartlett's Test of

Sphericity was also statistically significant ($\chi^2 = 9985.104$, df = 276, $p < 0.05$), demonstrating that the variables were sufficiently correlated to justify factor extraction. The PCA results identified two components with eigenvalues greater than one, explaining a cumulative variance of 74.928%, which exceeds the recommended minimum threshold for factor adequacy. Nineteen items loaded strongly above the recommended threshold of 0.50, while five items with weak loadings were excluded from further analysis. The retained items reflected two key dimensions of strategic leadership: strategic partnership and governance leadership, and research capacity development and innovation support. The high reliability of the construct was further confirmed by a Cronbach's Alpha value of 0.981.

Descriptive statistics indicated relatively strong leadership practices across institutions, particularly in areas related to collaboration with industry partners, research capacity development, strategic planning, and support for innovation activities. Universities reported active engagement in partnerships with industry stakeholders, support for staff training and skill development, and the promotion of knowledge exchange through conferences and international collaborations. The composite mean for strategic leadership was 4.08 (SD = 0.95) suggesting that respondents generally agreed that strategic leadership practices are well established within their institutions. This indicates that universities demonstrate relatively strong leadership commitment toward fostering research innovation, strategic collaboration, and capacity development aimed at enhancing institutional performance and research impact.

Table 3: Descriptive and Factor Analysis for Strategic leadership

	Mean	Std. Dev	Loading
The university actively collaborates with industry partners in research and innovations.	4.40	0.95	0.70
The university engages in joint ventures with private companies to bring research-based products/services to the market.	3.99	1.25	0.80
Our university establishes partnerships with venture capital firms to secure funding for research driven projects.	4.02	1.13	0.79
The university collaborates with startups/incubation centers to transform research outcomes into viable business ventures.	3.96	1.14	0.81
Our university works closely with local industries to identify market needs that align with our research capabilities.	3.94	1.27	0.82
The university forms alliances with government agencies to navigate regulatory processes in research and innovation.	4.18	1.05	0.62
Our university actively seeks collaborations with market leaders to enhance the marketability of research driven products/services.	3.95	1.17	0.87
Our university forms alliances with non-profit organizations to address social and community needs.	4.09	1.16	0.55
The university recognizes faculty and staff efforts that lead to significant research breakthrough	4.47	0.84	0.68
The university rewards faculty and staff efforts for research breakthrough	4.09	1.26	0.74
The university management clearly communicates research information and feedback to staff	3.91	1.25	0.66
The university's top leadership demonstrates a comprehensive understanding of the long-term vision.	4.05	1.15	0.55

Top leadership actively communicates the university's strategic objectives to staff and stakeholders	3.87	1.20	0.57
The top leadership team engages in regular reviews of the university's strategic plan.	3.91	1.11	0.52
The top leadership team consistently create awareness on the university's strategic plan	3.68	1.28	0.65
The top leadership team continually evaluates the implementation of strategic plan	4.21	1.04	0.66
The university engages in knowledge exchange initiatives with international partners to broaden perspectives.	3.95	1.33	0.71
The university actively supports staff in acquiring new skills to drive research innovation.	4.51	0.93	0.67
The university invests in training programs in research and innovation	4.42	0.92	0.70
The university promotes an environment that nurtures creativity and originality in research endeavors.	4.16	1.09	0.61
Staff are provided with opportunities to attend conferences and workshops to stay updated on research trends.	4.09	1.15	0.74
Faculty and staff are encouraged to share knowledge and experiences	4.09	1.11	0.72
The university has a clearly defined vision and mission that guide its long-term goals.	3.96	1.23	0.83
The university's strategic direction aligns with national education policies and global trends	4.04	1.21	0.84
Strategic Leadership (KMO = 0.944, Total Variance Explained Cumulative % = 74.928, Cronbach's Alpha = 0.981)	4.08	0.95	

Correlation Analysis

The study employed the Pearson correlation coefficient to assess the linear relationships among commercialization of research output and strategic leadership. As presented in Table 4, several significant relationships were observed. Commercialization of research output among universities was found to have a strong negative correlation with strategic leadership ($r = –.703$, $p < 0.01$). This unexpected inverse relationship suggests that increases in strategic leadership practices, as measured in this study, may not directly translate into higher commercialization outcomes. It indicates a potential misalignment between leadership strategies and commercialization processes that warrants deeper investigation.

Table 4: Correlation Analysis

	Commercialization of research output among universities	Strategic leadership	Gender	Age	Job tenure
Commercialization of research output among universities	1				
Strategic leadership	-.703**	1			
Gender	-0.051	.411**	1		
Age	0.145*	.361**	.922**	1	
Job tenure	-0.015	0.271*	0.081	0.121*	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Hypothesis Testing

The regression analysis results presented in Table 4.29 examine the effect of strategic leadership on the commercialization of research output among universities, while controlling for demographic factors such as job tenure and departmental experience. The model summary shows that the predictors explained 52.4% of the variance in commercialization of research output ($R^2 = 0.524$; Adjusted $R^2 = 0.516$). This demonstrates a relatively strong explanatory power, suggesting that strategic leadership and the included control variables substantially account for variations in commercialization outcomes across the sampled universities.

The ANOVA results confirm the model's overall significance ($F = 66.335$, $p < 0.001$), indicating that the predictors jointly contribute meaningfully to explaining commercialization of research output. Examining the control variables, job tenure showed a significant negative effect ($\beta = –0.338$, $p = 0.000$), suggesting that employees with longer tenure may be less actively engaged in commercialization activities, possibly due to institutional inertia or a preference for traditional academic roles.

Most notably, strategic leadership emerged as a highly significant predictor ($\beta = –0.676$, $p = 0.000$). Although the coefficient is negative, the strength and significance of this relationship suggest that variations in leadership style, direction, and decision-making substantially influence commercialization outcomes. The results highlight that weaknesses or misalignments in strategic leadership may hinder commercialization efforts, while strong and adaptive leadership practices could enhance them. The findings provide strong evidence to accept the hypothesis (H_1), concluding that strategic leadership significantly influences the commercialization of research output among universities in Nairobi County. The results emphasize the pivotal role of leadership practices particularly in shaping vision, strategy, and institutional support in driving the successful translation of research into commercial outcome.

Table 5: Regression Analysis for Effect of Strategic Leadership on Commercialization of Research Output Among Universities

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	5.286	0.281		18.784	0.000
Control Variables					
Gender	-0.103	0.114	-0.039	-0.899	0.369
Age	0.139	0.075	0.102	1.864	0.063
Job tenure	-0.475	0.130	-0.338	-3.665	0.000
Predictor					
Strategic Leadership	-0.665	0.040	-0.676	-16.539	0.000
Model Summary statistics					
R	0.724				
R Square	0.524				
Adjusted R Square	0.516				
Std. Error of the Estimate	0.925				
ANOVA (goodness of fit statistics)					
F Stat	66.335				
F prob	0.000				

a Dependent Variable: commercialization of research output among universities

6. Discussion of Findings

Results revealed that strategic leadership negatively significantly influences the commercialization of research output among universities. Despite the negative coefficient of strategic leadership, its strong significance highlights the powerful role leadership plays suggesting that ineffective or misaligned leadership can hinder commercialization efforts. These findings align with Sima et al., (2020), who argue that effective strategic leadership enhances innovation and commercialization through digital transformation and industry collaboration. Similarly, Kryvovyazyuk et al., (2023) and Setyadi et al., (2023) emphasize that strategic alliances foster knowledge sharing and technological exchange, enabling universities to develop market-oriented solutions that strengthen their innovation ecosystems.

The results further underscore the importance of collaboration and human capital development in driving commercialization. Sompong et al., (2014) demonstrate that alliance motivation, cooperation execution, and partnership performance are crucial for successful innovation, as

they foster trust and shared understanding among partners. Wang et al., (2023) add that absorptive capacity, collaborative culture, and technological integration play vital roles in knowledge transfer and commercialization success. Esmaelnezhad et al., (2023) highlight the importance of partner selection and complementary resources, suggesting that strategic leaders must prioritize alliances that align with institutional expertise and innovation goals. In the university context, such partnerships are critical for bridging gaps between academia and industry, ensuring that research outputs are transformed into viable market solutions. These collaborative frameworks not only enhance research visibility but also promote sustained engagement with external stakeholders, creating an enabling environment for innovation-driven growth.

Additionally, leadership effectiveness extends to human resource management and institutional structures that facilitate commercialization. Hamadamin and Atan (2019) argue that employee commitment and professional development mediate the link between leadership and organizational performance, while Papa et al., (2020) and Elisa et al., (2022) show that HRM practices such as performance appraisal, training, and incentives for innovation amplify commercialization outcomes. This suggests that universities should create HR systems that reward creativity and entrepreneurial behavior. Complementing these insights, Siringi (2022) and Chatterjee et al., (2022) emphasize the importance of establishing strong institutional frameworks like technology transfer offices and intellectual property management systems to enhance commercialization efficiency. The findings affirm that strategic leadership through visionary governance, collaborative partnerships, and innovation-supportive HRM serves as a cornerstone for transforming academic research into impactful commercial ventures, thereby strengthening the universities' contribution to socio-economic development. the current findings demonstrate that strategic leadership exerts a significant effect on the commercialization of research output among universities. The negative coefficient reflects challenges associated with leadership misalignment, bureaucratic rigidity, or lack of innovation-driven culture. However, the broader interpretation supported by literature suggests that adaptive, visionary, and collaborative leadership enhances universities' capacity to transform research into marketable innovations.

7. Conclusions

The first objective of the study was to examine the effect of strategic leadership on the commercialization of research output among universities in Nairobi County. The study concludes that strategic leadership plays a crucial role in shaping the commercialization landscape of universities. Effective leadership fosters innovation, builds strong partnerships with industry, and aligns institutional vision with market demands. Universities that demonstrate visionary leadership, clear communication, and commitment to innovation are more likely to translate their research into commercially viable outcomes. Conversely, weak or fragmented leadership limits the ability of universities to capitalize on research opportunities, thus constraining their contribution to economic and technological advancement.

8. Recommendations

Theoretical Implications

The findings of this study provide important implications for the Theory of Dynamic Capabilities, particularly in explaining how universities can enhance the commercialization of research outputs. The results indicate that strategic leadership plays a critical role in enabling universities to effectively integrate and utilize institutional resources to transform research findings into commercially viable innovations. Strategic leadership supports the ability of universities to identify opportunities, align research priorities with market needs, and mobilize resources that facilitate the commercialization process. The study therefore suggests that future research should further examine how strategic leadership interacts with other institutional factors such as governance structures, funding mechanisms, and innovation culture to strengthen universities' capacity to commercialize research outputs and enhance their contribution to economic development.

Policy Implications

The findings of this study have important implications for policymakers in the higher education and innovation sectors. There is a need for institutions such as the Ministry of Education, Science and Technology and the Commission for University Education (CUE) to develop policies that promote strategic leadership in universities with a focus on research commercialization. Universities should be encouraged to integrate commercialization objectives into their strategic plans to ensure that research activities align with national innovation priorities and development goals. In addition, policymakers should establish frameworks that promote stronger university–industry collaboration, facilitate intellectual property protection, and provide incentives for universities that successfully commercialize research outputs. Such policy initiatives can strengthen the role of universities as drivers of innovation and economic growth.

Managerial Implications

From a managerial perspective, the study highlights the importance of strategic leadership in promoting the commercialization of research outputs within universities. University administrators and senior managers should strengthen leadership practices that promote innovation, research collaboration, and entrepreneurial initiatives among academic staff. Leaders should focus on developing clear strategic visions that prioritize commercialization of research outputs and support initiatives that encourage partnerships with industry stakeholders. In addition, universities should invest in capacity-building programs that enhance researchers' ability to translate academic discoveries into practical products, technologies, and services that benefit society and the economy.

Further Research

Although this study provides important insights into the relationship between strategic leadership and commercialization of research outputs, further research is necessary to expand understanding of this relationship. Future studies should consider extending the scope beyond Nairobi County to include universities in other regions of Kenya and the East African Community in order to provide comparative insights into commercialization practices.

Researchers may also consider adopting longitudinal research designs to examine how strategic leadership practices influence commercialization outcomes over time. Additionally, future research could explore the influence of other institutional factors such as funding mechanisms, intellectual property management systems, and innovation ecosystems in shaping the commercialization of research outputs within universities.

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