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DIGITAL INNOVATION CAPABILITIES AND PERFORMANCE OF PRIVATE HIGHER EDUCATION INSTITUTIONS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

The main objective of this study was to assess the influence of digital innovation capabilities on performance of private higher education institutions in Nairobi City County, Kenya. Specifically, the study focused on assessing the influence of top management support, and innovation culture on Performance of Private Higher Education Institutions in Nairobi City County, Kenya. The study employed a descriptive research design utilizing a quantitative survey method in line with a positivist paradigm. A random sampling method was utilized to recruit participant from the study's target population, which comprised of the staff in IT departments, academic departments, registrar and in administrative units from the Private Higher Education Institutions in Nairobi City County as per the Ministry of Education and Commission for University Education. The participants were deemed ideal based on their familiarity with technology as users and have a significant role in decision-making related to digital innovation formed the unit of observation while the higher education learning institutions formed the unit of analysis. Stratified random sampling technique was used to select a sample size of 170 respondents from the 33 PHEIs in Nairobi City County, Kenya. Data collection was conducted using a structured questionnaire that was distributed online to the consented eligible participants. The study used questionnaires to collect primary data. The collected data was exported into the Statistical Package for Social Sciences (SPSS) version 28 for coding, cleaning, and analysis. Descriptive statistics, including frequencies, percentages, mean, standard deviations, and graphical charts were used to summarize the numerical and categorical data while inferential analysis techniques, such as correlational and regression analysis technique were used to explore the relationship between the dependent and independent variable. The analysis findings revealed that influence of top management ($r=0.860$), and performance of private higher education institutions in Nairobi City County indicated a strong positive correlation which was statistically significant ($p< 0.05$). The multiple regression analysis findings indicated that for every, a unit change in adaptation of top management indicated a statistically significant increase in performance of private higher institutions by 0.308 units ($\beta =.308$, $p= 0.005$) and innovation culture ($\beta = .435$, $p = 0.001$). The performance of Private Higher Education Institutions is highly influenced by top management support and innovation culture, as demonstrated by correlation analysis. Overall, the results indicate that the digital innovation capabilities have greatly improved the performance of Private Higher Education Institutions in Nairobi City County.

Key Words: Digital Innovation Capabilities, Top Management Support, Innovation Culture, Performance of Private Higher Education Institutions

Background of the Study

Digital innovation capabilities have become critical determinants of the performance of private higher education institutions on a global scale. Digital innovation capabilities and the performance of private higher education institutions highlight their interconnectedness and significance in the modern knowledge economy (Haque, Ahlan, & Razi, 2015). Drawing insights from global scholars and contemporary literature, it is evident that digital innovations are reshaping higher education, offering both opportunities and challenges for institutions worldwide, Wende and Teichler (2017). As private higher education institutions navigate this dynamic landscape, they must adopt a strategic approach to digital innovation, fostering a culture of experimentation, collaboration, and continuous improvement to enhance their performance and contribute meaningfully to the advancement of education on a global scale. Scholars such as Wende and Teichler (2017) highlight the profound impact of digital technologies on reshaping higher education worldwide. From the proliferation of online learning platforms to the implementation of data analytics for enhancing student success, digital innovations offer institutions diverse opportunities to augment their teaching methodologies, research actions, and managerial processes. Across the globe, institutions that effectively harness digital innovation capabilities are better positioned to adapt to the evolving needs of students, faculty, and broader society (Altbach & de Wit, 2017).

Advancements in technology have resulted in rapid changes in modern management including public and private learning institutions (Oboegbulem &Ugwu, (2016). The complexity of technological changes has led to far-reaching developments in managerial systems and especially on management tasks at individual and institutional levels (Wagithunu, Muthee, & Thinguri, 2018). The changes have been necessitated by advancement in Information and Communication Technologies (ICT) and witnessed in all sectors including management of educational institutions. In acknowledging this Roberts and Sikes (2018) asserted that as twenty first century's reality, ICT has necessitated a new perspective in education and greatly contributed to efficient management of learning institutions globally. ICT, as sum convergence between telecommunication, broadcasting multimedia and related technologies has promised a fundamental change in education within a short time and become a basic tool in modern school management. According to Oguta, Egessa and Musiega (2019) learning institutions are adopting ICT based instructional approach and presenting ICT oriented academic programs. Recently, the Government of Bangladesh has also adopted the use of ICT in the Bangladeshi Educational Institutions (home and abroad), giving the importance on this topic. Therefore, students own the ICT facilities for both academic and non-academic purposes using diverse smart devices and the internet. The use of the ICT for both academic and non-academic purposes pose the demands to evaluate the student's honesty and academic performance.

Statement of the Problem

The challenge surrounding digital innovation capabilities and performance within private higher education institutions (PHEIs) is multifaceted and poses significant obstacles to the equitable enhancement of educational quality. A critical concern revolves around the digital divide, which delineates the gap between those with access to digital technologies and those without. Globally, approximately 37% of the population lacks internet access, highlighting a significant disparity in digital readiness (World Bank, 2021). This issue worsens in low-income regions, where only 19% have internet access, thereby impeding the equitable adoption of digital innovations in PHEIs (World Bank, 2021).

In Africa, the digital divide is distinct, with an internet penetration rate of 39.3% compared to the global average of 63.2% (International Telecommunication Union, 2020). In Kenya, despite significant advancements, internet access remains at 40%, indicating substantial barriers to digital innovation and inclusion (Communications Authority of Kenya, 2020). These statistics illustrate the widespread digital inequity that hinders the integration and innovation of digital technologies in PHEIs.

Disparities in digital readiness and capabilities also exist within PHEIs. While some institutions have seamlessly integrated digital technologies into their academic and administrative processes, others struggle due to insufficient funding, inadequate training, and resistance to change among staff (Wong, 2020). A survey by the Educause Center for Analysis and Research (ECAR) found that 43% of faculty members in underfunded institutions reported a lack of necessary digital skills and resources, compared to just 15% in well-funded institutions. In Africa, the Association of African Universities (AAU) reported that 50% of higher education institutions faced significant digital infrastructure challenges, impacting their ability to deliver quality education (AAU, 2019). In Kenya, only 25% of private higher education institutions had adequate digital infrastructure to support online learning during the COVID-19 pandemic (KENET, 2021).

Furthermore, the effectiveness of digital innovations in improving the performance of PHEIs remains uncertain. Despite global investments in educational technology projected to reach $404 billion by 2025 (HolonIQ, 2020), the tangible enhancements in Academic quality, student outcomes like graduation rates, and institutional administration efficiency are not well-documented (Daniel, 2019). The OECD indicates that only 30% of institutions have implemented comprehensive evaluation frameworks to assess the impact of digital innovations on educational outcomes (OECD, 2020). In Africa, only 20% of institutions have formalized evaluation processes for digital initiatives (African Union, 2020), and in Kenya, this figure drops to 15% (KENET, 2021).

The rapid pace of technological advancements presents both opportunities and challenges for PHEIs. Emerging technologies have the potential to transform teaching and learning experiences but require continuous adaptation and upskilling among staff. In Africa, the African Development Bank reported that 70% of educators needed professional development to effectively use digital tools (AfDB, 2021). In Kenya, a survey by the Commission for University Education (CUE) found that 60% of faculty members expressed a need for more professional development to use digital tools effectively in their teaching (CUE, 2020).

This research aims to investigate these multifaceted challenges by exploring the extent of the, top management readiness and support and the effectiveness of innovation culture on the performance of PHEIs. Understanding these issues is crucial for developing strategies that ensure equitable and effective integration of digital innovation strategies in private higher education institutions.

Objectives of the Study

The general objective of the study was to assess the influence of digital innovation capabilities on performance of private higher education institutions in Nairobi City County, Kenya.

Specific Objectives

i. To determine the influence of top management support on Performance of Private Higher Education Institutions in Nairobi City County, Kenya
ii. To assess the influence of innovation culture on Performance of Private Higher Education Institutions in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Review

Dynamic Capabilities Theory

Dynamic Capabilities Theory was developed by David J. Teece and his colleagues in the early 1990s. Teece, along with Pisano and Shuen, introduced the concept in their seminal paper titled "Dynamic Capabilities and Strategic Management" published in 1997. Dynamic Capabilities Theory posits that competitive advantage and long-term success in dynamic and uncertain environments are derived from an organization's ability to adapt, innovate, and reconfigure its resources and capabilities over time. Unlike static capabilities, which are focused on exploiting

existing resources and capabilities, dynamic capabilities enable organizations to sense, seize, and reconfigure resources in response to changing market conditions, technological advancements, and competitive threats.

Dynamic Capabilities Theory operates on the assumption that the business environment is characterized by uncertainty, complexity, and rapid change. Organizations must continuously adapt and evolve to remain competitive and achieve long-term success in such environments. The theory assumes that resources and capabilities are heterogeneous across organizations and industries. Organizations possess unique combinations of resources, knowledge, and capabilities that enable them to develop distinct competitive advantages and respond differently to market opportunities and threats. Dynamic Capabilities Theory adopts a strategic management perspective, emphasizing the importance of strategic decision-making, resource allocation, and organizational learning in shaping an organization's ability to adapt and innovate over time. It views dynamic capabilities as a source of sustained competitive advantage and organizational resilience.

Resource Dependency Theory

Resource Dependency Theory was developed by Jeffrey Pfeffer and Gerald R. Salancik in their seminal work "The External Control of Organizations: A Resource Dependence Perspective," published in 1978. The theory was further refined and expanded upon by subsequent scholars, including Jeffrey Pfeffer, Gerald R. Salancik, and others. Resource Dependency Theory posits that organizations are dependent on external resources, such as capital, information, technology, and expertise, to survive and achieve their goals. According to the theory, organizations seek to manage and reduce their dependency on external sources of supply by establishing control mechanisms, forming strategic alliances, and diversifying their resource base. However, complete autonomy from external dependencies is often unattainable, and organizations must navigate complex interdependencies with external stakeholders to ensure their continued viability and success.

Resource Dependency Theory emphasizes the importance of external resources in shaping organizational behavior and decision-making. Organizations rely on external sources of supply for essential resources, including financial capital, raw materials, technology, and information. Dependency on external resources exposes organizations to vulnerabilities and risks, as they are subject to the interests and actions of resource providers. Interorganizational relationships play a critical role in managing resource dependencies and reducing uncertainty in the external environment. Organizations form alliances, partnerships, and networks with suppliers, customers, competitors, and other stakeholders to access resources, share risks, and coordinate activities. These relationships enable organizations to pool resources, leverage complementary capabilities, and negotiate favorable terms to enhance their competitiveness and resilience (Youssef, & Dahmani, 2015).

Conceptual Framework

Conceptual framework is a tool used by a researcher to develop awareness and understanding of the situation under scrutiny and to communicate (Kombo & Tromp, 2016). It can also be defined as a concise explanation of an occurrence accompanied by a visual or graphic representation of major variables of the study (Mugenda, 2018). Figure 2.1 presented the conceptual framework.

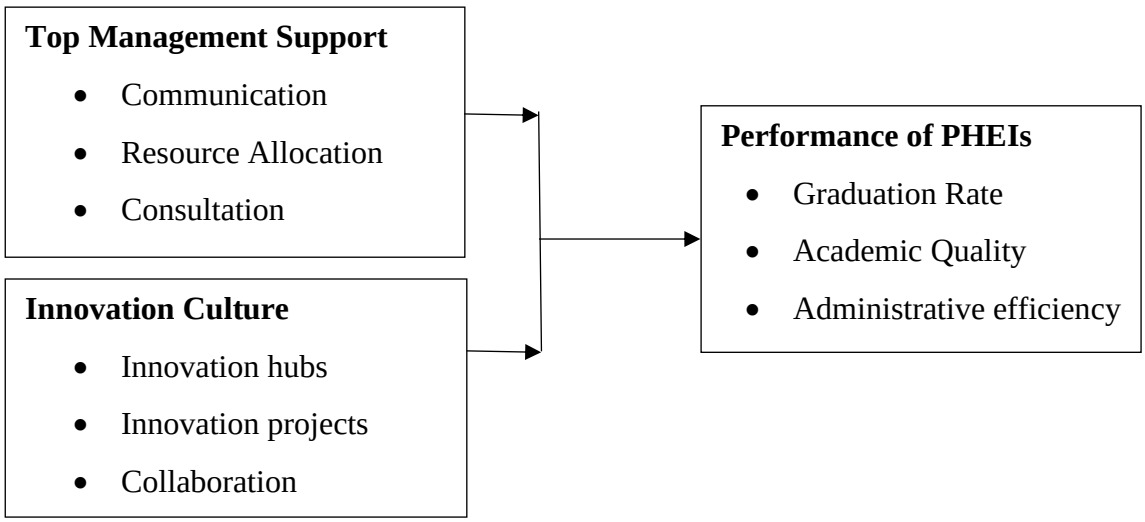

Figure 2. 1 Conceptual Framework

Top Management Support

Top Management Support plays a crucial role in enhancing Digital Innovation Capabilities (DIC) and subsequent performance of Private Higher Education Institutions (PHEIs) in Nairobi City County, Kenya. Three salient components encompass Communication, Resource Allocation, and Consultation.

Effective Communication is imperative to elicit widespread endorsement, appreciation, and participation in DIC ventures. Top management can articulate visionary missions, lucid strategies, and achievable milestones governing digital transformation. Clear pronouncements underscore priority, urgency, and necessity for change, mobilizing requisite resources and energies (Elbanna & Atkinson, 2016). Consequently, cascading messages downstream inculcates confidence and clarity, spurring concerted action towards realization of envisioned aspirations (Heeks, 2017).

Equitable Resource Allocation augments DIC by supplying adequate funds, state-of-the-art facilities, and skilled workforce commiserate with anticipated demands. Financial backing fuels procurement of avant-garde technology, maintenance of functional infrastructure, and delivery of bespoke training modules. Simultaneously, assigning suitably qualified experts exudes trust, delegating authority, and recognizing meritocracy – ingredients indispensable to unleashing creative juices and invoking inventive thinking (Bondarouk & Ruel, 2013).

Transparency, inclusivity, and participatory decision-making are all embodied in consultation. To foster harmonious relationships between disparate stakeholder groups, engagement fosters attachment, belongingness, and camaraderie. Participating in town hall meetings and workshops provides an avenue to express problems, voice opinions, and suggest alternative actions. Customized solutions that resonate locally and win over hearts and minds are shaped by repeatedly asking for bottom-up input (Boonstra & Bennington, 2019). PHEIs' DIC journeys are largely determined by the pace, tone, and trajectory set by Top Management Support. A top leadership team that understands the value of communication, resource allocation, and consultation will surely navigate difficult terrain with ease, reach new heights with assurance, and map fresh territory.

Innovation Culture

Innovation Culture significantly shape Digital Innovation Capabilities (DIC) and overall performance of Private Higher Education Institutions (PHEIs) in Nairobi City County, Kenya. Important dimensions encompass innovation collaboration, hubs and projects.

Collaborative Innovation reflects cooperation between PHEIs and partner institutions to create novel digital services and products. Synergistically combining complementary strengths, expertise, and intellectual property portfolios fosters cross-institutional fecundity, leading to generation of pioneering solutions transcending boundaries (Martínez-Conesa et al., 2019). Resultantly, joint explorations magnify outcome space, sparking serendipitous discoveries poised to revolutionize educational paradigms.

Innovation culture within Private Higher Education Institutions (PHEIs) can be effectively operationalized through the establishment and utilization of innovation hubs. The hubs serve as dedicated spaces fostering creativity, collaboration, and the development of new ideas, which are critical components within learning institutions. Kim et al. (2019) outlines that innovation hubs significantly contribute to higher research productivity and better learning outcomes. Institutions with active innovation hubs reported an increase in the number of publications and patents, indicating a robust innovation culture. PHEIs with well-established innovation hubs show better overall performance, including improved graduation rates, higher student satisfaction, and improved administrative efficiency.

Innovation projects are structured initiatives aimed at developing new products, services, processes, or methodologies within the learning institutions. This involves inter-disciplinary collaboration and multi-cultural problem-solving while using cutting-edge technologies in learning institutions with utility from digital interactions (Kim et al., 2019). By involving multiple actors, including academicians, students, entrepreneurs, investors, and governments, a multiplicity of perspectives emerges, giving rise to versatile and inclusive innovation cultural value propositions (Antón et al., 2017).The Strategies for sharing project results and integrating successful innovations into institutional practices enhances robust performance in different dimensions with PHEIs (Miller & Friesen, 2021).Optimal configurations afford ripe grounds for experimentation, iteration, and validation, continuously refining nascent ideas until mature digital innovations unfold. The performance of PHEIs in Nairobi City County, Kenya, is significantly influenced by innovation culture of all stakeholders. Encouraged by the right innovation hubs, projects and collaboration, PHEIs find their proper place in the hyperconnected world of the future, ready to thrive in the face of growing competition, overcome obstacles, and grab chances that present themselves.

Performance of PHEIs

Performance represents the ultimate barometer gauging the efficacy and success of Digital Innovation Capabilities (DIC) within Private Higher Education Institutions (PHEIs) in Nairobi City County, Kenya. Measures that represent the Graduation Rate, Academic Quality and Administrative efficiency illuminate the bearing of DIC on core academic deliverables and institutional sustainability.

The graduation rate is a stand-in for quality, student well-being, and readiness for the workforce. It takes unwavering will, pure grit, and confidence in oneself to overcome difficult academic obstacles. Increasing DIC encourages individualized instruction, considers different learning preferences, and builds a framework for cognitive growth (Chen et al., 2020). Accordingly, churning out accomplished graduates imparts profound ramifications on labor markets, economic growth, and societal upliftment.

The popularity and demand-side appeal of PHEIs are indicated by the quality of academic services offered. The rapidly growing youth bulge demands accessible, flexible, and reasonably priced education. Expanding academic opportunities requires clever use of digital technologies, particularly in large cities with millions of eager learners which are delivered in a quality way to bring out better learning outcomes (Khalid et al., 2019). Expanded bandwidth, faster processing speeds, and ubiquitous connectivity herald unprecedented opportunities for remote learning, flipped classrooms, and massively open online courses (MOOCs), democratizing access and widening gateways to hitherto marginalized segments of Kenyan society. Rehman,

Bisschoff, and Botha (2019) eludes that the measurement of academic quality is of value to school directors, managers and investors in private higher education.

Digital resources and streamlined administrative processes improve faculty working conditions and job satisfaction(Jawaad, Amir, Bashir, & Hasan, 2019).The availability of enhanced digital teaching tools like learning management systems (LMS) provide faculty with diverse teaching tools, such as virtual classrooms, multimedia resources, and interactive assessments for students while disseminating administrative tasks to staff. These tools enrich the teaching experience and facilitate innovative pedagogical methods thus enhancing the performance of PHEIs. The availability of Online professional development courses and webinars help faculty stay updated with the latest teaching strategies and technological advancements, contributing to their professional growth and job satisfaction (Alenezi, 2023).

Digital systems reduce administrative burdens and improve operational efficiency. According to Milumbe (2016),administrative systems automate routine processes such as student registration, fee collection, and record-keeping. This automation reduces manual errors and frees up administrative staff to focus on more strategic tasks. Digital databases allow for efficient data management, including student records, faculty information, and institutional data. Easy access to accurate and up-to-date information supports better decision-making and policy formulation (Means, Padilla, DeBarger, & Bakia, 2009). Ultimately, the performance of PHEIs manifests itself in graduation rate, academic quality and administrative efficiency. Equipped with DIC, PHEIs in Nairobi City County, Kenya, can soar to incredible heights, competing with internationally recognized centers of knowledge production and dissemination.

Empirical Review

Top Management and Performance of PHEIs

The most key role in fostering DIC is played by Top Management Support. Visionary leaders infuse contagious energy, fervent passion, and unstoppable momentum by bringing extensive ideas to life, letting go of inhibitions, and uniting people around admirable causes (Petridou et al., 2017). Digital destinies are controlled by smart advocates who wisely communicate, consult, and allocate resources, leading cautious innovators down promising avenues (Benbya et al., 2018).

In context to Uganda, Alemiga (2014) examined that top management are generally associated with better performance due to their enhanced ability to process information and execute complex tasks. They bring diverse skills and networks, which can lead to increased resources and improved decision-making capabilities.

According to study by (Alonderiene & Majauskaite, 2016) in UK, the leadership style adopted by top management has a profound impact on faculty satisfaction and overall institutional performance. Different leadership styles have varying effects on job satisfaction, motivation, and organizational culture. In contrast study by (Amin, 2012) in Egypt showed that, controlling and autocratic leadership styles tend to have a negative impact on faculty satisfaction. Such styles can lead to a lack of motivation and reduced job satisfaction, ultimately affecting the institution's performance.

Innovation Culture and Performance of PHEIs

Innovation culture within Private Higher Education Institutions (PHEIs), plays a crucial role in driving performance. The relationship between innovation culture and performance in PHEIs has an impact on institutional outcome.

In Malaysia, the foundation of a innovation culture is robust digital infrastructure, which includes high-speed internet, cloud computing, and advanced hardware and software in cooperated with collaborative innovation, innovation hubs and innovation projects (Bajunid & Wong, 2016). Implementing digital innovation systems streamlines administrative processes such as enrollment, grading, and communication. Automation of these processes reduces

administrative burdens and errors, leading to more efficient operations and allowing staff to focus on strategic activities(Attaran, 2020).

In Kenya, Makori (2017) opines that good innovation culture support research activities by providing access to digital libraries, databases, and collaborative tools that act as innovation hubs. These resources enhance the quality and reach of research outputs, promoting greater collaboration among faculty and with external partners.

A study of European universities by Coccoli, Guercio, Maresca, and Stanganelli (2014) highlighted the successful implementation of digital innovation projects which led to improved teaching quality and operational efficiencies. These universities employed various methods of resource sharing and knowledge advancement and transfer.

A study in Egypt showed that the COVID-19 pandemic accelerated the adoption of innovation culture in many PHEIs (Garad, Al Ajmi, & Khawaja). Institutions that had already invested in digital infrastructure were better positioned to transition to online learning, demonstrating the resilience and adaptability of robust innovation culture.

RESEARCH METHODOLOGY

The target population for this study were respondents from the 33 Private institutions accredited to undertake higher education in Kenya (CUE, 2021). The survey unit of analysis was composed of institutions accredited to undertake university education in Kenya whose staff in IT departments, academic departments, registrar and in administrative units who are the technology users and have a significant role in technical innovation mandates and decision-making related to digital innovation formed the unit of observation the units of inquiry or observation. The descriptive research design was employed. From each of the 33 PHE institutions 9 respondents were sampled randomly to form a homogenous stratum for the survey making a total target population of 297 respondents. The sample size was determined using the formula suggested by Yamane (1967) (Bell et al., 2022) since the study population is finite. Therefore, a sample size of 170 respondents participated in the study. This number was allocated proportionally to the 33 PHEIs for data collection instruments administration. Data was collected using a self-administered semi-structured questionnaire. Data obtained from the field was coded, cleaned, and entered to the computer for analysis using SPSS version 28. Descriptive statistical analysis techniques, such as frequency, percentages, mean and standard deviation were used to summarize the data. Inferential statistical analysis, including multiple regression and correlation analysis was used to assess the relationship between the independent and the dependent variables. The significance of each independent variable was tested at a confidence level of 95%.

FINDINGS AND DISCUSSIONS

The online survey tool was shared with all the eligible participants (n=170). Table 4.2 indicates that out of 170 employees of private higher education institutions in Nairobi City County, Kenya who participated in the study 159 questionnaires completed the survey indicating a response rate of 93.53%. Mugenda & Mugenda (2016) state that for analysis and reporting, a response rate of 50% or more is good, a rate of 60% is adequate, and a rate of 70% or above is exceptional. Because the response rate was higher than 70%, it was deemed exceptional; thus, providing backing for further explorative analysis and reporting.

Descriptive Statistics of Study Variables

The Likert Scale was used to assess data and determine the correctness of study findings. The self-administered questionnaire used in this study had five sections with items formatted using a Likert-type scale. As proposed by Alan (2001), the scale went from 1= Strongly Disagree (SD), 2 = Disagree(D), 3= Neutral(N), 4= Agree(A),5= Strongly Agree (SA). The Likert scale's items were constructed in an affirmative approach. Each of the five sections of the Likert-type scale format had nine items.

Top Management Support on Performance of PHEI's

Table1 presents the summary of the findings. The respondents were asked to indicate the determine the influence of top management support on performance of private higher education institutions in Nairobi City County, Kenya.

Table 1: Descriptive Statistics on Top Management Support on Performance of PHEI's

Statement	Mean	Std. Dev
The senior leadership at the institution understands and supports the use of technology in achieving strategic objectives	3.610	.8488
The top management involvement in promoting technology adoption and innovation is well communicated and structured.	3.579	.9167
The institution is transparent in sharing and communicating about technology failures, successes, and lessons learned	3.591	.8730
Top management ensures that there are enough technological resources (hardware, software, network) for both students and staff.	3.553	.9322
The institution does balance competing demands for resources between short-term operational needs and long- term strategic investments in technology	3.547	.9325
The institution allocates financial and human resources to support technology initiatives.	3.629	.8461
There are formal mechanisms for staff to provide input on technology-related issues.	3.572	.8748
Institution do engage with key stakeholders, such as faculty, staff, and students, in technology planning and decision-making processes	3.579	.8724
Institution does involve subject matter experts, consultants, or external partners in technology projects	3.591	.8945

Based on the findings presented in Table 1, the respondents agreed that the senior leadership at the institution understands and supports the use of technology in achieving strategic objectives (M=3.610, SD=.8488); the top management involvement in promoting technology adoption and innovation is well communicated and structured (M=3.579, SD=.9167); and the institution is transparent in sharing and communicating about technology failures, successes, and lessons learned (M=3591, SD=.8730). Respondents also agreed that the top management ensures that there are enough technological resources (hardware, software, network) for both students and staff. (M=3.553, SD=.9322); The institution does balance competing demands for resources between short-term operational needs and long- term strategic investments in technology (M=3.547, SD=.9325); The institution allocates financial and human resources to support technology initiatives (M=3.629, SD=.8461); there are formal mechanisms for staff to provide input on technology-related issues. (M=3.572, SD=.8748); the institution does engage with key stakeholders, such as faculty, staff, and students, in technology planning and decision-making processes (M=3.579, SD=.8724); and that institution does involve subject matter experts, consultants, or external partners in technology projects (M=3.591 SD=.8945).

The findings suggest a consensus among respondents regarding the significance of top management support on performance of PHEI's. Specifically, the results indicate that institutions share and communicates about technology failures, successes, and lessons learned, there is enough technological resources (hardware, software, network) and the private higher education institutions allocates financial and human resources to support technology initiatives. Furthermore, respondents concur that senior leadership at the institution understands and supports the use of technology in achieving strategic objectives, the institution engage with key stakeholders, such as faculty, staff, and students, in technology planning and decision-making processes and they involve subject matter experts, consultants, or external partners in technology projects.

These findings resonate with prior research on digital innovation capabilities on performance of private higher education institutions in Nairobi City County. Previous studies have highlighted the importance of top management and their performance (Petridou et al., 2017) emphasized the that the key role in fostering digital innovation capabilities is played by top management support. Visionary leaders infuse contagious energy, fervent passion, and unstoppable momentum by bringing extensive ideas to life, letting go of inhibitions, and uniting people around admirable causes.

Alemiga (2014) noted that that top management are generally associated with better performance due to their enhanced ability to process information and execute complex tasks. They bring diverse skills and networks, which can lead to increased resources and improved decision-making capabilities. In contrast study by (Amin, 2012) in Egypt showed that, controlling and autocratic leadership styles tend to have a negative impact on faculty satisfaction. Such styles can lead to a lack of motivation and reduced job satisfaction, ultimately affecting the institution's performance. The findings highlight the critical role of top management in promoting and fostering performance in private higher education institutions in digital innovation capabilities. By incorporating the top management performance will ultimately be improved.

Innovation Culture on Performance of PHEI's

Respondents gave their extent of agreement with statements on the influence of innovation culture on performance of private higher education institutions in Nairobi City County, Kenya. Table 2 presents the findings obtained.

Table 2 Descriptive Statistics on Innovation Culture on Performance of PHEI's

Statement	Mean	Std. Dev
There are several innovation hubs within the institution that foster a culture of creativity and learning.	3.428	.9444
Resources and support are provided within the innovation hubs to facilitate and develop innovative learning solutions.	3.447	.9254
The institution's innovation hubs have contributed to the broader digital success of the learning ecosystem.	3.642	.8441
The criteria used to prioritize innovation projects and allocate resources among various departments is equitable and balanced.	3.541	.8475
The institution supports interdisciplinary knowledge exchange among teams working on innovation projects.	3.535	.9398
Innovation projects align with the institution's strategic goals, mission and vision.	3.503	.9538
The institution fosters collaboration with external partners, including industry, government, and other educational institutions, to drive innovation initiatives.	3.623	.8545
Successful collaborative innovation projects have resulted in innovative solutions and shared learning experiences.	3.585	.7900
Strategies are being implemented to overcome challenges or barriers that exist in fostering collaboration for innovation.	3.566	.8534

From the findings in Table 2, the respondents agreed there are several innovation hubs within the institution that foster a culture of creativity and learning (M=3.428, SD=.9444); that resources and support are provided within the innovation hubs to facilitate and develop innovative learning solutions. (M=3.447, SD=.9254); and the institution's innovation hubs have contributed to the broader digital success of the learning ecosystem (M=3.642, SD=.8441). Respondents also agreed that the criteria used to prioritize innovation projects and allocate resources among various departments is equitable and balanced. (M=3.541, SD=.8475); The institution supports interdisciplinary knowledge exchange among teams working on innovation projects. (M=3.535, SD=.9398); that innovation projects align with the institution's strategic

goals, mission and vision. (M=3.503, SD=.9538); that the institution fosters collaboration with external partners, including industry, government, and other educational institutions, to drive innovation initiatives (M=3.623, SD=.8545). Respondents also agreed that successful collaborative innovation projects have resulted in innovative solutions and shared learning experiences (M=3.585, SD=.7900) and that strategies are being implemented to overcome challenges or barriers that exist in fostering collaboration for innovation.

This sentiment communicates that innovation culture is gradually being cultivated within the studied institutions. Collectively, the findings from Table 4.8 convey that the studied institutions have taken considerable steps towards progressing digital innovation culture. The present study's findings echo this principle, with respondents expressing consensus that the private higher education institutions have resources and support are provided within the innovation hubs to facilitate and develop innovative learning solutions, PHEIs institution supports interdisciplinary knowledge exchange among teams working on innovation projects and that successful collaborative innovation projects have resulted in innovative solutions and shared learning experiences.

In alignment with the Makori (2017) who opines that good innovation culture support research activities by providing access to digital libraries, databases, and collaborative tools that act as innovation hubs. These resources enhance the quality and reach of research outputs, promoting greater collaboration among faculty and with external partners. Also, consistent with a study of European universities by Coccoli, Guercio, Maresca, and Stanganelli (2014) highlighted the successful implementation of digital innovation projects which led to improved teaching quality and operational efficiencies. These universities employed various methods of resource sharing and knowledge advancement and transfer.

A study by Kim et al. (2019) outlines that innovation hubs significantly contribute to higher research productivity and better learning outcomes. Institutions with active innovation hubs reported an increase in the number of publications and patents, indicating a robust innovation culture. PHEIs with well-established innovation hubs show better overall performance, including improved graduation rates, higher student satisfaction, and improved administrative efficiency. By involving multiple actors, including academicians, students, entrepreneurs, investors, and governments, a multiplicity of perspectives emerges, giving rise to versatile and inclusive innovation cultural value propositions (Antón et al., 2017). The Strategies for sharing project results and integrating successful innovations into institutional practices enhances robust performance in different dimensions with PHEIs (Miller & Friesen, 2021).

Performance of Private Higher Education Institutions

Respondents were asked to indicate the extent to which they agreed with statements relating to performance of PHEIs in Nairobi City County, Kenya. Table 3 presents the findings achieved.

Table 3 Descriptive Statistics on Performance of Private Higher Education Institutions

Statement	**Mean**	**Std. Dev**
The current graduation rate at our institution is very good	3.667	.9915
The institution has addressed what makes students not to graduate in time.	3.409	.9950
The high graduation rate reflects the quality of education provided by the institution.	3.667	.9591
The academic quality of the institution is very good and meets the required accreditation standards.	3.616	1.1126
The institution has ensured a fair and inclusive academic process (i.e grading and examination)	3.585	.9892
The institution's reputation positively influences the academic quality.	3.597	.9488
The administrative processes at our institution are efficient and streamlined.	3.654	.9000
The use of technology has improved the efficiency of administrative tasks.	3.579	1.0150
Administrative efficiency has a positive impact on the overall performance of the institution.	3.660	.9535

From the findings presented in Table 3, the respondents agreed that the current graduation rate at our institution is very good. (M=3.667, SD=.9915); The institution has addressed what makes students not graduate in time. (M=3.409, SD=.9950); and that the high graduation rate reflects the quality of education provided by the institution. (M=3.667, SD=.9591). The majority of the respondents further agreed that the academic quality of the institution is very good and meets the required accreditation standards. (M=3.616, SD=1.1126); The institution has ensured a fair and inclusive academic process (i.e. grading and examination) (M=3.585, SD=.9892); and that the institution's reputation positively influences the academic quality (M=3.597, SD=.9488).

The findings from Table 4.9 indicate that there is improved performance in PHEIs in Nairobi City County. The PHEIs current graduation rate is very good institution has students have graduated in time and high graduation rate reflects the quality of education provided by the institution. Additionally, the PHEIs has a fair and inclusive academic process such as grading and examination purposes, they also noted that the use of technology has improved the efficiency of administrative tasks, and the administrative efficiency has a positive impact on the overall performance of the institution. These results indicate that digital innovation capabilities have improved the performance of private higher education institutions in Nairobi City County. This is supported by several studies. For instance, research has shown that the graduation rate is a stand-in for quality, student well-being, and readiness for the workforce. It takes unwavering will, pure grit, and confidence in oneself to overcome difficult academic obstacles (Chen et al., 2020). Accordingly, churning out accomplished graduates imparts profound ramifications on labor markets, economic growth, and societal upliftment.

Moreover, previous studies have highlighted that digital systems reduce administrative burdens and improve operational efficiency. According to Milumbe (2016),administrative systems automate routine processes such as student registration, fee collection, and record-keeping. This automation reduces manual errors and frees up administrative staff to focus on more strategic tasks. Digital databases allow for efficient data management, including student records, faculty information, and institutional data. Khalid et al., (2019) findings also tend to agree with the finding because it was stated that expanding academic opportunities requires clever use of digital technologies, particularly in large cities with millions of eager learners which are delivered in a quality way to bring out better learning outcomes

Correlation Analysis

Pearson moment correlation analysis employed to find the correlation coefficient. The study tested whether interdependency existed between the independent variables and whether there was any relationship between the dependent variable and independent variables and the direction of their relationship. The association was considered to be small if $\pm 0.1 < r < \pm 0.29$; medium if $\pm 0.3 < r < \pm 0.49$; and strong if $r > \pm 0.5$. The correlation findings were as presented in Table 4.

Table 4: Correlation Analyses

		Performance	Top management	Innovation culture
Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	159		
Top management	Pearson Correlation	.860**	1	
	Sig. (2-tailed)	.000		
	N	159	159	
Innovation culture	Pearson Correlation	.785**	.672**	1
	Sig. (2-tailed)	.000	.000	
	N	159	159	159

The analysis results in table 4 demonstrate influence of top management (r=0.860), and performance of private higher education institutions in Nairobi City County indicated a strong positive correlation which was statistically significant ($p< 0.05$). Further, it is observed that the performance of private higher education institutions in Nairobi City County has a substantial positive association (r=0.785) with innovation culture. It can be observed that the relationship's p-value (0.000) is less than the chosen level of significance. These findings show that top management and innovation culture have significant influence on performance of private higher education institutions in Nairobi City County. To further understand the level of influence these variables have on digital innovation capabilities and performance of private higher education institutions in Nairobi City County, the study computed regression analysis.

Regression Analysis

Multiple regression analysis was employed to establish the relationship between digital innovation capabilities and performance of private higher education institutions in Nairobi City County. The analysis results are summarized using the R-square table for model fit, ANOVA for model summary, and the model parameters table.

Beta Coefficients of the Study Variables

Multiple Linear regression model was employed to establish the influence among predictor variables and explain magnitude and course of relationship amongst the variables of the study utilizing coefficient of determination and the level of significance. The beta coefficients were used to illustrate the association between the variables using a model of the structure: $\mathbf{Y_i = \beta_0+\beta_1X_1+\beta_2X_2 + \varepsilon}$

Where: - Y_i = Performance of PHEI's in Nairobi City County; β_0 = Constant (Coefficient of intercept); X_1 = top management; X_2 = innovation culture.

Table 5 Beta Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.916	3.034		1.620	.107
	Top management	.308	.108	.268	2.852	.005
	Innovation culture	.435	.103	.364	4.223	.000

a. Dependent Variable: Performance of PHEI's

The results demonstrated that top management is statistically significant in explaining performance in private higher institutions in Nairobi City County, as indicated by (β = 308, p = 0.005). Given that the p-value (0.005) is smaller than the chosen level of significance (0.05), the influence is significant. This suggests that the performance in private higher education institutions in Nairobi City County is favorably and considerably influenced by the top management. Findings showed that private higher institutions in Nairobi City County will perform better by 0. 308 units because of strengthening top management.

Innovation culture is also found to be statistically significant in explaining performance in private higher institutions in Nairobi City County as demonstrated by (β = .435, p = 0.000). Given that the p-value (0.000) is smaller than the chosen level of significance (0.05), the influence is significant. This suggests that innovation culture has a favorable and considerable impact on the performance in private higher institutions in Nairobi City County. This indicated that a unit change in innovation culture resulted to 0.435 unit's changes in performance of private higher education institutions in Kenya.

Conclusions

Based on the findings on top management and performance of Private Higher Educations Institutions in Nairobi City County, Kenya. According to the study's findings, skilled managers

recognize that building team trust is an essential part of their job to win over the trust and dependability of their peers, superiors, clients, and other pertinent stakeholders. They also recognize how important it is to create communication and organizational structures inside the company, as well as to put policies in place that promote trust at all levels of the hierarchy. It is often known that effective communication is critical to managing the everyday encounters that arise, to initiating organizational change, and to producing noticeable performance improvements.

On innovation culture and performance of Private Higher Educations Institutions in Nairobi City County, Kenya. The study concludes that institutions foster a strong culture of innovation tend to exhibit enhanced performance in several areas, including academic excellence, operational efficiency, and student satisfaction. A robust innovation culture encourages creative problem-solving, promotes the adoption of new teaching methods and technologies, and facilitates continuous improvement. This, in turn, leads to a more dynamic and responsive educational environment.

Recommendations

The study recommends the top management at private higher education institutions should ensure that activities are well coordinated, teamwork is encouraged, and communication is successful. The capacity of private universities to effectively manage their human and physical resources is contingent upon their possession of management competencies. As a result, the study suggests that the university management team participate in a variety of training programs, seminars, and workshops to acquire and implement new management techniques.

It was suggested that private higher education institutions focus more on technological improvement in the major areas of operation, such as administration, teaching, planning, marketing, and examination administration, in order to increase the technical capability of the university staff's knowledge. Providing high-quality service at the best possible price while meeting deadlines should be the main priority. Modern technology can aid in the integration of numerous departmental tasks, and the top management in private institutions should take this into consideration.

The study recommends that private higher education institutions should put more emphasis on innovation, marketing, research and development for they have positive effect on performance

Areas for Further Research

The present study was limited to Private Higher Education Institutions in Nairobi City County, Kenya. Therefore, it is essential to do further research in the following areas:

- A similar study should be conducted to ascertain the barriers impending the adoption of digital innovation in Technical and Vocational Education and Training (TVET) institutions.
- A study should be conducted to determine the impact of staff digital literacy and how it affects performance of institutions of higher learning.
- A study should be done to investigate the long-term sustainability of digital innovations in teaching and learning within both private and public learning institutions.

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