UNIVERSITY-INDUSTRY SYNERGIES IN THE EMERGENCE OF AN ENTREPRENEURIAL UNIVERSITY: A CONCEPTUAL PAPER

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ABSTRACT

As public funding for tertiary institutions continues to decline amid government cost-cutting measures, the traditional response of industrial actions, which often leads to prolonged disruptions in academic activities, has proven largely ineffective. The transformation of Nigerian universities into entrepreneurial institutions hinges on their ability to move beyond traditional educational structures and embrace a more market-oriented and innovation-driven model. This article provides a template for understanding how university-industry (UI) synergies can serve as a strategic mechanism for repositioning Nigerian universities as active contributors to national development. It argues that while financial constraints have been a persistent challenge, the real issue lies in the structural rigidity of universities, which limits their ability to engage productively with industry. This paper thus contributes to the ongoing discourse on higher education reform by offering a strategic perspective on how Nigerian universities can reposition themselves as active participants in an increasingly knowledge-driven economy.

Keyword: *University-Industry Partnership; Entrepreneurial University; knowledge-intensive economy; Technology Transfer Office*

INTRODUCTION

The role of universities in contemporary society has undergone unalloyed scrutiny and debate in the past decades, particularly concerning their potential as entrepreneurial entities (Klofsten et al., 2019). Some section of critics argued that universities should embrace entrepreneurship to contribute to economic development within the knowledge-based economy (Guerrero and Lira, 2023). While others however, contend that universities should remain detached from economic activities and influences to preserve their mission of teaching and research, emphasizing their roles as engaged or civic institutions rather than profit-driven entities (Toole & Czarnitzki, 2020).

This debate highlights the lack of consensus on the general scope of what constitutes a modern university in an era where knowledge is considered

a factor in the competitiveness of national economies. Such ambiguity stems from the unique nature of each university and the specific context within which it operates (Guerrero et al., 2021) as various concepts have been adopted to describe the changing roles of universities, including the knowledge hub ((Uyarra, 2021), the civic university (Goddard et al., 2023), the engaged university (Fitzgerald et al., 2020); then most recently and more impactful, the entrepreneurial university (Etzkowitz, 2004; Guerrero and Lira, 2023).

These diverse concepts reflect the evolving expectations and roles of modern universities within their regional and societal contexts, providing strong evidence of the shift towards universities being viewed as active participants in economic and social development. Consequently, the concept of the entrepreneurial university has gained significant traction within academic communities as a specialized research domain, reshaping perceptions of higher education institutions and prompting a re-evaluation of their strategies, structures, and partnerships to better align with the demands of the knowledge economy.

One prominent outcome of this structural shift is the dynamic evolution of collaborations between universities and industries, particularly within fields deeply intertwined with innovation systems. This includes sectors such as bio-technology, nuclear energy, information technology, and modern transportation technologies. These collaborations are not merely marriage of convenience; they represent a fundamental reimagining of how academia and industry can work together to drive progress and tackle complex challenges to derive mutual value (Pansera et al., 2020; Padilla-Meléndez et al., 2021; Liboreiro et al., 2022). Within this context, university-industry partnership goes beyond signing agreement to represent a comprehensive change in the ethos and values of the university, permeating all aspects of its functioning and necessary structural tweaks. The modern university embodies this profound change, integrating collaborations not only into its research and teaching activities, but also into its overarching vision, attitude and transformative culture. This holistic approach positions the university as a powerful catalyst for economic and social progress within its sphere of influence (Hou et al., 2021; Pugh et al., 2022; Sim et al., 2023).

In specific cases, university-industry collaboration have been found to have profound influence on Knowledge transfer (Fischer, et al., 2021; Cheng, 2021), knowledge management (Guerrero et al., 2021); Spin-off formation (Bagchi-Sen et al., 2022; Walter et al., 2024), regional innovation (Tseng et al., 2020; Fan et al., 2020), improved R & D efficiency (Audretsch and Belitski, 2020), graduate employability (Lu, 2021; Succi and Canovi, 2020), socio-economic development (Orazbayeva and Plewa, 2020), environmental sustainability (Di Maria et al., 2019). The concept of university-industry (UI) collaboration

is particularly more crucial with the emergence of a global knowledge-intensive and entrepreneurial economy which now require tertiary institutions of education that are capable of responding to the new mission of acting as catalyst in the development of socio-economic progress of their regions (Link and Sarala, 2019; Fischer et al., 2022).

For instance, Shi et al. (2020) conducted a longitudinal study between 2008 – 2011 using data from 443 Chinese companies to investigate the impact of UI partnership on their innovation efficiency, results revealed that UI does not improve innovation efficiency initially due to direct cost that UI collaboration as it raises the firm's administrative overhead associated with coordination and monitoring activities; but as collaboration deepens the benefits tend to outweigh the costs associated with such partnership. Findings further indicated that efficiency of the firms notably increased from 2008 to 2009, declined from 2009 to 2010, and then rebounded from 2010 to 2011. The dip in efficiency during 2009-2010 was attributed to the Global Financial Crisis, which exerted widespread economic pressures during that timeframe.

Within the African context whose economy is predominantly factor-driven (Guimon, 2020), there are very few studies examining the concepts of entrepreneurial university orientation and its proxies. A study by El-Hadidi et al. (2017) revealed that only 6% of the sampled firms had some sort of connections with universities in Egypt and only 33% of firm claimed to have knowledge of the concept of entrepreneurial university. According to Hasche and Linton, (2021) research on entrepreneurship connected to universities has mainly focused on two streams of research: first, researchers starting ventures, and second, entrepreneurship education. In the context of Nigeria, entrepreneurship research connected with universities has primarily centered on the later with emphasis on skills acquisition (Undiyaundeye and Otu, 2022), entrepreneurial intentions (Abdullahi et al., 2021); teaching and publications as a measure of entrepreneurial university orientation (Adelowo and Surujlal, 2020).

The paucity of research within this specialized domain of entrepreneurial university mean that researchers in Nigerian universities may be overlooking crucial aspects of entrepreneurship research areas such as university-industry partnership which has enormous implication on its ability to foster an entrepreneurial ecosystem within its institutions and the economy. Without a comprehensive research into the dynamics of the entrepreneurial university model, including its institutional structures, support systems, and outcomes, Nigerian universities may struggle to fully leverage their potential as hubs for innovation and knowledge creators. Thus, there exists an urgent need for expanded scholarly inquiry into the nuances of entrepreneurial

university frameworks within the Nigerian context to inform strategic initiatives and policy decisions aimed at enhancing entrepreneurial ecosystems and fostering sustainable development.

The aim of this article is to contribute towards addressing this gap by offering a conceptual framework for understanding university-industry collaboration and its significance in cultivating an entrepreneurial university environment within a developing nation. Prior investigations, such as those conducted by El-Hadidi et al. (2017), have explored similar themes within the context of Egyptian academic institutions and industries. Building upon this foundation, this study employs exploratory qualitative approach to gather insights from extant literatures and develop a conceptual framework. Extensive review of existing scholarly articles is undertaken, and relevant theoretical frameworks pertaining to entrepreneurial university models, where UI is treated as a construct, are examined to provide answers to the question of why the Western model of an entrepreneurial university has not gained traction within the African context. Furthermore, the study explores how such a space can be recreated not just in the traditional sense but by propelling Nigerian universities towards becoming embedded in the innovation systems of industries.

Literature Review

Literature Review

The Concept of Entrepreneurial University

Several authors have tried to explain the phenomenon of entrepreneurial universities. The models developed by authors generally differentiate between external (Rothaermel et al. 2007; Fan et al., 2020) and internal factors (Rothaermel et al., 2007; Sànchez-Barrioluengo & Benneworth 2019) that influence the evolution of entrepreneurial university. The concept of the entrepreneurial university represents a fundamental redefinition of the role of universities, moving beyond their traditional role as creators and disseminators of knowledge. Instead, they have become dynamic entities that actively use their intellectual and human resources to contribute to social and economic progress on a global scale (Etzkowitz, 2020).

This transition is based on the recognition of universities as key drivers of innovation, fostering an entrepreneurial ethos that permeates all aspects of their operations, from academia to administration (Smith, 2023). Universities are now recognized as primary catalysts for knowledge diffusion and technology transfer, thereby catalyzing broader social and economic progress. This redefined role reinforces the active engagement of universities in mobilizing their academic researches for the common good, and affirms their potential to shape and drive socio-economic progress. In essence, the entrepreneurial university serves as a powerful force in steering progress and prosperity in knowledge-driven economies (Feola et al., 2021).

The concept of University-Industry Collaboration

UI collaboration refers to the interface between different components of the higher education institutions and industry, with the primary aim of promoting the exchange of knowledge and technology in order to enhance the knowledge base of organizations (Rossoni et al., 2023). The increase in collaborative activity is a direct result of converging pressures affecting both industry and academia in terms of declining financial fortunes of the both entities. In the corporate domain, these pressures stem from the relentless march of technological advancement, short product life cycles, and intensified global competition, all of which have fundamentally reshaped the competitive landscape for firms (Ankrah & Omar, 2015).

Collaboration between firms and academic researchers is often conceptualized as a higher-level process that encompasses many frequently studied constructs such as cooperation, teamwork and coordination (Bedwell et al., 2012). UI collaboration has also been suggested to encounter "cultural divide" challenge due differences in objectives, perspectives, motives and routines; therefore, such collaboration is inherently complex (Bäck & Kohtamäki, 2015).
Amabile et al. (2019) identified three key aspects of collaboration between academic researchers and business practitioners: Firstly, it involves individuals from different professions (academia and business). Secondly, it constitutes a collaboration among individuals or teams, rather than between entire organizations. Lastly, the collaborators are not necessarily all affiliated with the same organization. This study emphasizes the differentiation between individuals/teams and organizations, with a conceptual focus on the former. While organizations provide the collaboration's context, the motivation and maturity for such collaboration depend more on the unique characteristics of individual actors and teams rather than on general organizational processes.

This implies that researchers in universities do not necessarily require extensive structural changes or reforms from top management to engage with industry regarding their frontier research findings. Instead, the focus should be on fostering an environment that encourages and supports individual researchers or teams in establishing meaningful connections and collaborations with industry partners. By nurturing the specific skills, motivations, and collaborative capacities of these individuals and teams, universities departments can enhance their ability to effectively bridge the gap between academia and industry, leveraging their expertise to drive innovation and mutual benefit.

Factors affecting of UI Collaboration

Rajalo and Vadi (2017) underlined a research gap within UI collaboration literature concerning the insufficient understanding of implicit factors that determine the partnership process. In response, they propose an approach centered on two critical preconditions: motivation and absorptive capacity of both partners. By assessing the levels of these preconditions for both partners and analyzing the degree of alignment between partners, they aim to explain organizational specific attributes and variations perceived performance of responsibilities.
Absorptive capacity in this context refers to the dynamic capability of a firm to evaluate and utilize external knowledge based on prior knowledge or existing competencies, thereby facilitating the integration of new knowledge into the organization's practices, processes, and products. This entails not only the ability to recognize the value of external knowledge but also the agility to assimilate and apply it effectively within the firm's operations. Therefore, the better the match of preconditions between partners, the more likely that partners are able and willing to decide upon criteria for execution of collaboration. Therefore, a proposition is stated thus:

Proposition 1: Outcomes of university-industry collaborations in emerging economies is determined by the motivation and absorptive capacity of both parties towards wards integrating external knowledge into their respective operations.

Furthermore, Hou et al. (2021) conducted a longitudinal study involving 71 universities in China that had one or more co-applying patents with firms between 2007 and 2015, aiming to assess UI efficiency. The research revealed that various universities characteristics, including age, availability of MBA programs, number of faculties and staff, scientific research funds, and regional endowments, significantly influence the efficiency of university-industry collaboration. However, it was observed that universities specialized exclusively in science and engineering in China, comparable to the Federal University of Technology in Nigeria, exhibit inefficiencies in UI collaboration. Hence, the presence of specialized social science courses and MBA Programs in university of technology in Nigeria will not only broaden the scope of collaboration opportunities and enhance relevance to various sectors but also equip researchers and faculty members with business acumen and managerial skills. For instance the Hefei University of Technology, China has a faculty of economics which offers undergraduate and post-graduate courses in Economics, Financial Engineering, International Economic and Trade. Therefore, a proposition is stated thus:

Proposition 2: University characteristics will enhance the efficiency of University-Industry collaboration by broadening collaboration opportunities and scope.

In addition, geographical proximity is widely acknowledged as another important determinant of university-industry collaboration. This recognition is evident in various bodies of literature, encompassing research on localized knowledge spillovers, the systemic nature of knowledge and innovation, and the development of industrial clusters (Messeni and Murgia, 2020). The assumption is that firms that are located near universities may frequently collaborate with them and benefit from knowledge spillovers which occur when parties work collaboratively, exchange information, ideas, or expertise, leading to beneficial outcomes for the recipient firm.

Geographical proximity as highlighted by Morgan (2020), also facilitates the transmission of tacit knowledge, which is often person-embodied and context-dependent, making it challenging to acquire through market transactions and difficult to convey except through regular personal interactions within shared experiences. Particularly, proximity becomes crucial when knowledge spillovers occur informally and when there's information asymmetry between researchers and firms. The presence of multiple universities within a firm's regional vicinity not only increases the likelihood of interaction with nearby universities but also enhances the scope for knowledge spillovers. This phenomenon underscores why technology-driven products often find early adopters in southern Nigeria compared to core Northern states, where the concentration of universities and proximity facilitate greater knowledge exchange and innovation diffusion through academic institutions.

Geographical proximity universities holds varying degrees of importance depending on the type of research involved. According to Audretsch and Belitski, (2020), proximity may play a more significant role in accessing social science research compared to natural science research. This suggests that when it comes to UI collaboration, firms seeking to engage in social science research may benefit more from being located near universities than those focusing on natural science research. The emphasis on proximity for social science research highlights the importance of face-to-face interactions and local networking in the exchange of tacit knowledge and the development of collaborative relationships between academia and industry. In contrast, the nature of natural science research, which often relies on codified knowledge and formalized methodologies and laboratory facilities, may lessen the necessity for close proximity. Thus,

Proposition 3: The geographic location of firms in proximity to universities significantly impacts the frequency and effectiveness of university-industry collaboration, particularly in facilitating knowledge spillovers and the transmission of knowledge.

Finally, the emergence of Technology Transfer Offices (TTO) has been identified in the literature as a significant factor influencing university-industry (UI) collaboration (Chiș and Crișan, 2020; Yin et al., 2023). University researchers typically operate within the familiar confines of academia, and engaging with external stakeholders necessitates specialized social and business skills, which many researchers lack (Angiola et al., 2018).

TTO is a specialized entity tasked with identifying and supporting research within universities that hold potential for commercialization, as well as devising strategies for its exploitation. The primary goals of TTOs are to safeguard and commercialize the intellectual property (IP) generated by the university, facilitating technology diffusion and securing research funding.

Pronay et al. (2022) conducted a survey of 187 TTOs across 18 European nations and Japan to assess their effectiveness in facilitating the commercialization of research innovations through university-industry (UI) partnerships. The study revealed that the performance of TTOs in fostering UI collaboration is positively influenced by their marketing capabilities and social embeddedness. When TTOs are socially rooted and possess insights into a prevalent social and economic trends, they can establish extensive networks of stakeholders. This network can then be leveraged during the commercialization process of new technologies, thereby enhancing UI partnerships. This leads us to develop the last proposition thus:

Proposition 4: The establishment of Technology Transfer Offices can significantly enhance university-industry collaboration by promoting academic entrepreneurial activities in universities and improving innovative capabilities of firms.

Theoretical Foundation

UI collaboration is a complex and interdisciplinary phenomenon (Rajalo and Vadi, 2017). Institutional theory provides a lens to examine the diverse contexts of this construct, while giving researchers insights into the dynamics of these collaborations which often results in reconfiguration of structures, systems and strategies of both parties for optimal results. Moreover, institutional theory helps to explain the reasons why organizations display remarkably similar attributes and the semiotics behind conformity to new industry standards by existing firms. At the core of institutional theory are institutions, which Scott and Davis (2015 p.33) defined as "consisting of cognitive, normative, and regulative structures and activities that provide

stability and meaning to social behavior". Similarly, Meanwhile, Meyer et al. (2017 p.835) opined that "Institutions are social structures that reduce uncertainty by establishing a stable structure of interaction including conventions, codes of conduct, norms of behavior, laws, and contracts, which organizations incorporate to gain legitimacy, resources, stability, and enhanced survival prospects". At the core of institutional theory lie concepts of Legitimacy and Institutional Isomorphism. These notions suggest that organizations enhance their survival prospects by conforming to prevailing institutional norms, behaviors, and beliefs established by societal, governmental, and public entities. This conformity is sought to establish credibility with stakeholders and ensure alignment between organizational activities and the broader external environment's norms and expectations (Tzeng, 2018). In the context of UI collaborations, universities often engage in activities beyond their traditional academic pursuits, known as the "third mission," which encompasses activities such as technology transfer, innovation, and entrepreneurship. To legitimize their foray into these areas, universities may seek to align their actions with prevailing institutional norms and societal expectations regarding the role of higher education institutions in fostering innovation and economic development. For instance, universities may establish TTOs to facilitate the commercialization of research outcomes and foster collaboration with industry partners. By doing so, universities demonstrate their commitment to translating academic knowledge into tangible societal benefits and economic growth, thus enhancing their legitimacy in the eyes of various stakeholders, including government agencies, industry partners, and the public.

Furthermore, institutional isomorphism is provides additional incentives for organizations to conform to prevailing sentiments. Driven by any combination of three isomorphic forces—coercive, mimetic, and normative, organizations within particular domains progress toward conformity in both structure practice and behavior (Struckell et al., 2022). Coercive isomorphic forces are applied by important stakeholders such as government regulations, media, or funding conditions; mimetic isomorphic forces emerge under conditions of environmental uncertainty, which occur during the reorganization phase of an industry's life cycle where weak firms are forced to mimic successful models within the industry to ensure survival. Hence, uncertainty becomes a powerful force encouraging imitation and the further adoption of institutional rules and norms; and finally normative isomorphism is characterized by more exclusive membership that requires professional credentials, including licenses, higher education levels, and higher standards of conduct and operations. Organizations conform to professional norms, values, and beliefs prevalent in their field or industry, often enforced by professional associations, accrediting bodies, or academic institutions.

Hence, institutional theory provides a robust framework for this study in two ways. Firstly, it accentuates the critical importance of the environment where the university is located. In examining the evolution of universities towards an entrepreneurial orientation, it's imperative to consider the broader contextual factors that shape their behaviors and strategies. This includes regulatory frameworks, cultural norms, economic conditions, and the competitive landscape in which the university operates. For instance, how does the dearth of innovative firms in Nigeria or the country's predominantly factor-driven economy impact UI collaboration and consequently, the transition to an entrepreneurial university orientation? Does this lack of a vibrant entrepreneurial ecosystem hinder the development of entrepreneurial initiatives within universities? Alternatively, should these contextual factors provide additional incentives for Nigerian universities to become more entrepreneurial, serving as catalysts for universities to become embedded into the innovation system of industries? By addressing these questions, we can better understand the role of the external environment in shaping the direction and pace of UI collaboration.

Secondly, institutional theory highlights the significance of UI collaboration in fostering the emergence of an entrepreneurial university orientation. These collaborative efforts often leverage pre-existing activities and draw upon existing contexts to drive innovation and entrepreneurship within the university ecosystem. However, in the pursuit of becoming more entrepreneurial, the influence of the old system on the new is inevitable and can either facilitate or impede the transition process (Bruneel et al., 2010). Universities, being culturally complex organizations, are best understood as entities with multiple levels of control and loosely coupled activities. Within this organizational framework, different components of the university may exhibit distinct identities that shape normative behaviors and decision-making processes. From recent policy pronouncements by the Federal Government, it appears that Nigerian universities are gradually embarking on a journey towards autonomy. In this context, mimetic isomorphic forces are likely to play a significant role, as universities may look towards their counterparts in advanced economies as models to emulate and there are copious examples to emulate.

Conceptual Framework

Drawing on the synthesis of relevant literature, the framework emphasizes the interplay between institutional characteristics, absorptive capacity, motivation, and knowledge transfer mechanisms that underpin effective collaboration.

At the core of the framework is the recognition that motivation and absorptive capacity are foundational to successful UI partnerships. Universities must nurture an institutional culture that incentivizes researchers to engage with industry while ensuring they possess the cognitive and organizational capacity to integrate industrial insights into academic research and commercialization efforts. Without these fundamental conditions, UI collaborations risk remaining transactional rather than transformative.

Beyond individual motivation, institutional attributes significantly influence the effectiveness of UI engagement. The presence of diverse academic programs, particularly in business and social sciences, expands the knowledge base available for collaboration. These disciplines contribute essential skills such as strategic thinking, market analysis, and policy development, which are critical for entrepreneurial engagement. This perspective challenges the traditional emphasis on STEM fields alone, arguing that social science research also plays a strategic role in fostering innovation, particularly within the Nigerian context where socio-economic challenges demand interdisciplinary solutions.

Geographic proximity is another crucial factor which can facilitate the exchange of tacit knowledge and enabling more frequent and informal interactions between universities and industry. This proximity effect is especially relevant in Nigeria, where infrastructural constraints often limit opportunities for sustained collaboration across long distances. In particular, for social science research, physical closeness enhances the co-creation of knowledge by fostering iterative feedback loops between academic researchers and industry practitioners.

A critical institutional mechanism within this framework is the role of Technology Transfer Offices (TTOs). Positioned at the interface of academia and industry, TTOs function as conduits for knowledge commercialization, intellectual property management, and partnership facilitation. However, their effectiveness is not merely a function of their structural existence but is contingent on their social embeddedness and marketing capabilities. In the Nigerian context, where weak institutional support and bureaucratic inefficiencies often hinder innovation diffusion, TTOs must actively engage with industry networks and policy actors to solve these challenges.

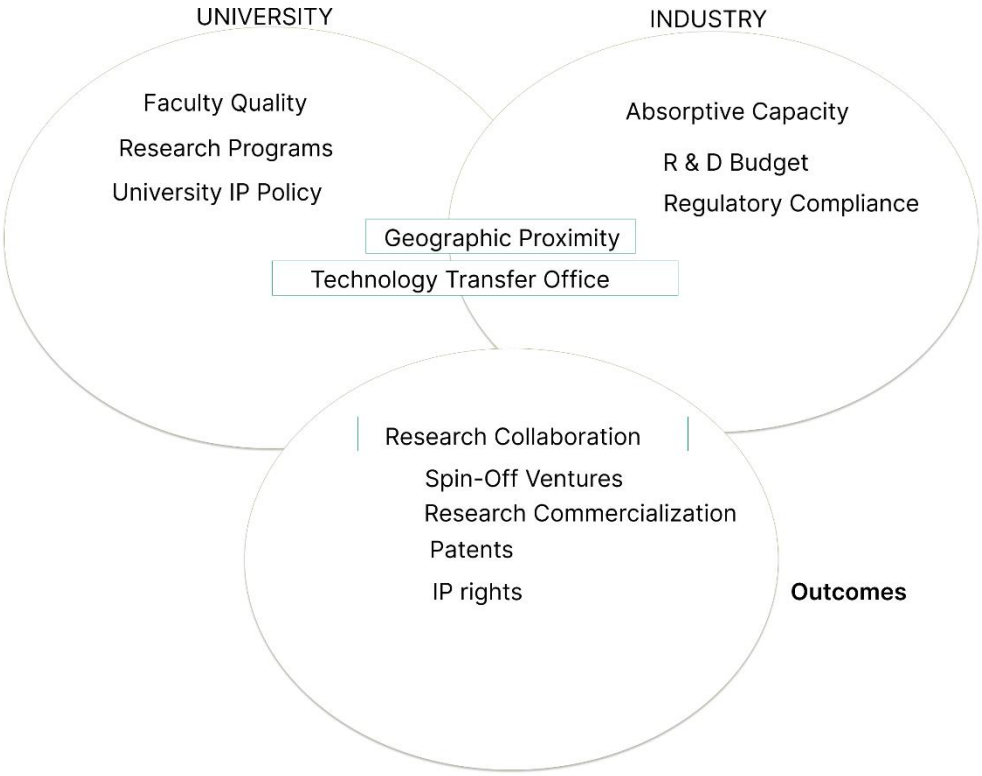

Figure 1.1 Conceptual Framework
Source: Authors, 2025

Conclusion and Implications for Nigerian Universities

This article has examined the relationship between university-industry (UI) collaborations and the emergence of entrepreneurial universities, emphasizing the Nigerian context. The proposed conceptual framework provides a structured lens through which the dynamics of these collaborations can be understood and leveraged to transform Nigerian universities into active drivers of innovation and economic development.

The implications for Nigerian universities are significant. As public funding continues to decline amid government cost-cutting measures, the traditional response of industrial actions, often leading to prolonged disruptions in academic activities, has proven largely ineffective in securing long-term financial sustainability. Repeated cycles of strikes, while intended to pressure the government into increasing funding, have instead weakened institutional stability, eroded public trust, and disrupted the academic calendar. The

overreliance on government subventions, without a strategic shift toward alternative funding sources, leaves universities vulnerable to fiscal instability.

A paradigm shift is necessary. Nigerian universities must proactively engage with industry to diversify revenue streams and reduce dependence on government allocations. Strengthening Technology Transfer Offices (TTOs) and fostering research commercialization can provide universities with new funding avenues while enhancing their relevance in national development. Institutions that fail to cultivate effective partnerships with industry risk stagnation, while those that embrace entrepreneurial strategies will be better positioned to navigate financial constraints.

Ultimately, the transformation of Nigerian universities into entrepreneurial institutions hinges on their ability to move beyond traditional academic structures and embrace a more market-oriented, innovation-driven model. This requires institutional reforms**,** policy support, and a cultural shift that encourages academics to engage with industry, commercialize research, and view collaboration as a strategic necessity rather than an ancillary activity. If Nigerian universities are to remain competitive in the global knowledge economy, they must redefine their role within the national innovation ecosystem. This entails not only producing knowledge but ensuring that such knowledge translates into tangible socio-economic benefits.

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