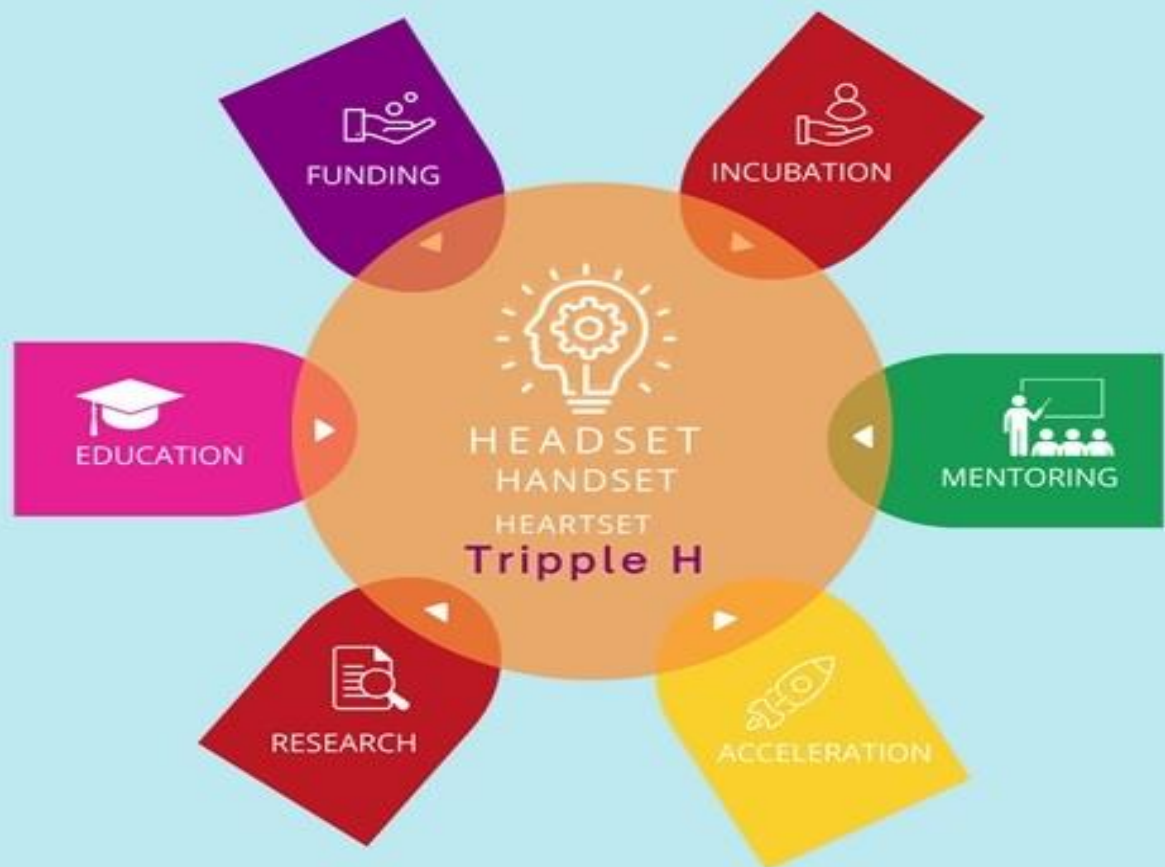


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Exploring the Entrepreneurial Capability of Nigerian Universities for Future Roles: Study of Nigerian Universities

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Abstract

In an era where universities are expected to play a key role in driving innovation and economic growth, this study focuses on the entrepreneurial capabilities of academics and academic departments at a foremost university in the Southwestern part of Nigeria. By surveying 298 faculty members from 79 departments, the research sheds light on the level of entrepreneurial engagement and the support system for entrepreneurship within the university. The findings reveal that there are limited entrepreneurial activities among academics and departments, primarily due to the lack of entrepreneurial skills among academics, and perceived inadequacies in university support systems and infrastructure. Individual and institutional barriers further hinder entrepreneurial endeavours. This study contributes to the literature on African Academic Entrepreneurship by providing empirical evidence on the challenges and opportunities facing universities in Africa. The results underscore the need for interventions to enhance entrepreneurial activities in higher education institutions, and offer recommendations for policy development and program implementation to foster entrepreneurship in academia.

Key Words: *Academic Entrepreneurship, Departmental Entrepreneurial Capabilities, University Entrepreneurship Support System*

Introduction

In the future, African universities will need to focus on entrepreneurship and industry collaboration for research with commercial value. The industry and universities' relationship will deepen, with the industry playing roles as customers, partners, and competitors. With limited funding in some countries like Nigeria, universities must adapt by hosting multiple conflicting structures, combining business and social services. They will strengthen relationships with industry through joint programmes and research, becoming innovation hubs. Commercializing research will be a key funding source. A strategic plan for this must be established and communicated effectively throughout the institution, with commitment from staff and students.

The decision of universities to become entrepreneurial will be supported by strong leaders and committed administrators who will provide an enabling environment, institutional support, and infrastructure to assist faculty members in overcoming constraints such as insufficient rewards, time constraints, and funding difficulties. This shift will involve giving equal importance to inventions, innovations, and patent developments for promotion as publications.

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The lack of innovation and engagement in entrepreneurial activities in African universities has been blamed on the limited capacity of academics and higher education institutions (Bamiro, 2004; Sá, 2014; Bogoro, 2015; Odetunde, 2022; Athreye et al., 2023). Studies show that only a small percentage of Nigerian academics produce research for societal development, with low rates of commercialization. Additionally, less than 60% of academics publish their research in credible outlets, and only about 28% develop research products for societal use, with less than 10% commercializing their outcomes (Oduwaiye, Owolabi, & Onasanya, 2009; OECD, 2013). Furthermore, only 3% of Nigerian businesses sourced their innovation from universities between 2010 and 2017 (Fadeyi et al., 2019). These challenges underscore the importance of African universities enhancing their entrepreneurial capabilities and collaborating with industry and government to have a meaningful impact on society. Universities, thus, play a vital role in promoting mechanisms for innovation and entrepreneurship, and they must fulfill this responsibility diligently (Kruger & Steyn, 2024). They act as the central hub for creativity and advancement by establishing strong knowledge ecosystems that promote the growth of skills and active participation, stimulating innovation (Cobben et al., 2022).

The literature, however, suggests that African universities face various barriers to research, innovation, and entrepreneurship, such as weak institutional capability, limited funding, and a lack of entrepreneurial capabilities (Bogoro, 2015). Despite efforts to enhance research capacities and infrastructure in Nigeria, research commercialization and entrepreneurship engagement among academics remain at a low level. Universities are expected to have a more significant role in the future, particularly in entrepreneurial engagement. Consequently, there is a need to focus on improving the entrepreneurial capabilities of academics, departments, and the university. For this reason, this study examines the entrepreneurial capabilities of a foremost Nigerian University as a case study. The focus will be on academic entrepreneurial capability and practices, departmental entrepreneurial orientation, and the support system for entrepreneurship within the university with four research questions exploring these activities. By addressing these aspects, the study aims to highlight the challenges and opportunities for enhancing entrepreneurial activities at the Nigerian universities and potentially offer insights into strategies for promoting innovation and entrepreneurship in African higher education institutions.

Literature Review

Academic Entrepreneurship

Academic entrepreneurship leverages cutting-edge knowledge from academic institutions to drive entrepreneurial activities, thereby improving the effectiveness of translating research outcomes into practical applications. It is widely recognized as a key catalyst for advancing industries and fostering economic growth (Galati et al., 2020; Gieure et al., 2020; Kong et al., 2020). Abreu and Grinevich (2013) and Meng et al. (2019) also conceptualised it as encompassing the creation and administration of novel ventures that are rooted in technology or knowledge derived from academic research. This practice involves utilizing intellectual property and knowledge acquired in academic environments to generate economic value and commercial possibilities. This process is done alongside traditional academic duties of teaching and research. Academic entrepreneurship aligns with the idea of using research knowledge to start businesses, contributing to the broader mission of universities to create value through teaching, research, and technology transfer.

Scholars have outlined various academic entrepreneurial activities which include providing seminars and training, consulting for industry, creating goods or services, obtaining research funding, collaborating with businesses, engaging in knowledge transfer, forming joint ventures, assisting in spin-off firms, establishing incubators, and conducting contract research and patenting (Odetunde, 2022; Mirani & Yusof, 2016; Ojo et al., 2022). These activities involve a blend of teaching, research, and business creation, leading to the concept of academic entrepreneurial engagement as a comprehensive term to encompass these diverse activities. The aim is to bridge academia, industry, and innovation through various forms of engagement and partnership, highlighting the multifaceted role that academics can play in driving economic growth and innovation.

Academic Entrepreneurial Capability (AEC)

Scholars have examined entrepreneurial capability from various viewpoints in the literature, with Ge and Zhao (2021) and Hu et al. (2022) defining it as the skills, experiences, or resources that enable entrepreneurs to identify opportunities, lead teams, and create value. Academic entrepreneurial capabilities are seen as possessing specific traits needed by academics to identify opportunities and leverage research outcomes. These capabilities, including innovation tendencies and motivation, drive academics to pursue and exploit research opportunities. These capabilities are crucial for academic

entrepreneurs to establish new ventures successfully, whether within or outside of the university setting.

Academic Entrepreneurial Innovativeness (AEI)

Innovation refers to the development or enhancement of concepts, ideas, products, procedures, or technology (Barringer & Ireland, 2019). It is defined as the adoption of a novel or unique behavior or idea, representing an exceptional concept and an opportunity to discover new solutions to specific problems (Tian et al., 2020). Within an organizational context, innovativeness is the tendency to innovate and introduce new products or enter unexplored markets by combining a strategic mindset with innovative processes or behaviors, thereby fostering the generation of new ideas and transforming them into significant commercial prospects (Barringer & Ireland, 2019; Beugelsdijk & Welzel, 2018). At an individual level, it represents the capacity of entrepreneurs to identify opportunities and generate fresh ideas to capitalize on them effectively. Mueller and Thomas (2001) emphasize the importance of innovativeness as a precursor of entrepreneurial behavior.

Academic entrepreneurial innovativeness involves academics engaging in innovation and entrepreneurial practices by seeking and exploiting opportunities in their academic roles, requiring them to be innovative and entrepreneurial. Previous studies have shown a strong connection between innovation and entrepreneurship, with entrepreneurs being more innovative individuals compared to non-entrepreneurs. The ability to innovate distinguishes academic entrepreneurs from others, and innovativeness is considered an important entrepreneurial capability. Multiple studies have demonstrated a positive correlation between innovativeness and entrepreneurial engagement, with innovativeness influencing entrepreneurial intentions (e.g., Ahmed, Nor'Aini, & Ilias, 2010; Hamidi, Wennberg, & Berglund, 2008; Gurol & Atsan, 2006).

Academic Entrepreneurial Motivation (AEM)

Wang et al. (2021) define motivation as the endogenous driving force that motivates people to act. Edelman et al. (2010) see motivation as the stimulus that turns intention into action, especially in entrepreneurial contexts. Zhang, Wang, and Zhao (2022) define academic entrepreneurial motivation as the incentives that motivate scholars to engage in academic entrepreneurial activities, and it involves the intensity and persistence of goal-oriented behaviour. Academic entrepreneurial motivation, therefore, drives intention and action in setting up a business. Intrinsic motivation stems from

personal satisfaction in accomplishing tasks, while extrinsic motivation is driven by external benefits like financial gain and recognition. In essence, motivation is the driving force behind the behavior, particularly in entrepreneurial endeavors.

In some cases, intrinsic and extrinsic motivations can either work against each other or complement each other when it comes to engaging in entrepreneurial behaviour (Bowles & Polania-Reyes, 2012). Generally, intrinsic motivations tend to be stronger than extrinsic motivations in determining academic entrepreneurship. Academic entrepreneurship is influenced by a combination of intrinsic and extrinsic motives, such as personal reasons, the desire to obtain resources for research, and the goal of solving societal issues through research knowledge. Some academics are driven by non-monetary incentives, such as independence, prestige, and the desire to bring research to the market, while others are more motivated by financial gains (Azagra-Caro et al. 2008; D'Este & Perkmann, 2011). Studies have shown that academics who engage with industry typically have research-related motivations rather than financial motives (D'Este & Perkmann, 2011). Financial considerations become more prominent when academics are involved in spinning off research into commercial ventures, with the need for increased personal income and research funding being significant factors (Nilsson et al. 2010; Hayter, 2011). In essence, both intrinsic and extrinsic motivations play a role in academic entrepreneurship, with different academics being driven by different combinations of these motivations.

Research has demonstrated that the context in which entrepreneurial behaviour occurs can impact intrinsic and extrinsic motivations, with social norms hindering or enhancing these motivations (Bercovitz & Feldman, 2008). Entrepreneurial university environments are more likely to motivate and facilitate academic entrepreneurship among academics compared to non-entrepreneurial university environments. Individuals embedded in contexts that emphasize academic entrepreneurship are more likely to engage in entrepreneurial activities. Factors such as intrinsic and extrinsic motivations influence academic entrepreneurial behaviours, with stronger motivations and more entrepreneurial facilitating environments increasing the likelihood of engagement in entrepreneurial behaviour, while individuals lacking motivation and supportive environments are unlikely to engage in entrepreneurial activities.

Academic Entrepreneurial Orientation (AEO)

Entrepreneurial orientation, originating from the organizational context, encompasses processes, practices, philosophy, and decision-making activities driving innovation and firm performance. Introduced by Miller in 1983, it includes proactiveness, risk-taking, and innovativeness. Proactiveness involves anticipating and acting on future needs, while risk-taking entails engaging in profitable high-risk projects. Innovativeness supports new ideas, experimentation, and creative processes leading to new ventures or products. Entrepreneurship involves taking risks crucial in decision contexts like entering new markets. Entrepreneurial orientation provides firms with a foundation for strategic decision-making. Research has traditionally focused on how it impacts company performance, but recent studies explore individual entrepreneurial orientation (Robinson & Stubberud, 2014). Studies found correlations between individual EO and business success measures (e.g., Chien, 2014; Ismail et al., 2015; Vogelsang, 2015).

The study focuses on addressing gaps in the application of entrepreneurial orientation in academic entrepreneurial engagement, particularly in university settings. While entrepreneurial orientation has been widely studied in business organizations, its application in academic settings has been limited (Dal-Soto et al., 2021). The relevance of dimensions like proactiveness, risk taking, and innovativeness to academic entrepreneurship is emphasized. Proactiveness is important for anticipating research needs and market changes, while risk-taking is necessary for committing resources to unpredictable ventures. Innovativeness plays a crucial role in recognizing and pursuing new opportunities and is a key determinant of entrepreneurial action. The study highlights the need for increased application of entrepreneurial orientation in academic settings, given the rise in university-based entrepreneurial ventures. Overall, the dimensions of entrepreneurial orientation are essential for promoting academic entrepreneurship through innovation, risk-taking, and proactive engagement in entrepreneurial activities (Dianez-Gonzalez & Camelo-Ordaz, 2016).

While, entrepreneurial orientation was originally believed to consist of risk-taking, innovativeness, and proactiveness, additional dimensions of autonomy and competitive aggressiveness have been added by some researchers (Lumpkin & Dess, 1996; Dess & Lumpkin, 2005). Recent studies tend to focus on the original 3 dimensions rather than the added ones, as autonomy and competitive aggressiveness, may not hold up at the individual level due to learned behaviours that develop over time or in more competitive environments.

Opportunity recognition is a key aspect of entrepreneurship, with entrepreneurs being characterized by their ability to identify and pursue opportunities. These opportunities can involve introducing new products or services to the market, improving existing offerings, or capitalizing on underserved markets. Recognizing and exploiting these opportunities is a cognitive process that requires entrepreneurial orientation and the ability to push research discoveries into the marketplace. High levels of entrepreneurial orientation have been linked to increased opportunity recognition and creation. Therefore, recognizing and exploiting opportunities is a fundamental activity that is included as a component of entrepreneurial orientation in this study. By acknowledging the importance of opportunity recognition within entrepreneurial orientation, this research aims to further understand the role it plays in successful entrepreneurship.

Academic Entrepreneurial Intention (AEInt)

Intention is crucial in starting a business, as it represents an individual's willingness and effort toward becoming an entrepreneur. Ajzen (1991) defined intention as perseverance and effort towards a specific behaviour, while Thompson (2009) describes it as the conscious conviction and planning to start a business in the future. Prodan and Drnovsek (2010) highlight intention as a precursor to entrepreneurial behaviour and business incorporation. Krueger, Reilly, and Carsrud (2000) emphasize that entrepreneurship is a deliberate effort, not a reflex, and Bird (1988) suggests that entrepreneurial intention predicts the decision to become an entrepreneur. Therefore, success in entrepreneurship depends on the level of tenacity and effort individuals are willing to invest in starting and growing a business. It is not a matter of chance, but a result of intentional planning and execution. Understanding and prioritizing entrepreneurial intention is essential in the entrepreneurial process and in achieving business success.

Academic entrepreneurial intention refers to academics' inclination to start businesses based on their research outcomes (Fernandez-Perez et al., 2015; Yu & Lu, 2023). Entrepreneurial intention is crucial for academics' involvement in business creation, research commercialisation, and knowledge transfer. It represents academic entrepreneurs' attention and behaviour, resulting in a subjective psychological state in which they decide whether to establish spin-offs, licensing, technology transfer, or other comparable activities (Zhang, Wang, & Zhao, 2022). Despite having the necessary skills, individuals may not succeed in entrepreneurship without a strong intention to do so. Scholars who possess entrepreneurial potential may not pursue business opportunities without the intention to do so. The

significance of intention in business initiation has been widely studied in entrepreneurship research as highlighted by Prodan and Drnovsek (2010). However, there is a lack of research applying this concept to academic contexts. Therefore, this study aims to fill this gap by examining the role of entrepreneurial intention in academic business engagement. By exploring this relationship, we can gain a deeper understanding of the importance of intention in academic entrepreneurship.

Departmental Entrepreneurial Orientation and Engagement (DEOE)

The need for universities, especially public ones, has increased due to a decline in funding. To access extra funding, universities are increasingly turning towards commercializing research and technology transfer. Research has focused on the interaction between universities and industry, but entrepreneurial activities often start at the department level. Rasmussen, Mosey, and Wright (2014) argue that departmental entrepreneurship is crucial for university spin-off creation. Therefore, attention should be given to the entrepreneurial engagement of departments, which influences the overall entrepreneurship of the university. Departmental entrepreneurial orientation refers to the culture of entrepreneurship within a department and its support for entrepreneurial endeavors among academics.

Researchers have focused on the entrepreneurial orientation of academic departments as a key factor in predicting entrepreneurial success in universities. The ENTRE-U scale, developed from ENTRESALE by Todorovic, Naughton, and Guild (2011), to measure this orientation, identifies research mobilization, unconventionality, industry collaboration, and university policies as key dimensions of entrepreneurial departments. These dimensions distinguish entrepreneurial departments from others and have been found to predict departmental commercialisation activity, particularly spinout generation.

Despite the success of ENTRE-U in predicting entrepreneurial activity, there is a lack of research on its application in the study of university entrepreneurship. Given the pivotal role of academic departments in university entrepreneurial activities, further studies are needed to assess the relevance of ENTRE-U in understanding departmental enterprise. This scale offers a valuable tool for assessing and fostering entrepreneurial orientation in academic departments, with potential benefits for university innovation and commercialisation efforts.

University Entrepreneurship Support System (UESS)

Universities are increasingly being required to be more entrepreneurial due to various factors such as the need for additional sources of finance, the importance of knowledge in society, and the drive for regional and national development. While some universities excel in this area, the key lies in their internal mechanisms and facilities. Research indicates that a supportive environment within universities, which includes a positive entrepreneurial culture, institutional support systems, information and resource availability, and effective management, can foster academic entrepreneurship (Hesse, 2014; Makiela, 2017). Gaspar Pacheco et al. (2024) have shown that incubator programs, support initiatives, and proof-of-concept programmes within universities can significantly enhance academic entrepreneurship and benefit their institutions. Measures like sensitization campaigns, advisory services, advocacy efforts, and educational support also play a crucial role in preparing academic entrepreneurs to successfully develop and commercialize their research outcomes.

Infrastructure like technology transfer offices and entrepreneurship professors also play a key role in supporting academic entrepreneurs (Guerrero & Urbano, 2012). A university's commitment to commercialize knowledge and technology through spin-off formation is crucial, along with specific rules and norms to encourage intellectual property exploitation (Astebro et al., 2012). Exclusive licenses and patent rights, as well as incentive structures, can further support academic entrepreneurs in starting and growing their businesses. Overall, a supportive environment and resources are essential in fostering academic entrepreneurship within universities. Overall, a comprehensive entrepreneurial support structure within universities is essential for fostering entrepreneurship.

The European Commission and OECD (2013) developed the HEInnovate framework based on the best practices of entrepreneurial universities. This self-assessment tool allows universities to evaluate themselves on seven key statements that define an entrepreneurial university. Institutions can assess themselves on a scale of 1-10 and identify areas for improvement. HEInnovate is designed to support higher education institutions in managing cultural and institutional change for innovation and entrepreneurship. It covers areas such as leadership, organizational capacity, teaching, entrepreneurship support, knowledge exchange, internationalization, and impact measurement. Users rate statements in each dimension to determine strengths and weaknesses. The tool provides feedback

and personalized learning materials based on the assessment results. Users can focus on relevant dimensions to drive improvement in their institution.

The HEInnovate framework has been proven to be a valuable tool in evaluating the entrepreneurial nature of universities across various cultures. It has guided universities seeking to enhance their internal frameworks to promote entrepreneurship. Studies in countries such as Palestine, Austria, and Indonesia have demonstrated varying levels of implementation of the framework, with some universities still in the early stages of development (Sperrer, Muller, & Soos, 2016; Beehive, 2017). Despite some progress, there are still areas for improvement identified in the institutions studied. The European Commission (2014) reports a growing number of institutions utilizing HEInnovate to assess and enhance their entrepreneurial capabilities, with over 450 institutions using the framework by July 2014.

Research Methodology

Participants and Data Collection Procedure

Data were collected from 298 academic staff members across status and 12 institutes/colleges/faculties and 79 departments in the university through cross sectional design using a quantitative and qualitative survey instrument. Data collections across the departments were done through personal visits to the members of academic staff in their offices. The data collection exercise lasted for about 10 weeks with about 4 visits to each of the academics.

Measures

Academic Entrepreneurial Innovation (AEI): Measure of innovation tendency was taken with a 16-item scale Odetunde (2022) adapted from Scott and Bruce's (1994) innovative work behaviour scale, Sherman's (1999) employee innovation behaviour scale and Odetunde's (2012) employee innovativeness scale. Cronbach alphas reported for these three scales are 0.89, 0.78, and 0.92 respectively.

Academic Entrepreneurial Motivation (AEM): Academic entrepreneurial motivation was assessed with a 21-item scale (Odetunde 2022), comprising 7 subscales of 3 items each derived from academic entrepreneurial motivation literature. Characteristics assessed include personal motives, motivation

for research resources, funding for research, learning, financial benefits, peer recognition, and altruism, and community development.

Academic Entrepreneurial Orientation (AEO): A measure of academic entrepreneurial orientation was taken with a 12-item scale assessing three dimensions of the variables: risk-taking (4 items), proactiveness (4 items), and opportunity recognition (4 items) with Cronbach alpha ranging between 0.765 and 0.800 (Odetunde, 2022).

Academic Entrepreneurial Intention (AEInt): The construct was assessed using a modified version of Krueger et al.'s (2000) 3-item entrepreneurial intention scale. Two other dimensions not covered by Krueger were identified in the literature and were adopted from Zampetakis and Moustakis's (2006) and Wu's (2009) entrepreneurial intention scales. The scale captures the likelihood of finding a firm to benefit from one's research, as well as the intention to start an academic business for the purpose of commercializing one's research. Cronbach alpha for 5-item scale 0.817.

Academic Entrepreneurial Engagement (AEE): This construct was assessed using De Silva et al.'s (2012) 5 dimensions, which include training, consultancy, company formation, venture creation, industry partnerships, teaching, research, and programme development. Widely used in academic studies on entrepreneurship (e.g., Athreye et al., 2023; Odetunde, 2022, Mirani and Yusof, 2016), its subscales show strong internal consistency, with Cronbach alphas between 0.701 and 0.913.

Departmental Entrepreneurial Orientation and Engagement (DEOE) were measured using an adapted version of the ENTRE-U scale (Todorovic, McNaughton, & Guild, 2011), consisting of 12 items in three subscales: Research Mobilization, Unconventionality, and Industry Collaboration, with Cronbach alpha ranging from 0.750 to 0.859. The scale was modified from the original to better capture the entrepreneurial orientation and engagement of university departments, by removing the University Policies subscale and selecting the top four items with the highest factor loadings and standardized regression coefficients from each remaining subscale. This approach aimed to reduce item-response bias and provide a more comprehensive measure of entrepreneurship within universities' institutional frameworks.

University Entrepreneurship Support System (UESS): An assessment of the university entrepreneurship support system was conducted using a 21-item scale based on the OECD's (2013) Guiding Framework for Entrepreneurial Universities. The framework consists of seven areas: Leadership and Governance, Organizational Capability, People and Incentives, Entrepreneurship Development in Teaching and Learning, Pathways for Entrepreneurs, University-Business/External Relationships for Knowledge Exchange, and Measuring the Impact of the Entrepreneurial University. To reduce response bias, only three items from each dimension were used in the study. A 7-point Likert response scale was adopted for all the scales.

Data Analysis and Discussion of Findings

To analyze the data, a series of mixed data analyses were conducted. Descriptive analysis, principally frequency distribution, was employed to analyse the demographic and entrepreneurial characteristics of the academics. Content analysis was adopted to analyse the qualitative data and integrated with the quantitative data analysis to provide specific and additional details, and to complement the quantitative data (Creswell, 2014).

Descriptive Analysis of Demographic Characteristics of Respondents

Table 1: Description of Characteristics of Respondents

Variable		Frequency	%	Cumulative %
Gender				
Valid	Male	211	70.8	70.8
	Female	87	29.2	100.0
	Total	298	100.0	
Level of Education				
Valid	MSc/MPhil	152	51.0	51.0
	PhD	146	49.0	100.0
	Total	298	100.0	
Position in University				
Valid	Early Career Academics	153	51.3	51.3
	Middle Career	116	38.9	90.2
	Late Career Academics	29	9.8	100.0
Academics		298	100.0	
Discipline				
Valid	STEM	150	50.3	50.3
	HASS	148	49.7	100.0
	Total	298	100.0	

Source: Primary data analyzed on SPSS

As can be seen from Table 1, the majority of the academic respondents are males (70.8%), and fair distribution among MSc/MA/MPhil, etc. (51.0%) and doctoral degree holders (49.0%) and early career academics (51.3%) and middle career academics (38.9%), and STEM (50.3%) and HASS (49.7%) academics. Thus, aside from the gender composition, all other demographics were fairly well represented in the data.

Correlations Analyses

Table 2: Mean scores, Standard Deviation, and correlations among variables

SN	Variable	Means	SD	1	2	3	4	5	6	7	8
1.	Demo	1.29	0.46	1							
2.	AEI	5.56	0.95	-.004	1						
3.	AEM	5.53	0.98	.037	.412**	1					
4.	AEO	5.36	0.90	-.002	.376**	.469**	1				
5.	DEO	4.88	1.11	-.009	.310**	.283**	.265**	1			
6.	UESS	4.92	1.34	-.074	.249**	.317**	.332**	.561**	1		
7.	AEInt	5.07	1.12	-.009	.397**	.578**	.537**	.387**	.322**	1	
8.	AEE	3.78	1.46	.076	.311**	.212**	.234**	.452**	.300**	.409**	1

** $p < .001$, N = 298

Notes: Demographic Variables (Demo), AEI (Academic Entrepreneurial Innovation), AEM (Academic Entrepreneurial Motivation), AEO (Academic Entrepreneurial Orientation), DEO (Departmental Entrepreneurial Orientation), UESS (University Entrepreneurial Support System), AEInt (Academic Entrepreneurial Intention), AEE (Academic Entrepreneurial Engagement).

The descriptive analysis in Table 2 shows that the mean scores for the academic entrepreneurial capability factors are relatively high, ranging between 5.36 and 5.56, indicating that participants generally possess a high level of entrepreneurial capability. The standard deviations for these factors are also relatively low, ranging between 0.90 and 0.98, suggesting that there is not a large amount of variability in the responses. The mean scores for departmental entrepreneurship and university support system are slightly lower, but still relatively high at 4.88 and 4.92 respectively. The standard deviations for these factors are higher than the academic entrepreneurial capability factors, indicating more variability in the responses for these variables. The correlation analysis reveals that there are moderate positive correlations between the three entrepreneurial capability factors (AEO, AEI, AEM) and academic entrepreneurial intention (AEInt). The correlations range from $r = .397$ to $r = .578$, indicating that as participants' entrepreneurial capability increases, so does their intention to engage in academic entrepreneurship. There are also significant positive correlations between departmental entrepreneurial orientation and university support systems with academic entrepreneurial intention. These correlations range from $r = .387$ to $r = .452$ for departmental entrepreneurship and $r = .300$ to

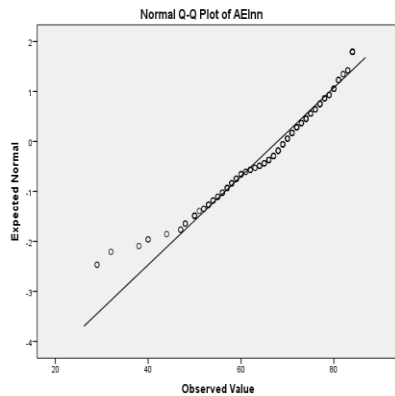
$r=.322$ for the university support system, indicating that a supportive departmental and institutional environment can positively influence academic entrepreneurial intention. Additionally, academic entrepreneurial intention is significantly correlated with academic entrepreneurial engagement, with a correlation of $r=.409$, suggesting that individuals who intend to engage in academic entrepreneurship are also likely to be actively involved in entrepreneurial activities.

Findings of the Research Questions

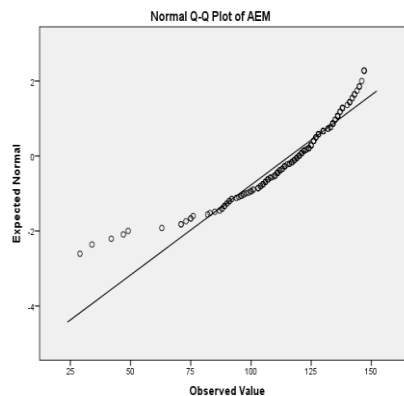
Analyses and Findings

Parametric statistics were used to analyse the data due to the large sample size (>30 to 40) (Pallant, 2007). The normality of distribution tests and Q-Q plots (Harpe, 2015) indicated that the data were normally distributed and did not contain extreme scores that would impact the use of mean and standard deviation.

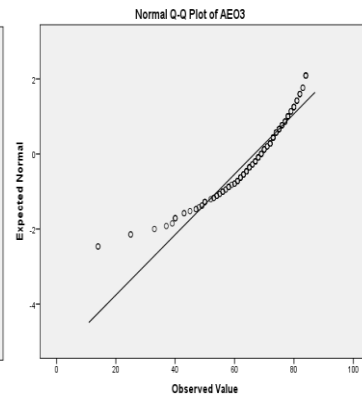
(1) Normal Q-Q Plot of AEInn



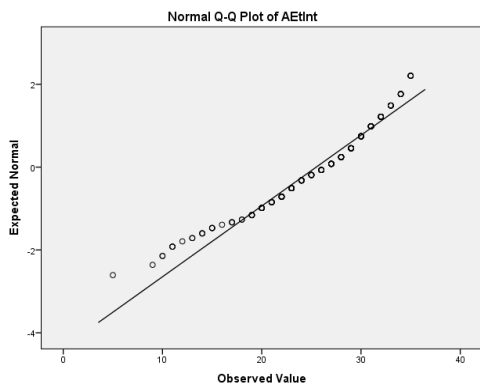
(2) Normal Q-Q Plot of AEM



(3) Normal Q-Q Plot of AEO



(4) Normal Q-Q Plot of AEInt



(5) Normal Q-Q Plot of AEE

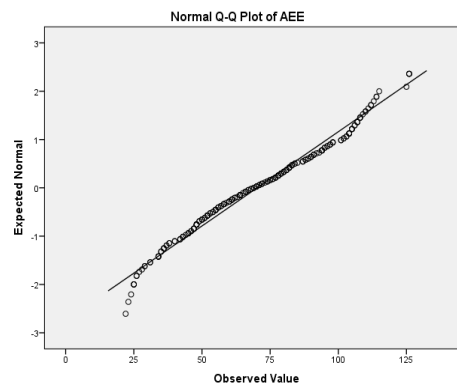


Fig. 1: Q-Q Plots to check the normality of distribution of data on AECs and AEE

Findings on Research Question 1

Table 2 shows that the mean scores ranged between 6 for Academic Entrepreneurial Innovativeness (AEI) and Academic Entrepreneurial Motivation (AEM) on a scale of 1 (To no extent) to 7 (To a very large extent). However, Academic Entrepreneurial Orientation (AEO), Academic Entrepreneurial Intention (AEInt), and Academic Entrepreneurial Engagement (AEE) scores are around 5 with low standard deviations and clustering around means. The findings suggest that academics at the university show high levels of entrepreneurial innovativeness and motivation, as indicated by mean scores of 6 on these factors. However, they exhibit moderate levels of entrepreneurial orientation, intention, and engagement, with mean scores around 5 and low standard deviations. This indicates that while academics may possess entrepreneurial capability, they may not be fully engaged in entrepreneurial practices or have concrete intentions to pursue entrepreneurial activities. It suggests there is potential for further development and support in fostering entrepreneurial behaviour among academics at the university.

Research Question 2

Research question 2 uses quantitative and qualitative data to explore academic departments' entrepreneurial orientation and practices. The quantitative analysis indicates a mean score of approximately 5 on the entrepreneurial orientation scale and the qualitative data shows that 48.32% of respondents believe their departments engage in some entrepreneurial practices, with only 17.45% providing specific information. Out of 298 respondents, only 52 mentioned entrepreneurial practices, revealing 8 identified practices in Table 3. The findings suggest that there is only partial agreement among academics within academic departments regarding their entrepreneurial orientation. While the quantitative analysis indicates a moderate level of entrepreneurial orientation, the qualitative data reveals that less than half of respondents believe their departments engage in entrepreneurial practices. Additionally, only a small percentage of respondents provided specific information about these practices, indicating a lack of awareness or visibility of entrepreneurial activities within the departments. The limited number of respondents who mentioned entrepreneurial practices and the small number of identified practices suggest that there may be a need for greater emphasis on and support for entrepreneurship within academic departments.

Table 3. Entrepreneurial engagement of academic departments of the university

SN	Departmental Entrepreneurial Practices
1.	Fieldwork assistance/Internship programme for students
2.	Floating of new academic and professional programmes
3.	Conducting academic and professional conferences and seminars
4.	Practical industrial exercises for students
5.	Products /Equipment development for self and industrial use
6.	Collaboration with industry
7.	Train-the-trainer engagement
8.	Consultancy services for the industry

Research Question 3

Research question 3 examines the perceived availability of a support system to promote entrepreneurial engagement among academics in the university. Both quantitative and qualitative data were analysed. There is a relatively high level of perceived availability of support systems to promote entrepreneurial engagement among academics in the university, as evidenced by the mean score of approximately 5.00 on a 7-point agreement scale. However, there is not a clear consensus among academics, as the qualitative responses show that 50.83% agree that these support systems are available while 49.17% disagree. This suggests that while some academics perceive the university support systems to be effective in promoting entrepreneurship engagement, there is still a significant portion who do not share this perception. Table 4 displays the support systems available within the institution to promote entrepreneurial engagement in the university.

Table 4. List of research, innovation, and entrepreneurship support systems available in the university

SN	University Support System and Infrastructures for Innovation and Entrepreneurship
1.	University Consultancy Service
2.	Research Grant through the University Central Research Committee (CRC)
3.	Research Grant through Government Institution - Tertiary Education Trust Fund (TETFUND))
4.	University Financial Support for Conference Attendance
5.	Research Management Office (RMO)
6.	Innovation & Technology Management Office (ITMO)
7.	Entrepreneurship and Skill Development Centre (ESDC)

Further analysis of the qualitative data to examine if the support facilities were effective in promoting entrepreneurial engagement among academics shows that a significant portion of academics feel that the support facilities designed to promote entrepreneurial engagement may not be as effective as intended. Only 40.60% of academics provided information on the effectiveness of these facilities,

suggesting a lack of awareness. Additionally, the majority of academics (62.81%) believe that the support facilities have some desired effect, but a notable percentage (37.19%) think that they have a great effect. This shows a divide in opinions regarding the extent to which these facilities are successful in promoting entrepreneurial engagement. The data also reveals that a majority of academics (60.33%) feel that the support facilities are underutilized, indicating a potential discrepancy between the availability of these resources and their actual usage. On the other hand, 39.67% believe that the facilities are well utilized, suggesting that there may be differing perceptions of the effectiveness of these resources. Overall, these findings highlight the need for further exploration and evaluation of the support facilities to better understand their impact on promoting entrepreneurial engagement among academics. Additional research and assessment may help identify factors contributing to the perceived effectiveness or lack thereof, ultimately leading to improvements in the support provided to academics in this area.

4.3.5 Research Question 4:

Qualitative analysis of Research Question 4 in Table 5 revealed that 85 academics (28.52%) responded. Five individual and 7 institutional factors hindering entrepreneurial practices were identified, with time constraints and heavy workloads being the top constraints. Other individual obstacles included a lack of knowledge and skills, difficulty balancing academic and industry demands, and financial issues. Institutional barriers included a "publish or perish" culture, lack of support systems, inadequate training, and weak leadership orientation towards entrepreneurship. Therefore, university academics face constraints from individual and institutional factors on entrepreneurship.

Table 5: Individual and Institutional Factors Constraining innovation and entrepreneurial engagement of the academics

SN	Individual Factors	Respondents %	Institutional Factors	Respondents %
1.	Time constraints	44.71	Heavy workload	43.53
2.	Lack of knowledge of academic entrepreneurship	23.53	University culture of 'publish' or 'perish'	18.82
3.	Lack of entrepreneurial skills	15.29	Inadequate support system for entrepreneurship in the university	12.94
4.	Difficulty in integrating academic duties with industrial research demands and practices	12.94	Lack of entrepreneurship training for academics	10.59
5.	Financial constraints to conduct research	3.53	Lack of entrepreneurship sensitization by management	8.24
6.			Weak entrepreneurial orientation of university leadership	3.53
7.			Lack of institutional incentives	2.35

*Note N=85. Constraints arranged in order of magnitude of occurrence

Discussion of Findings

The study at a Nigerian university focused on academic entrepreneurship capability, departmental support, and institutional infrastructure. Four research questions were explored, with the findings discussed below.

Research Question 1

The research findings suggest that while many academics have innovative thinking and motivation for entrepreneurship, they lack the entrepreneurial orientation and intention needed to engage in entrepreneurial activities successfully. Being innovative and motivated is important, but insufficient for starting a business. To succeed as an academic entrepreneur, one must be proactive, willing to take risks and have the intention to establish and grow a business. Individual factors, rather than organizational ones, play a significant role in determining the success of academic entrepreneurship, according to various studies (e.g., D'Este & Patel, 2007; Ambos et al., 2008; Clarysse, Tartari, & Salter, 2011). Personal characteristics have a greater impact on entrepreneurial engagements and the commercialization of university knowledge among academics in the UK.

Previous studies have shown a connection between entrepreneurial orientation and commercialization, with some arguing that simply possessing entrepreneurial capabilities is not enough for success. It is suggested that the intention to start a venture is crucial for success. Academics with entrepreneurial potential may not become entrepreneurs without the necessary intention. This lack of intention may lead to a shortage of human capital in African universities for academic entrepreneurship. Studies by Vogelsang (2015), Bolton (2012), Ismail et al. (2009), and Krueger et al. (2000) all support these ideas.

Research Question 2

This study aimed to investigate the extent of innovation and entrepreneurial practices among academics and academic departments. Results showed that only a small number of academics and departments were involved in such practices. The few academics in business engaged in various fields like cosmetics, chemicals, estate management, training, consultancy, and community services. Additionally, only a minority of academic departments were found to be entrepreneurially oriented. Most academics believed their departments did not encourage innovation and entrepreneurship. The low response rate to qualitative questions may be attributed to the ease of completing quantitative

surveys, lack of understanding of academic entrepreneurship, and limited engagement in entrepreneurial activities. This aligns with the overall lack of capabilities among academics to engage in entrepreneurial practices.

However, only a few academics are involved in businesses such as training, consultancy services, and community service. It is unclear if these businesses are directly related to their research, as the data collection did not address this. Private discussions with academics who own businesses reveal that while some are related to their fields, they are not spin-offs from their research. These businesses are private and not affiliated with their university. This aligns with previous concerns about African universities' ability to engage with industry, as well as research showing that academics in Nigerian universities primarily conduct research for promotion and career advancement, with limited commercialisation of their results (Bamiro, 2004; Bogoro, 2015; Sá, 2014; Oduwaiye, Owolabi, & Onasanya, 2009; OECD, 2013).

The analysis of academic departments' entrepreneurial orientation and engagement in entrepreneurial activities revealed that they are minimally entrepreneurially oriented and engage in such practices. While quantitative data showed marginal entrepreneurial orientation, qualitative responses were more emphatic with most academics stating their departments are not entrepreneurially oriented. Reasons cited for this lack of orientation included limited resources, time constraints, lack of visionary leadership, and low awareness of academic entrepreneurship. Some departments do engage in entrepreneurial practices like industry collaboration, conferences, product development, and consultancy services. However, most academics believe their departments do not encourage or support innovation and entrepreneurial engagement due to funding constraints, lack of cohesion, and poor reward systems. The study by Todorovic, McNaughton, and Guild (2011) suggests that entrepreneurially oriented departments stand out for their active engagement in research mobilization, industry collaboration, and community involvement.

Research Question 3

The research examined the availability of institutional frameworks to support entrepreneurial engagement in the university and their impact on academics. Quantitative data indicated that these facilities are only somewhat available within the institution. Qualitative data reflected a divided opinion among academics regarding the availability and utilization of these facilities, with some agreeing and

others disagreeing. The qualitative data also suggested that while some academics believe the facilities are being used and are positively impacting their entrepreneurial engagement and innovation, others may not be aware of their existence and may not be utilizing them.

The split opinions among academics may be attributed to a lack of education and information about the facilities, leading to a potential lack of utilization. Additionally, there may be inadequacies in the facilities themselves, making them easily accessible to some and not to others. Overall, the study concluded that the institutional framework and facilities supporting entrepreneurial engagement in the university are inadequate, and there is a need for improved education, information dissemination, and sensitization among academics to enhance their utilization and impact on innovation and entrepreneurship.

The literature identifies inadequate institutional framework and facilities as hindering African universities' entrepreneurial engagement. Concerns about the capacity of African universities to engage in academic entrepreneurship often revolve around the perceived lack of institutional frameworks and facilities. Bogoro (2015) listed weak institutional capabilities, such as poor research infrastructure, as discouraging entrepreneurial efforts in Nigerian universities. The lack of appropriate systems and institutional frameworks has impeded entrepreneurship in African higher education. Resource-rich environments are highlighted as enabling universities to be entrepreneurial, with a comprehensive support structure that includes a positive entrepreneurial climate, institutional support systems, and infrastructural facilities being crucial (De Silva, 2012; Etzkowitz & Leydesdorff, 2000; Siegel et al., 2004).

To foster entrepreneurial engagement, universities must establish appropriate institutional environments with adequate support systems, infrastructures, and frameworks. This includes providing necessary resources, information, and education and sensitization efforts. Strong and effective leadership is also essential in creating an entrepreneurial culture within universities. By implementing these measures, Nigerian and African universities can work towards becoming more entrepreneurial institutions.

Research Question 4

The question of what factors constrain academics from being innovative and entrepreneurial was examined through qualitative analysis, revealing both individual and institutional constraints. Individual constraints included a lack of time, knowledge, skills, and financial resources, as well as difficulty integrating academic duties with industry demands. Institutional constraints encompassed work overload, a 'publish or perish' university culture, a lack of support structures and policies for entrepreneurship, and inadequate training and incentives for academics. These findings align with existing literature indicating that perceived barriers hinder individuals from acting on entrepreneurial intentions, such as time constraints, conflicting academic and business responsibilities, and insufficient institutional support and incentives (Ajzen, 2012; Carsrud & Brännback, 2011; De Silva, 2012).

The identified constraints reflect challenges faced by academics worldwide and raise concerns about the entrepreneurial potential of African academics and universities. Factors such as limited resources, weak research capabilities, and lack of entrepreneurial competencies and support systems inhibit entrepreneurial engagement among academics on the continent. The study sheds light on the complex interplay of individual and institutional factors that impede academic innovation and entrepreneurship, highlighting the need for targeted interventions to address these barriers and foster a more entrepreneurial culture within academic institutions.

Conclusion and Recommendations

The study focused on addressing concerns about African universities' limited ability to engage in academic entrepreneurship due to a perceived lack of entrepreneurial capability and support systems. Four research questions were explored to achieve the research aim. Firstly, the study revealed that while academics are innovative and motivated, they lack the necessary entrepreneurial orientation and intention to engage in entrepreneurial activities. This hinders the translation of research with commercial value into entrepreneurial action. Secondly, findings indicated that only a few academics are involved in businesses, which are often unrelated to their research or university. The lack of entrepreneurial orientation among academics and departments further hinders academic entrepreneurship.

Thirdly, the study highlighted inadequate institutional frameworks and facilities to support entrepreneurial engagement in universities. The lack of information, education, and awareness about

these facilities further impedes entrepreneurial activities among academics. Lastly, the study found that most academic departments are not entrepreneurially oriented and do not support entrepreneurial practices. Overall, the lack of entrepreneurial orientation and intention among academics, coupled with limited institutional support, hinders successful academic entrepreneurship in African universities.

Fourth, the barriers to innovation and entrepreneurial practices among academics are attributed to both individual and institutional factors. Individual hindrances include time constraints, lack of entrepreneurship education, skills, knowledge, and competencies, along with difficulties in balancing academic duties with industrial research demands and financial constraints. Institutional barriers include work overload, a university culture emphasizing publication over entrepreneurial pursuits, a lack of support systems and policies, insufficient training in entrepreneurship, inadequate information and sensitization by university management, a lack of entrepreneurial leadership, and limited institutional incentives.

Overall, the study reveals that academics and academic departments lack essential entrepreneurial skills, specifically in areas of entrepreneurial orientation and intention. While there are some institutional frameworks and resources in place to support entrepreneurial endeavors, they are often insufficient and underutilized by academics who are facing various individual and institutional constraints hindering their entrepreneurial engagement.

Contributions of the Study

This study has made significant contributions to the research on African academic entrepreneurship by increasing awareness, knowledge, and understanding in a field that lacks sufficient research. By highlighting areas of entrepreneurial deficiencies in academics and academic departments, the study presents opportunities for correction and improvement. Additionally, the study provides empirical evidence for the lack of entrepreneurial capabilities in Nigerian and African universities, supporting concerns about their effectiveness in academic entrepreneurship.

Practically, the study emphasizes the importance of personal entrepreneurial attributes, institutional support, and overcoming constraints for academics and departments to be entrepreneurial. By identifying gaps in innovation and entrepreneurial capabilities, the study offers insights for policy

formulation, capacity building, and intervention programmes. This research aims to guide the development of entrepreneurship-supportive institutional frameworks to enhance innovation and entrepreneurial engagement in academics and departments, ultimately fostering the growth of entrepreneurial universities in Nigeria and Africa.

Limitations of the Study

The study was limited by its focus on a single university and a small number of participating academics. The findings could have differed if a larger and more diverse sample across departments and universities were included. Due to these limitations, the results should be considered tentative and not generalized beyond the specific university studied. Further research with larger, more representative samples from other Nigerian and African universities is needed for more generalizable conclusions.

Recommendation

To enhance academic entrepreneurship, 28.52% of academics provided suggestions on how to improve entrepreneurial capabilities. Their recommendations are included in the findings and recommendations presented in Table 6.

Table 6: Suggestions of academics to improve and facilitate innovation and entrepreneurial capabilities and engagement of academics and academic departments in the university

SN	SUGGESTIONS BY ACADEMICS
1	Encouragement of active participation of academic staff members in industry
2	Departmental and university support for researchers to commercialise their research output
3	Liberalising rules of engagement in entrepreneurship
4	Provision of entrepreneurship support facilities, equipment
5	Promotion of entrepreneurship culture in the university
6	Reduction or elimination of bureaucratic bottlenecks in the university
7	Restructuring of curriculum in the university to emphasis practice as much as knowledge
8	Establishment of the academic department of entrepreneurship in the university
9	Institution of Entrepreneurship and Innovation awards
10	Provision of more financial support, grants, resources, and facilities for research
11	Promotion of university-industry collaboration
12	Provision of necessary incentives for academics
13	Provision of entrepreneurship education, orientation to change people's mind
14	The government should formulate policies to promote entrepreneurial universities
15	The university should promote interdisciplinary research

*Note N=85

Academics

Individual academics play a central role in entrepreneurial activities and must take responsibility for developing their skills in business practices and entrepreneurship. This can be achieved through attending seminars, workshops, and conferences to acquire knowledge and competencies in starting and managing businesses, career development, innovation, technology, and building industry relationships. These efforts will greatly enhance their entrepreneurial skill development.

University

Universities looking to become entrepreneurial should focus on creating a supportive internal environment, with university management playing a key role in providing necessary support and infrastructure. Recommendations include establishing institute support systems to facilitate entrepreneurial engagement among academics and departments. Capacity development programmes such as entrepreneurship education and skills training can be organized periodically for academics to enhance their entrepreneurial engagement. Lack of training and support may hinder academics from adopting innovative practices (Hodges et al., 2020), so the involvement of accomplished entrepreneurial professors and other experts can anchor such programmes. The university can also help academics connect with industry players to establish networks and further their entrepreneurial skills.

Additionally, the university can implement internal mentorship programmes to pair less experienced academics with senior mentors who can guide entrepreneurial engagement. Younger academics are more likely to be influenced by peer pressure and may benefit from learning opportunities through mentorship (Aschhoff & Grimpe, 2011). Providing mentorship can help motivate academics to engage in enterprise activities and increase knowledge sharing among colleagues (Wang & Noe, 2010).

To mitigate individual and institutional constraints, the university should offer adequate entrepreneurship support structures and necessary resources for academics. Financial support can help with research and commercialisation efforts while instituting rewards for best innovation and research outcomes can motivate academics to participate in impact research and innovation. Providing research leave and additional financial support can help alleviate time constraints and workload issues faced by academics.

To foster collaboration with industries, the university can establish partnership programmes involving staff exchanges between academia and industry. This can enhance academics' understanding of industry research needs and lead to more commercializable research outcomes. Industry leaders can also serve as adjunct lecturers and contribute to curriculum development to align academic programmes with industrial needs. The exchange programme can help to bridge the cultural gap between universities and the industry.

The university can help academics overcome the pressure to 'publish or perish' by valuing invention, innovation, and patent development as much as publications for career advancement. By emphasizing the importance of commercial value in research and incentivizing innovation, academics may be encouraged to conduct research with both academic and commercial significance.

Furthermore, instituting academic programmes in entrepreneurship can cultivate entrepreneurial skills and mindsets among students and faculty members, leading to advocates of innovation and entrepreneurship within the university and beyond. Such programmes are essential for promoting transformative change and progress, as no university can truly embody entrepreneurship without dedicated academic initiatives focused on entrepreneurship and innovation.

To enhance innovation and entrepreneurship, the university can establish a technology transfer office and an industrial liaison office, along with business incubation centres and science parks. These entities will collaborate to identify research projects with commercial potential, facilitate technology transfer, and support the growth of innovation-driven companies. Skilled personnel will be needed to find academic partners, assess commercial viability, and manage intellectual property. Staff will also support company formation, incubation, and other related tasks.

University management should prioritize facilitating entrepreneurial engagement and commercialisation of research products by offering incentives and support structures. They should provide comprehensive information to inform academics of available entrepreneurship support, efforts, and programmes within the institution.

Government

The government's role in promoting entrepreneurship in universities, as seen through the impact of the Bayh-Dole Act in the US, has led to the successful commercialization of research findings and increased patent numbers. This legal framework allows universities to own patents resulting from their research, leading to technology transfer and the creation of startups. This model has been adopted by many countries, showcasing its benefits. To replicate this success, it is recommended that the Nigerian government adopt a similar framework, including mandatory professional practice leave for academics to gain industry experience. This would foster entrepreneurial activities and innovation within Nigerian universities.

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