Building a Sustainable and Innovation-Driven Economy in Nigeria: Academic Entrepreneurship Perspective

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Transitioning from resource-dependent society to a more advanced economy requires the development of highly sophisticated knowledge society. Evidences from developed and newly industrializing economies have consistently shown that knowledge generation and exploitation is critical to technological and socio-economic progress of nations. Unfortunately, latecomer economies, particularly in Africa, have paid little or no attention to innovation resulting in high unemployment and pervasive poverty. For that reasons, these economies need to deliberately invest in knowledge production and commercialisation to stimulate innovation and employment. This puts higher education and research institutions (HERIs) at the forefront of creating knowledge-based and innovation-driven economies, as they have the potential not only to produce top quality human capital and expand the frontiers of knowledge but also to continuously replenishing the market with innovative products, processes and services to satisfy societal needs. However, turning the knowledge outputs to products, processes and services demands that deliberate initiatives and strategies be put in place in these institutions to foster research commercialisation through academic entrepreneurship. Therefore, this paper examined faculties’ perception of university context in fostering academic entrepreneurship. Primary data was collected from two hundred and twenty-nine (229) faculties in thirteen selected universities across South-Western Nigeria. The standardized academic entrepreneurship perception scale was adapted to obtain the data. Data collected were analysed using frequencies, component factor analysis and binary logistic regression. The results showed that faculties’ positive perception of university characteristics (OR=1.78, CI 95%, p < 0.05) and innovation support system (OR=1.93, CI 99%, p < 0.01) were positively related and significant to academic entrepreneurship. However, faculties’ perception of strategic resources (OR=0.811, CI 95%, p > 0.52) did not show significant relationship to academic entrepreneurship. Other key results included poor perception on the
reward system for innovation, as greater emphasis was placed on publication, rather than
research commercialisation. The paper concludes that university administrators and
government should create and strengthen positive ambience for innovation in Nigerian
university system. Also, there is urgent need to initiate institutional re-configuration,
individual re-orientation and adopt the triple-helix approach in R&D management to support
Nigerian innovation system.

**Keywords:** Academic entrepreneurship, SDGs, Innovations, triple-helix, Intellectual
property, Nigeria, Africa

### INTRODUCTION

In today’s globalized economy characterized by stiff competition and constant changes,
knowledge and innovation are twin drivers of sustainable development. Innovation thrives in
knowledge domain and knowledge provides critical inputs to innovation. Therefore, knowledge
is a dominant mover in the innovation space. The ability to acquire, deploy and diffuse new
knowledge is crucial to local, regional and national competitiveness. The difference between
developed and developing countries lies in their ability to create positive ambience for new
knowledge production, utilization, and exploitation (Kim, 2013). For instance, developed
countries were able to transition from agrarian societies to highly industrialized ones in the 19th
century through knowledge production and commercialisation. They master the deployment of
scientific and technological breakthroughs to solve practical development problems. Even in the
current dispensation of knowledge economy, they still play a leading role in economic renewals
through knowledge applications. Also, the newly industrializing economies of Asia achieved
diverse developmental objectives through catching-up, stage-skipping and quantum-leaping
innovation strategies. The strategies involve heavy investment in knowledge production and
innovation facilities, building technology and innovation capability and creating positive
ambience for technopreneuship to thrive. The results are obvious today as they have become
choice destinations for foreign direct investment. Today, the culture of innovation in both
developed and newly industrializing economies is growing more rapidly. Most innovative
companies globally and companies with top global brands come from these nations (Brand
Finance, 2018; BCG, 2018). In fact, most firms that appear on the globalfinancebrand ranking
report in 2018 are essentially companies with huge investment in knowledge generation and
exploitation (Brand Finance, 2018). Out of 500 companies that featured in the report, there is
none from Africa. Some of the firms from emerging economies that featured among the top ten
brands include Samsung (S. Korea) and ICSB (China) which ranked 4th and 10th respectively. On
the most innovative companies in 2018, only Samsung and Alibaba made the first ten with 5th
and 10th positions respectively. The dominant strategies which mark-out those firms include
dedicated resources, speed of opportunity exploitation, smart risk taking potential, investment in
data and ability to secure top talents. Historically, China and S. Korea have deliberately and
consistently invested heavily in building virile culture of innovation through critical investment in human capital, science and technology (S&T), innovation infrastructure and superhighways. The latecomer’ economies of Africa are faced with diverse developmental challenges ranging from infrastructural decay, huge unemployment, poverty, low technology capability, to incessant conflicts and political instability. One main solution to these challenges is the promotion of socio-economic prosperity of her citizens. For this to happen, the economy has to be diversified away from resource dependence to enhanced value-addition in the key sectors. This brings the issue of knowledge generation, exploitation and innovation to the forefront of policy debate. Since positive relationship exists between knowledge creation and innovation which also correlate with economic growth/development (Myteka, 2000; Global Innovation Index, 2012; 2017; 2018), the emphasis now is on stimulating the culture of innovation not only in the real sector of the economy but also in the knowledge institutions. For instance, little success was recorded across Africa on the attainment of Millennium Development Goals (MDGs) because of late recognition of the need to drive the goals with requisite scientific, technological and innovative capabilities (AAS, 2018). How can hunger be banished without the application of scientific and technological solutions in agriculture? Therefore, to attain the sustainable development goals (SDGs), latecomer economies should of necessity deploy scientific, technological and innovative solutions. This places knowledge institutions at the centre of strategic economic planning by stimulating innovation culture among faculties and students. The argument for stimulating innovation culture in knowledge institutions hinges on the knowledge spill-over theory of entrepreneurship and entrepreneurial universities as advanced by Etzkowitz, (1998) and Acs et al. (2013). The latter postulated that knowledge institutions possess capabilities to create talents and tangible research results capable of transforming the society or economy. This is evident in the fact that most cutting-edge technologies and innovations transforming economic landscape today are developed by eminent researchers (faculty and students) from research laboratories, private or public. The Silicon Valley in the USA known as the ‘innovation machine’ has its origin in knowledge commercialisation from the surrounding universities and research institutes. The Valley is now home to thousands of high-tech firms including google and facebook adding thousands of jobs to California every year with huge socio-economic benefits. This proves that latecomer’s economies could be improved, if deliberate efforts are made to promote innovation culture in their system, including knowledge institutions. Most jobs of the future depend entirely on the knowledge inputs from the research organisations. For instance nanotechnology, biotechnology, robotics and Artificial intelligence emerged from the application of high-tech which requires top-notch scientific knowledge. These technologies are deployed in the management of natural resources for optimal productivity and innovations. For the latecomer economies to catch-up with development frontiers, there is a need to understand and imbibe the culture of innovation. This implies heavy investment in training and education, developing accessible and modern information infrastructure, using intensive research & development (R&D) to boost innovation, and focusing on economic incentives and a favorable institutional regime conducive to knowledge-oriented investments (Asongu, 2015).
This paper delves into the system thinking approach and examines how the perceptions of the faculties about the entrepreneurial context of their universities affect/influence their entrepreneurship potential. The argument is that where the context provides sufficient support for the occurrence of a phenomenon, it is a matter of time for it to become widespread. For instance, the Bayh-Dole Act in the USA changed the perception of researchers, to a greater extent that USA witnessed huge patent upsurge (AUTM, 1998). In addition, the need to fulfill the ‘third mission’ objective has mandated universities and research organisations to be more responsive to societal challenges beyond teaching and research engagements. Today, universities take pride in not only the successes of their alumni, but also in the number of patent disclosures, filed, granted, licensed and the spin-off created. To that extent, some African institutions need to embrace this development to transform its society in this era of Artificial Intelligence (AI) driven global competitiveness. In additions, this paper addresses the literature gap on the perceptions of African faculties on the entrepreneurial ambience of their universities. The paper is divided into five sections: introduction, background literature, research methods, key results and discussion and policy recommendations.

PERSPECTIVES FROM THE LITERATURE

Recent explosion of entrepreneurial activities and the prominent role of knowledge in the ‘new economy’ have prompted a shift in societal expectations from universities, particularly research commercialisation and contribution to job and wealth creation for development (Todorovic, McNaughton and Guild, 2005). Mowery and Shane (2002) and Siyanbola (2014; 2019) argued that universities need to become entrepreneurial, requiring a change in their approach to governance and administration, for them to fulfill this role more effectively. In addition, knowledge institutions are pressured to foster economic development of the region where they are located (fulfil the ‘third mission’ objective) through internal re-organisation and diverse strategies. Parts of these strategies include the establishment of technology incubators and science parks near or on university campuses, strengthening of technology transfer offices and creating virile entrepreneurship programmes across disciplines. These strategies are important because for university to be entrepreneurial, different skill sets are required and faculty members need re-orientation to that effect. Therefore, approach to university administration and management requires substantial change towards technology transfer activities and faculty members need to embrace new approach for successful technology transfer and commercialisation (Mowery and Shane, 2002). This gave rise to incidence of academic entrepreneurship in the developed and newly-industrialising economies. Cantaragiu (2012) defined academic entrepreneurship as ‘a process of transferring knowledge between the university and the external environment, in order to produce economic and social value, both for external actors and for members of the academia, and in which at least a member of academia maintains a primary role’ This definition strikes three important aspect of academic entrepreneurship, first, knowledge transfer activities are embedded, second, at least a faculty
member is involved and lastly, economic activities are created and benefits accrued from them. This suggests that members of academic community are key to spin-off formation, or value creation from research outputs. Similarly, De Silva, Uyarra and Oakey (2012) defined academic entrepreneurship more specifically as a process of translating knowledge outputs into commercial products/process while Ramaciotti and Rizzo (2014) viewed academic spin-off as new firms whose business is to translate knowledge developed within universities into commercialisable products. New knowledge is useful for transforming economic landscape by introducing new products and services to the economy. As a result, both direct and indirect jobs are created for the masses and some key sustainable development goals are achieved. In fact, Etzkowitz (2001) articulated three important reasons for strong interest in supporting policies aimed at stimulating knowledge transfer to firms around virtually all western universities. These reasons are: first, to transfer new knowledge from the universities to productive firms to stimulate innovation and development; second, the pursuit of revenue for universities to advance knowledge and third, the positive externalities on the local area.

Moreover, universities and other research organisations constitute major sources of human capital development, knowledge production through research and development and new technologies that are useful for industrial purposes. Universities produce the necessary human and technical skills required for the new economic order in a knowledge economy through specialised training and directed efforts. Knowledge institutions through robust science programme contributes to the key functions of knowledge production, knowledge transmission and knowledge transfer. The high industry expenditure on R&D in America, Europe and newly-industrialising economies is an indication of increasing role of knowledge in production. Similarly, increased emphasis on the creation of skilled workers is necessary for building technological capabilities required for industrial and technological development.

Universities with great emphasis on knowledge transfer for industrial applications is referred to as entrepreneurial universities. These universities can significantly contribute to increase the competitiveness of national economies, by providing an effective channel for technology transfer and a quick application of innovative discoveries in the society (O’Shea et al., 2005; Rasmussen and Gulbrandesen, 2006; Rasmussen, 2011). Creating robust entrepreneurial environment through appropriate instruments in these universities has been advanced to produce legitimate results (Lundqvist and Williams 2013). The entrepreneurial environments act beyond being transactional technology transfer offices (TTOs) for innovations through their ability to legitimize and connect with internal and external university resources, including students as key drivers. In relation to the cases considered in their study, they further suggested that government and university-level initiatives helped legitimize, enhance and integrate resources already in existence. This indicates that entrepreneurial capabilities at universities fostering venture creation primarily are to be initiated and supported from within universities. Some of the key motivations for researchers and scientists are what counts for promotion and whether entrepreneurial activities also count for advancement. Therefore, to a very great extent, the way
Although entrepreneurial consciousness of professors is important to determine their interest in entrepreneurial activities, for example, the incentive provided by Bayh-Dole Act in 1980 increased technology transfer in the US research system. After the enactment of this Act, USA witnessed large patent generations and transfer to the industry (AUTM, 1998, 2018). Since that time, similar incentive schemes have been formulated across Europe, Asia, Australia and other emerging economies. In Nigeria, parts of the initiatives established to encourage industry-academia linkage and academic entrepreneurship are the creation of technology transfer offices in the universities and research institutes. NOTAP (2019) assessment report showed that not many of these universities operated their TTOs to the best advantage of the institutions due to inadequate capabilities and resources. Despite the shortcomings, the potential exists in each university to promote jobs and wealth creation through technology transfer and commercialization.

**Summary of the Review**

Given the wide array of literature on the entrepreneurial universities, academic entrepreneurship and technology transfer in the universities, it is important to emphasize that the perception of the faculties on the readiness of their institutions to embrace entrepreneurial activities could determine their interest and propensity. In countries that have already embraced the concepts, the target would be on improving the process to increase technology commercialization for industrial renewals. However, in the developing countries where research funding is limited and awareness about university fostering innovation is low, great effort is required to propagate the idea. In Nigeria, the idea has been around for decades now, at least universities and some research institutions have established intellectual property and technology transfer offices since 2007 but the efficiency of these offices in fostering innovations in the knowledge institutions is yet to be ascertained. In addition, how many faculties are aware of these offices and their roles, including the extent to which they are being patronized? The literature also pointed to other facilities and incentives that could stimulate innovations in the knowledge institutions such as incubators, science parks, IP policy, innovation fund and, or venture capital. Therefore, the impression of the faculties on the ability of the university to create conducive ambience for innovation could go a long way to determine motivation and interest.

**RESEARCH METHODS**

Given the homogenous nature of faculties and department in Nigerian university system and ability to generate tangible research results, the study focused essentially on the departments of science, technology and engineering. Adelowo (2018) detailed methods adopted in the selection of universities and appropriate representative sample. Primary data collected from two hundred and twenty-nine (229) faculties in thirteen universities were analysed using descriptive and inferential statistics. The perceptions of the faculty on the entrepreneurial context of their universities were captured using an adapted research instrument developed by the Stevens Institute of Technology USA (Christodoulatos, Lechler and Furnbach, 2012). The
entrepreneurial perception of the universities by the constituents; faculty and students, does have effects on whether they would be interested or likely engage in such activities. The questionnaire considered the general characteristics of the institution as to whether it is favourably disposed to academic entrepreneurship or not. The perceptions of the faculties on the supports and preconditions, process and strategy for academic entrepreneurship were evaluated using fifteen questionnaire items. Some of these items included 1. education and research activities at my university are aimed at the integration of technological and market knowledge into curriculum, 2. collaborative research with industry and other universities for the creation of intellectual property are supported in my universities, 3. technical inventions based on research results are often commercialised in my university (see Table 4.2 for details). These items were measured using five points likert-rating scale from strongly disagree to strongly agree (1 to 5). The fifteen items were later subjected to data reduction strategy using Principal Component Analysis (PCA) to summarize the entire items. The PCA produced three major factors, which were re-named based on item loading (Henson and Roberts, 2006; Williams, Brown and Onsman, 2010). In total, the PCA analysis showed statistically significant Barlett’s Test of Sphericity of (940.213, df = 105, p˂0.000), and the Keiser-Meyer-Olkin index of 0.86 which was regarded as ‘meritorious’ (using the thresholds proposed by Kaiser, 1974). The analysis identified three factors with Eigenvalues greater than 1.0, and accounting for 54.1% of the variance. The ‘elbow’ in the scree plot and ‘principle of parsimony’ (Handfield and Melnyk, 1998) suggested retaining the three factors. The first factor dimension is dominant, accounting for 36.38% of the variance, while others accounted for 10.16% and 7.56%. In addition, these factors followed theoretical richness as they represented faculties’ perception of entrepreneurial richness of the universities’ contexts. Factor one had eight strong items loading and was named perception of faculties on the university’s innovation support system. These items were: technical inventions based on research results are often commercialised in my university, sufficient funds are available for AE initiative, sufficient rewards and compensations are offered for AE initiative, AE and IP seminar/workshop are offered for students and faculty at my university, my university provides sufficient resources for spin off companies, a support network of industry partners, investor and regulators helps my university' faculty students in their AE activities, an incentive system motivates faculty and students at my university to participate in AE initiative and there are well established/structured technology transfer and commercialisation processes within my university. Factor two had four items loading and was tagged ‘perception on university entrepreneurial characteristics’. These items were: education activities at my university are aimed at the integration of technological and market knowledge into curriculum, research activities at my university are focused on scientific breakthroughs and technological advances to create economic values, and collaborative research with industry and other universities for the creation of intellectual property are supported in my universities. The third and last factor had two items loading which were: my university has dedicated resources to quickly exploit evolving innovation opportunities and effective administrative functions exist to improve AE processes. This was named as perception on university’s entrepreneurial resources.
For the purpose of regression analysis, the three extracted factors were used as independent variables while the age and qualifications of the faculties served as control variables. The dependent variable for the study was whether the faculty had intellectual property or not. The item was captured using binary variable of 1 for ‘Yes’ and 0 for ‘No’, hence the choice of binary logistic regression. Moreover, faculties provided information on the entrepreneurial activities of their departments and universities, in addition to the traditional teaching and research endeavours. The results of the analysis are presented and discussed in the next section of this paper.

RESULTS AND DISCUSSIONS

The results of the study is presented in three parts; the first part presents and discusses background information of the faculty surveyed; the second part gives clear discussion of the perceptions of the faculties on the entrepreneurial contexts of their universities and the empirical data reduction strategy results; and the third part discusses the results of the binary logistic regression analysis.

Background Information of the Faculty Members

Majority of the faculties surveyed are male gender (77.2%) while only few of them are females (see Figure 1). This presents prevailing circumstances across Nigerian universities. The human capacity assessment conducted by the Federal Ministry of Education in 2010 reflected similar trend. The skewness towards male gender becomes more pronounced as the department of consideration tended to science, technology and engineering programme (Adelowo, 2018). Gender has been found to be a key factor determining entrepreneurial propensity among students of higher institutions (Wang and Wong, 2004; Siyanbola et al, 2012 and Adelowo et al., 2018; Olofinyehun et al., 2018). These empirical evidences have supported male gender being more entrepreneurial than their female counterpart (Corley and Gaughan, 2005; Link et al., 2007).

Figure 1: Gender distribution of Faculty Members (N=229)
Age is another important factor that could have significant effect on entrepreneurial inclination of the respondents. About 70% of the faculties are between the ages of 31 and 50 years and younger faculties of between 21-30 years are about 15.3%, the same goes for older faculty members (Figure 2). It is generally believed in Nigerian settings that younger generations are more prone to risk taking and innovativeness than the older ones. In fact, results from Global Entrepreneurship Monitor (2018) showed high entrepreneurial activities among younger people in developing countries with similar trends observed in some developed economies. It is also very important to point out that certain economic parameters could influence the choice of starting a business, even as academics. For instance, where certain incentives are provided and there is access to innovation facilities, the chances are that most faculties would be interested in the commercialisation of their R&D results.

Figure 3 shows the distribution of faculty members by their highest academic qualifications. The results showed that majority of them possessed doctoral degrees in their various fields of endeavours while about 39% possessed master degrees. In Nigeria, the minimum academic qualification to qualify as academic is doctoral degree, however those with master degree with potentials to undertake doctoral programmes are also considered.
Entrepreneurial Perception of Universities’ Context by the Faculty Members

The perception of academics about the entrepreneurial nature of the university is an important factor in determining whether a faculty would be interested in pursuing commercialisation of their research outputs or not. This study considered how academics perceived their university characteristics, supports and preconditions as well as existing strategies in their university to pursue academic entrepreneurship. The results, as presented in Table 4.1, shows that most academics (83%) concurred that technological and market knowledge were integrated into their school curriculum indicating that greater attention is being paid to entrepreneurship. This might, partly, be due to the recent initiative of the NUC mandating all tertiary institutions in the country to include entrepreneurship education into the school programmes. A recent study showed that most universities in Nigeria have complied with this directive (Adelowo et al., 2015).

Table 1: Academic Perception of Entrepreneurship Activities in the Universities

<table>
<thead>
<tr>
<th>University Characteristics</th>
<th>% SA</th>
<th>% A</th>
<th>% D</th>
<th>% SD</th>
<th>% I</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Educational activities at my university are aimed at the integration of technological and market knowledge into the curriculum</td>
<td>32.3</td>
<td>50.7</td>
<td>4.5</td>
<td>4.0</td>
<td>8.5</td>
</tr>
<tr>
<td>b. Research activities at my university are focused on scientific breakthroughs and technological advances to create economic value</td>
<td>28.6</td>
<td>55.4</td>
<td>4.0</td>
<td>2.2</td>
<td>9.8</td>
</tr>
<tr>
<td>c. Collaborative research initiatives with industry and other universities (in areas of common research interest) for the creation of IP (Intellectual Property) are supported at my university.</td>
<td>20.9</td>
<td>53.2</td>
<td>6.8</td>
<td>1.4</td>
<td>17.7</td>
</tr>
<tr>
<td>d. Technical inventions based on research results are often commercialised in my university.</td>
<td>14.3</td>
<td>34.3</td>
<td>20.0</td>
<td>3.8</td>
<td>27.6</td>
</tr>
</tbody>
</table>
About 84% of them agreed that research activities in their selected universities focused on scientific breakthroughs and technological advances to support economic value. In addition, collaborative researches with industry for the creation of intellectual property were fostered in these universities as claimed by 74% of the academics while 48.6% indicated that research commercialisation were carried out in their universities. The percentage of academics that perceived that their universities support academic entrepreneurship was generally low. The analysis shows that few academics perceived that there was sufficient funding for AE (37.5%), sufficient rewards or compensation for AE (37.4%), sufficient resources for start-ups (27.6%) and networking platforms for AE activities (39%). However, half of the academics (50%) perceived that sufficient AE and intellectual property seminars/workshops were offered for students and faculty members in their university. This results suggests the need for training and awareness-creation efforts in all these universities to demonstrate their readiness for academic entrepreneurship.
entrepreneurship and to encourage faculty’s’ participation. Further, about 68.6% of the faculty members believed that their universities emphasised research for development and diffusion of AE within the system while 60.6% of them concurred that their universities had well-communicated strategy to foster technology commercialisation, including research and technology fairs and exhibition. These are avenues to attract industrialists, assess university research outputs/technologies for uptake. The avenue is widely used in the country, particularly among the technical departments and, or universities. The result also shows that about 46.2% of faculty members perceived that their universities had well-established technology transfer structure as parts of the process for promoting academic entrepreneurship. About 47% of them concurred that their universities had dedicated resources to exploit innovations and about 52% of them agreed that effective administrative framework exist for improving academic entrepreneurship process.

Moreover, university that engages in technology transfer activities, in addition to traditional teaching and research, could be termed to be entrepreneurial (Siegel and Zervos, 2002; Link and Siegel, 2007) and faculty members in such university tend to accept entrepreneurship as one of their ambitions. In this study, information on other engagements of the faculty members’ department and universities was examined. As presented in Figure 1 and 2, the result shows that 53% of the academics reported that their departments engaged in consultancy services which portray a good starting point for an entrepreneurial university. Other entrepreneurial engagements at the departmental levels included community service (47.1%), industrial linkage (38.3%), patenting (16.3%), technology licensing (13.2) and creation of spin-offs (11%). Community service in the university system in Nigeria has not really been properly defined as academics whose research activities provided solution to certain problems in the locality could be said to have fulfilled community service.

It could be observed from the analysis that the more the activities move towards core academic entrepreneurship, the fewer the responses from the faculty members. This suggests that start-ups, technology licensing, patenting and industrial linkage were not common practice at the departmental level in the selected universities as presented in Figure 4.

Similarly, Figure 5 shows the level of university entrepreneurial activities. Community service (52.9%) was reported to be in the forefront of university engagements in addition to teaching and research activities. About 38.3% of faculty members claimed that their university engaged in consultancy. Other entrepreneurial activities of the universities were industry linkage (37.9%), patenting (24.2%), technology licensing (17.2%), and creation of spin-offs (16.7%).
Exploratory Factor Analysis of the Independent Variables

The results of the PCA showed that three factors were dominants and were used as the independent variables for the binary logistic regression. The reliability test also showed great Cronbach’s alpha of 86%. The entire process of naming the factors had earlier been discussed in section three of this paper.

Table 2: Exploratory analysis of faculties’ perception of university’s entrepreneurial context

<table>
<thead>
<tr>
<th>Factor Loading Patterns</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational activities at my university are aimed at the integration of technological and market knowledge into the curriculum</td>
<td>.723</td>
</tr>
<tr>
<td>Research activities at my university are focused on scientific breakthroughs and technological advances to create economic value</td>
<td>.793</td>
</tr>
<tr>
<td>Collaborative research initiatives with industry and other universities (in areas of common research interest) for the creation of IP (Intellectual Property) are supported at my university</td>
<td>.628</td>
</tr>
<tr>
<td>Technical inventions based on research results are often commercialised in my university.</td>
<td>.522</td>
</tr>
<tr>
<td>sufficient funds are available for AE initiative</td>
<td>.720</td>
</tr>
<tr>
<td>sufficient rewards and compensations are offered for AE initiative</td>
<td>.738</td>
</tr>
<tr>
<td>AE and IP seminar/workshop are offered for students and faculty at my university</td>
<td>.478</td>
</tr>
<tr>
<td>my university provides sufficient resources for spin off companies</td>
<td>.751</td>
</tr>
<tr>
<td>a support network of industry partners, investor and regulators helps my university’ faculty student in their AE activities</td>
<td>.640</td>
</tr>
</tbody>
</table>
Adelowo et al.

Influence of Faculties’ perception of university context on their entrepreneurial Propensity

The binary logistic regression analysis presents the likelihood of faculties’ perception of entrepreneurial context of university to influence their academic entrepreneurial propensity, as capture by the intellectual property disclosures among them. The results, as presented in Table 3, showed that faculty members who perceived that their university provided innovation support system are 93% likely to make intellectual property disclosures. The positive relationship between innovation support system and intellectual property disclosures have been well established in literature. From the perspectives of theory of planned behaviour, as advanced by Azjen (1989), a well-supported entrepreneurial behaviour in the university settings have a way of resonating among the academics, to the extent that the behaviour becomes normal in the system. The innovation support system is known to have triggers for promoting academic entrepreneurship in the research system. The experience of research institutions in the USA after the passage of Bayh-Dole Act of 1980 was a case in time, which triggered huge patent disclosures among the faculties. Today, in Nigeria, apart from improved patent awareness among the faculties, about forty-four universities, research institutes and polytechnics have established technology transfer offices to link up with industry on R&D commercialisation (NOTAP, 2019). Mere recognition of researchers with patentable research outputs in the university could attract positive outcomes for the universities.

Moreover, the faculties’ perception of university characteristics, in terms of disposition to meeting industry challenges with research results showed high likelihood of engagement in

<table>
<thead>
<tr>
<th>Question</th>
<th>Variance Explained</th>
<th>KMO and Bartlett’s Test</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>An incentive system motivates faculty and students at my university to participate in AE initiative</td>
<td>.658</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are well established/structured technology transfer and commercialisation processes within my university</td>
<td>.564</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My university has dedicated resources to quickly exploit evolving innovation opportunities</td>
<td></td>
<td>.876</td>
<td></td>
</tr>
<tr>
<td>Effective administrative functions exist to improve AE processes</td>
<td></td>
<td>.596</td>
<td></td>
</tr>
<tr>
<td>My university has a strong emphasis on research and AE</td>
<td></td>
<td>.541</td>
<td></td>
</tr>
<tr>
<td>My university has a well communicated strategy that aims to foster and exploit technology commercialization and AE</td>
<td></td>
<td>.472</td>
<td></td>
</tr>
<tr>
<td>Variance explained</td>
<td>36.38%</td>
<td>10.16%</td>
<td>7.56%</td>
</tr>
<tr>
<td>KMO and Bartlett’s Test</td>
<td>0.86, Chi-Square=940.2, DF=105, p˂0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s Alpha</td>
<td>86%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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academic entrepreneurship. The result suggests that faculties who perceive their universities as being responsive to market needs tend to engage in patent disclosures. Some academics find fulfillment in seeing the fruits of their research efforts in the market, that is, beyond paper publication. On strategic resources, faculties’ perception of universities context having requisite strategic resources for academic entrepreneurship does not show significant relationship with likelihood of making IP disclosure among them.

On the control variables, gender showed positive relationship and very high likelihood to make patent disclosures among the faculties, particularly the male gender. The result suggests a very high possibility of academic entrepreneurship among the male faculties than the female counterparts. Highest academic qualification does not show any significant likelihood of influencing patent disclosures among the faculties. However, the chances are that entrepreneurship training attended could be a positive factor, but it was not included in the analysis.

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>B</th>
<th>S.E.</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAC1: Innovation support system</td>
<td>.659</td>
<td>.246</td>
<td>.007</td>
<td>1.932</td>
</tr>
<tr>
<td>FAC2: University Characteristics</td>
<td>.577</td>
<td>.274</td>
<td>.035</td>
<td>1.780</td>
</tr>
<tr>
<td>FAC3: Strategic resources</td>
<td>-.209</td>
<td>.330</td>
<td>.526</td>
<td>.811</td>
</tr>
<tr>
<td>Gender</td>
<td>2.302</td>
<td>1.057</td>
<td>.029</td>
<td>9.998</td>
</tr>
<tr>
<td>Qualification</td>
<td>.334</td>
<td>.494</td>
<td>.499</td>
<td>1.397</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.640</td>
<td>1.322</td>
<td>.000</td>
<td>.010</td>
</tr>
</tbody>
</table>

2 Log likelihood | 122.424* |

Cox & Snell R Square | .099 |
Nagelkerke R Square  | .181 |

Dependent variable: Intellectual property disclosure
*Parameter estimates changed by less than .001.

CONCLUSION AND POLICY RECOMMENDATIONS

The paper examined the roles of knowledge institutions in stimulating innovations and technology commercialisation in a developing country using primary data collected from thirteen
selected universities. It also evaluated the perceptions of faculties’ on the entrepreneurial context of the universities and how the perceptions drive them to engage in academic entrepreneurship. The results showed that faculties’ positive perception of university characteristics (OR=1.78, CI 95%, p < 0.05) and innovation support system (OR=1.93, CI 99%, p < 0.01) were positively related and significant to academic entrepreneurship. However, faculties’ perception of strategic resources (OR=0.811, CI 95%, p > 0.52) did not show significant relationship to academic entrepreneurship. In addition, male gender is more likely to engage in academic entrepreneurship in these institutions. Other key results included poor perception on the reward system for innovation, as greater emphasis was placed on publication, rather than research commercialisation. The study concluded that strengthening existing innovation facilities, increased incentive system for innovation and devising motivation for female faculties could trigger higher academic entrepreneurial propensity among the faculties.

REFERENCES


