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African Journal of Science Policy and Innovation Management
OPEN ACCESS | PEER REVIEWED
AJSPIM

Critical Skills for the 21st Century: Technopreneurial and Innovative Behaviour of Fresh Graduates in Lagos State, Nigeria

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Article information

https://doi.org/10.69798/38959103

2756 – 4118

Published by Koozakar LLC. Norcross GA 30071, United States

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ABSTRACT

This study explores the influence of the acquisition of critical skills on the technopreneurial and innovative behaviour of fresh graduates in Lagos State, Nigeria. One set of structured questionnaire was administered on two hundred and fifty (250) graduates of Engineering, Science and Management Science disciplines. The survey revealed that the skills that have been acquired by the respondents are critical thinking and problem solving (89.23%), creativity and innovation (87.34%), collaboration (70.40%), and perseverance (73.95%). These skills were acquired through multiple sources such as personal exploits (88.46%), skill acquisition/entrepreneurship development programmes (82.09%), entrepreneurship education (79.67%), family business (76.92%); and seminars and workshops (75.80%) among others. Majority (87.65%) of the graduates claimed to be engaged in technological enterprises such as Software Development, AutoCAD Design, Digital Printing/Multimedia Publishing, Technology Gadget Rentals; and Photoshop Services. Regression analysis revealed that all the skills contributed 67.8% (Adjusted R2 = 0.678) to the technopreneurial and innovative conduct of the graduates. The study concluded that acquisition of critical skills influenced the technopreneurial and innovative behaviour of young graduates in Lagos State. The research recommended that government and private organisations should encourage and support the acquisition of necessary skills designed for the technopreneurial development of the youth. Moreover, the study recommended that graduates should be engaged in entrepreneurship programmes.

Keywords:
Critical Skills, Technopreneurial, Innovative capability Graduates, Nigeria

1.0. Introduction

Literature on the knowledge economy has emphasised that some critical skills are valuable for entrepreneurial and innovative behaviour of individuals and competitive advantage in business organisations (Wright, 2002; Laura *et al*., 2010; Puccio and Cabra, 2012; Dada and Abayomi, 2018). Certain critical skills are required for the ability to access, synthesise and communicate information; for collaborative work to solve complex problems; and to create new knowledge through the innovative use of multiple technologies (Ledward and Hirata, 2011; Dada and Oyebisi, 2016; Lamb *et al*., 2017). The partnership for 21st century skills (P21) defines 21st century skills as a blend of content knowledge, specific skills, expertise, and literacies necessary to succeed in work and life. As argued by Paige (2009), the 21st century skills are more than technological literacy. These skills also include proficiency in critical thinking, problem solving, communication and team work. The innovative and imaginative capture of opportunities generated by technological applications can be universally applied for the entrepreneurship growth and development of nations. The exploitation of entrepreneurial opportunities include designed actions such as business plan development, acquisition of needed human resources, management of financial and other required resources as well as responsibility for the success or failure of an enterprise (Siyanbola, 2013; Abayomi and Dada, 2018). Entrepreneurial spirit, characterised by innovation and risk-taking is an essential part of a nation's ability to succeed in an ever changing and increasingly competitive global marketplace (Malerba and Nelson, 2011; Dada and Abayomi, 2018). Moreover, the success of economies requires the employment and effective use of a critical mass of skilled individuals.

Entrepreneurs are generally considered as the most important internal and vital resources in any organisation for their contributions to enterprise performance (Asaolu, 2017; Asaolu and Dada, 2018). As emphasised by Schumpeter, the role of an entrepreneur is similar to that of an innovator who implements change in an economy through the introduction of new goods or new methods of production. In the Schumpeterian view, the entrepreneur is a disruptive force in an economy The author emphasised the beneficial process of creative destruction in which the introduction of new products and production processes result in the obsolescence or failure of others. In contrast to Schumpeter's view, Kirzner sees an entrepreneur as a person who discovers previously unnoticed profit opportunities. The entrepreneur's discovery initiates a process in which these newly discovered profit opportunities are then acted on in the marketplace until market competition eliminates the profit opportunity. Economists in the modern Austrian school of economics further refined and developed the ideas of Schumpeter and Kirzner on entrepreneurship as the capacity and willingness to develop, organise and manage a business venture along with any of its risks in order to make a profit. The most obvious example of entrepreneurship is the starting of new businesses but to achieve competitive advantage, entrepreneurs should invest in skill acquisition for effective performance (Care and Vista, 2017).

To meet the demands of the new global economy, 21st century critical skills assist in synthesising information, working effectively in diverse teams, managing complex projects, and demonstrating responsibility to the community and environment (Ledward and Hirata, 2011). These skills refer to content knowledge, literacies and proficiencies that prepare individuals to meet the challenges and opportunities of today's world.

It is therefore essential for individuals to access, synthesise and communicate information, and use multiple technologies innovatively (Higgins, 2014; Dada and Oyebisi, 2016). Other strands of literature by Abiodun (2010) and Akerele (2000) revealed that apart from the qualifications possessed, there are other innovative qualities and practical skills appropriate for graduates to succeed and have life fulfilment. These skills are critical thinking, creativity, problem solving, collaboration, motivation, self-efficacy, diligence; and perseverance (Lamb, *et al.*, 2017). These skills are considered important for entrepreneurial and innovative actions and have received close and concerted attention from policy makers, researchers and practitioners (Dada, 2016; 2018). A variety of these critical skills are regularly considered as vital for entrepreneurial and innovative attitudes in the 21st century. Such

innovative behaviours are facilitators of entrepreneurship and a way of empowering people to take charge of their lives and economic prosperity. For instance, entrepreneurship typically focuses on identifying new opportunities for creating value for customers or users and commercially developing those opportunities to establish a profitable business (Shane and Venkataraman 2000; Brazdauskas, 2015). Lack of entrepreneurial skills is a major contributing factor to the problem of unemployment of graduates and youths in Nigeria (Adebisi and Oni, 2012). The 21st century critical skills could help develop youths and unemployed graduates to acquire new skills and create opportunities that would help them create jobs and be self-reliant. In Nigeria, despite the increasing recognition of the importance of 21st century critical skills on both individual and organisational performance, limited attention has been devoted to research on using entrepreneurial skills to enhance productivity and career options by young graduates in the country. There is a broad consensus among policy makers, researchers and practitioners on entrepreneurship that a major source of problem experienced in Nigeria and other developing nations is lack of technological entrepreneurship activities (Siyanbola, 2012; Dada, 2018). According to Obamuyi (2018), the emphasis on youth entrepreneurship is important, given that Nigeria has a population which is heavily skewed towards the younger generation, most of whom are either unemployed or underemployed. There is an urgent need for deliberate formulation of entrepreneurship policies aimed at engendering entrepreneurship spirit among the Nigerian youth (Dada, 2016; Obamuyi, 2017; Ekanem, 2018).

2.0. Main Focus of the Study

There is a consensus among scholars, business practitioners as well as policy makers that entrepreneurial and innovative skills among youth are germane to the growth and development of nations. However, despite the critical importance of entrepreneurship to economic development, less developed nations especially in sub-Saharan African have not fully developed strategies to take advantage of this resource. What the countries have are policies which do not actually reflect the importance of entrepreneurship to economic development (Bawuah *et al.*, 2006; Olugboyega, 2017). As witnessed in China and East Asian Economies, industrialisation is central to end the vicious cycle of poverty (Siyanbola *et al.*, 2012; Ekanem, 2018). For this to occur in Nigeria, some amount of critical skills and knowledge have to be sought and developed for technology driven work needs and innovation-related projects. All innovations begin with creative ideas as creativity is the starting point to innovation. Creativity and innovation is the successful development of competitive advantage and as such, it is the key to entrepreneurial development. According to Drucker (1985), innovation and creativity are the tools of entrepreneurship. Entrepreneurial creativity and innovation has helped to improve entrepreneurship activities which has played vital role in national economy. Thus, by creating an entrepreneurial culture, graduates are expected to develop the skills that could encourage entrepreneurial activities. Thus, the main focus of this study is to develop an insight of the importance of 21st century critical skills and how these skills have impacted on the entrepreneurial and innovative behaviour of fresh graduates in Lagos State. This is an important issue since the quality of start-ups, entrepreneurial persistence, business growth, and the influence of innovation on entrepreneurship development affect the economy. The choice of Lagos State was informed by the high number of graduates in the State and the fact that the State has the largest industrial sector in the country. Moreover, Lagos State presently has the nation's highest share of people less than 25 years of age in the country and is estimated to be home to about 20 percent of this age group by 2025 (Adebule, 2017).

3.0. Critical Skills for Technopreneurship in Nigeria

Economic globalisation has changed the world economic order, bringing new opportunities and new challenges. Entrepreneurial activities influence national economic performance by bringing new products, new production processes, new market strategies and boosting productivity and competition (Kritikos, 2014). In the global economy, countries at different levels of development increasingly recognise that innovation is critical for maintaining a competitive edge and economic progress (Dada, 2016; 2018). Consequently, developing countries are seeking to develop innovation strategies and policies that can strengthen their competitiveness and stimulate economic development.

Innovative entrepreneurs are vital to the competitiveness of the economy because they establish new ventures. Special entrepreneurial and innovative skills required for business growth are developed and attained. This makes enterprises experience more success when their managers have sufficient entrepreneurial and innovative skills (Perks and Smith, 2006; Zehra, 2016). Entrepreneurs that introduce innovations to the market bring key value-generating contributions to economic progress (Anyadike *et al*., 2012; Ekanem, 2018). The growing need to accelerate economic development in Nigeria by generating new ideas which translate into profitable ventures makes entrepreneurship an attention for the scholars as well as the policy makers (Siyanbola, 2012; Orishede and Ezenwakwelu, 2014; Olugboyega, 2017; Dada and Abayomi 2018). Entrepreneurship is the ability to accept risks and combine factors of production for goods and services. It is the willingness and ability of an individual to seek investment opportunities in the environment and, thereafter, successfully establish an enterprise based on the identified opportunities. Entrepreneurs promote a productive economy as a result of efficient and innovative ways of production to seize new business opportunities towards economic growth (Holcombe, 1998; OECD, 1998).New entrepreneurial and innovative capabilities are of central importance and required for the adoption, adaptation and modification of technologies developed elsewhere, introduction of modifications and incremental innovations and generation of new products and processes within an innovation system (Dada and Abayomi, 2018; Dada *et al*., 2018).

According to Freeman (1987), an innovation system is the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies. An innovation system highlights the importance of strengthening individual and collective capabilities to innovate and improve organisational values in support of such capabilities and of fostering linkages and partnerships with other actors in the innovation system. An innovation system can also be described as a network of organisations, enterprises, and individuals that focus on bringing new products, new processes as well as organizational processes into economic use, together with the institutions and policies that affect their behaviour and performance (World Bank, 2012). For an innovation system to be effective on entrepreneurial behaviour in Nigeria, the skills of its youth must be supported and strengthened (Siyanbola *et al.,* 2010; Dada *et al.,* 2018). One of the key actors required for translating knowledge outputs into products or processes in any nation is technological entrepreneurship which is a business that involves identifying technology-intensive profitable opportunities requiring talent, capital and decision-making skills. In an effort to support youth entrepreneurship, the government of Nigeria established the youth enterprise programme (YEP) to provide training and start-up knowledge as well as capital for emerging entrepreneurs.

4.0. Methodology

This study adopted survey design with two research instruments. These are questionnaire and interview guide. A set of structured questionnaire was administered on two hundred and fifty (250) graduates with a 70.40% response rate. The study synthesised the Partnership for 21st century critical skills frameworks developed by Silva (2009) and Voogt and Roblin (2012). The major critical skills are critical thinking and problem solving, creativity and innovation, collaboration, analytical and investigative abilities, self-efficacy, perseverance, verbal and written communication, conscientiousness, motivation, computer/information skill and global relevance and sustainability.

The study also purposively selected some technology-based enterprises for the study. These were derived from the pilot study conducted in an area of Lagos State which was not eventually included in the major study area to validate the research instrument. These enterprises are in aquaculture, food processing, automobile engineering services, technology gadget rentals, graphics design, software development, leather/footwear, renewable energy, 3D–Printing and digital printing/multimedia sectors. Others were waste recycling, engineering fabrication, AutoCAD design, soaps and detergent production, wood processing/furniture, paints manufacturing and Photoshop services. A stage-wise sampling technique was employed. The first stage is stratified

sampling technique of selecting three educational disciplines - Engineering, Pure Sciences and Management Sciences. One industrially populated area was selected from each of the three Senatorial Districts of Lagos State. These are Lagos-Island from Lagos Central, Oshodi from Lagos-West and Ikorodu from Lagos East. A snow-ball sampling technique was then adopted to administer a structured questionnaire on two hundred and fifty (250) graduates who are already involved in at least one form of technological enterprise. Descriptive and inferential statistics were employed for data analysis. The descriptive statistics included frequency counts and percentages and the inferential statistics were regression, correlation and analysis of variance.

5.0. Discussion

This segment presents the results and discussion of the study. These include the knowledge of critical skills for 21st century, the nature of critical skills acquired by the fresh graduates; and sources of critical skills acquired by the graduates. Other variables of measurement in this section are the current entrepreneurial activities of the graduates, the nature of the enterprise and; motivations for such enterprises. Finally, the study determined the influence of acquired critical skills on the technoepreneurial and innovative activities of the fresh graduates.

5.1. Knowledge of critical skills for 21st century by the fresh graduates (n = 250)

The knowledge of the respondents on critical skills for 21st century was examined. As shown in Figure 1, only 44% of the respondents readily had the knowledge of 21st century critical skills. The Figure also revealed that 45% and 11% did not have the knowledge and not sure of the knowledge respectively.

The lack of knowledge of critical skills for 21st century may not be unconnected with the lack of critical thinking abilities and innovative capabilities that constitute the hub of technopreneurial and innovative performance of youth in a nation. A review of the literature on 21st century skills suggested that education must be upgraded for learners to thrive in the new global economy.

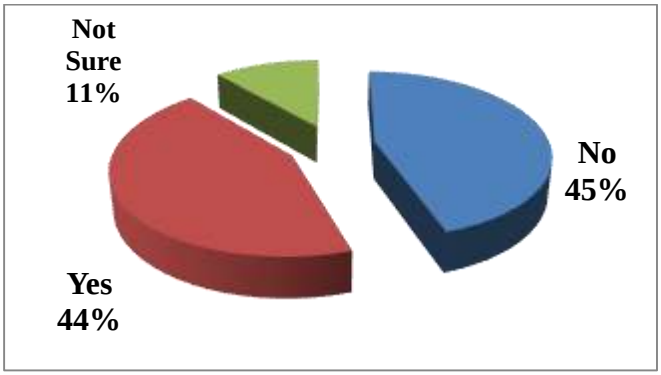

Figure 1: Knowledge of Critical Skills for 21st Century (N=250)

Success in today's world requires the ability to access, synthesize, and communicate information; to work collaboratively across differences to solve complex problems; and to create new knowledge through the innovative use of multiple technologies. This brief provides a framework for understanding the relevance of 21st century critical skills which are more than technological literacy, instead they include proficiency in critical thinking, and problem solving, communication, and team work for entrepreneurial impact on the youth (Paige 2009). The future workforce of advanced economies will increasingly demand roles that involve perception and manipulation, creative and social intelligence (Frey and Osborne, 2017).

5.2. Nature of acquired critical skills for 21st century by the fresh graduates

A number of critical skills have received much attention in recent years for the mastery of various technology-based environments and use of tools. Further analysis on the acquired critical skills by the young graduates indicated multiple technopreneurial and innovative skills as revealed in Figure 2. Majority (90.12%) of the graduates claimed to have acquired critical thinking and problem solving skills. Critical thinking requires appropriate evaluation and analysis, evidence of deductive and inductive reasoning for making the right decisions and to solve complex problems (Lai, 2011; Lai and Viering, 2012; Lamb *et al.*, 2017). Researchers on critical thinking tend to agree that a level of background knowledge is imperative for thinking critically (Bailin *et al.*, 1999; Willingham, 2008). Problem solving is an individual's capacity to engage in intellectual processing to understand and resolve problems (OECD, 2014). Complex problem solving is associated with intellectual

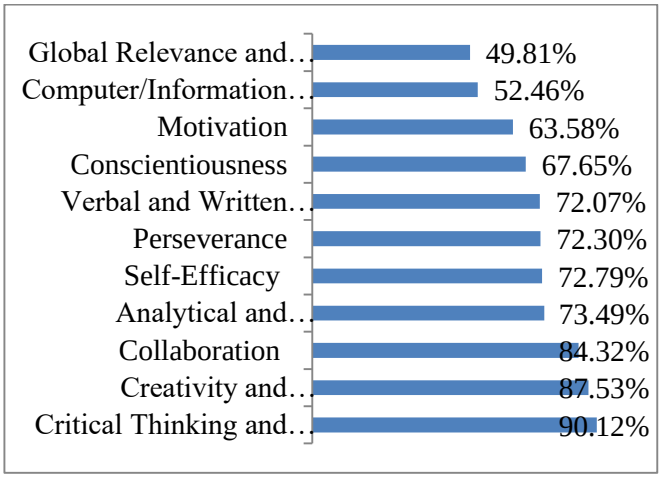

Figure 2: Acquired Critical Skills for 21st Century by the Fresh Graduates (N = 93)
*** Multiple Responses

ability in order to achieve one's potential for deep and productive engagements (Oyewale *et al.*, 2015). Problem solving consists of three parts which are selection of strategies to solve a given problem, the application of strategies to this problem and the monitoring of the strategies for solving the problem. Recent developments have emerged in collaborative problem solving, based on the premise that these skills are most useful in the types of problems encountered by individuals (OECD, 2017). Consequently, critical thinking and problem solving are teachable skills that can influence technopreneurial and innovative propensity among the youth.

Creativity and innovative skills were indicated to have been acquired by 87.53% of the young graduates. Creativity and innovation are often associated with critical thinking in discussions on 21st century technopreneurial and innovative skills since these skills are often seen as a condition for creativity and vice versa. Creativity is also seen as closely related to other cognitive skills such as problem identification, idea generation and problem solving (Baer, 2016; Barbot *et al.*, 2016). Critical thinking, creativity and innovative skills could influence the dispositions and related skills to support creative abilities, such as motivation, risk-taking ability, open-mindedness to new ideas and capacity to tolerate uncertainty. The creativity and innovative skills can therefore affect entrepreneurial and innovative tendencies of the graduates in the study area. Many of the respondents (84.32%) also claimed to have acquired collaboration skills. Collaboration skills can positively affect the entrepreneurial and innovative engagements of the young graduates. Other critical skills acquired by the responding graduates are analytical and investigative abilities (73.49%); self-efficacy (72.79%); and perseverance (72.30%). Analytical and investigative skills are fact-finding and evidential abilities towards achieving a goal such as technology-based entrepreneurship. Self-efficacy is the perceived ability to succeed and an individual's sense of control over the outcome of a task or activity expressed in a personal entrepreneurial characteristics of an *'I can do it'* attitude (Eccles and Wigfield, 2002; Geisinger, 2016).

Perseverance is a commitment to tasks and activities (long-term goals) despite difficulties (or obstacles). Perseverance or tenacity generally relies on goal-setting and accepting delayed gratification (Geisinger, 2016). Verbal and Written Communication (72.07%), Conscientiousness (67.65%), Motivation (63.58%), Computer/Information Skill (52.46%); and Global Relevance and Sustainability (49.94%) have been developed by the graduates. The computer/information skill has become a source of knowledge sharing and global businesses. The on-going globalisation and the intensely competitive environment have a significant impact on production and service sectors.

Conscientiousness is a diligent behaviour based on self-discipline and efforts to a given problem, task or activity. This has been found to show a consistent association with performance (Geisinger, 2016). Although, the importance of conscientiousness for achievement had been established in the literature, there is scanty evidence that these skills can be developed through training. Rather, its acquisition is usually associated with life experiences and social factors (Roberts and DelVecchio, 2000). Motivations shape interests for entrepreneurial interest and tasks (Hidi and Harackiewicz, 2000; Hidi and Renninger, 2006). The computer/information skill has become a source knowledge sharing and global businesses. Some researchers had established correlations of this scientific outputs and the entrepreneurial and innovative engagement of youths.

5.3. Sources of critical skills acquired by the fresh graduates

The motivation (s) of critical skills acquired by the fresh graduates in Lagos State is shown in Table 1.

Table 1: Critical Skills Acquired by the Fresh Graduates

Source	Percentage
Personal Exploit	88.46
Skill Acquisition/Entrepreneurship Development Programme	82.09
Entrepreneurship Education	79.67
Family Business Experience	76.92
Seminar and Workshop	75.80
Students' Innovation Challenges Programme	71.05
Business Innovation Competitions (YOU-Win, Hult Price, Hackahton)	71.03
Foundations (Fate, Tony Elumelu, Bode Akindele Youth Initiative, BAYI)	68.81
Campus Entrepreneurial Initiatives (CEI)/ Entrepreneurial Action in Us (ENACTUS)	67.54
Entrepreneurship Mentorship Programme	64.34
Lagos State Empowerment Trust Fund	60.19
Lagos State Vocational Training and Skills Acquisition Centres	57.28
Africa Entrepreneurship Award	53.90
Exhibitions and Fairs	52.71
The Bank of Industry Youth Entrepreneurship Support Programme (YES-P)	48.11

Personal exploit (88.46%), skill acquisition/entrepreneurship development programme (82.09%), Entrepreneurship education (79.67%); and family business experience (76.92%) were found to be the major sources of the 21st century critical skills. Without essential enterprise-based knowledge, new firms may drift away from the dynamics of the market and lack the proper background to control its business. Scholars (for instance, Wang and Wong, 2004; Afolabi *et al.*, 2008; Siyanbola *et al.*, 2012) have found that entrepreneurial interest can be developed in young people especially when they are in school. Effective youth entrepreneurships education prepares young people to be enterprising individuals who can become entrepreneurs or entrepreneurial thinkers that can contribute to sustainable economic development. Entrepreneurship education is a collection of formalised teaching that informs and trains individuals who are interested in business creation or small business development that equip entrepreneurs with entrepreneurial skills (Adeola and Bolarinwa, 2010; Uzo-Okonkwo, 2013).

Other major sources of entrepreneurial and innovative skills of the graduates are seminar and workshop (75.80%), students' innovation challenges programme (71.05%), business innovation competitions (Hult Price, Hackahton) (71.03%), Foundations (Fate, Tony Elumelu, Bode Akindele youth initiative, BAYI) (68.81%); and campus entrepreneurial initiatives (CEI)/entrepreneurial action in us (ENACTUS) (67.54%). Other sources are entrepreneurship mentorship programme (64.34%), Lagos State empowerment trust fund (60.19%), Lagos State vocational training and skills acquisition centres (57.28%), Africa entrepreneurship award (53.90%), exhibitions and fairs (52.71%); and the bank of industry youth entrepreneurship support programme (YES-P) (48.11%).

5.4. Current engagement of graduates in tech nology-based enterprise (s) in Lagos State

The analysis revealed that 68.75% of the responding graduates are currently engaged in one form of technology-based enterprise (Figure 3).

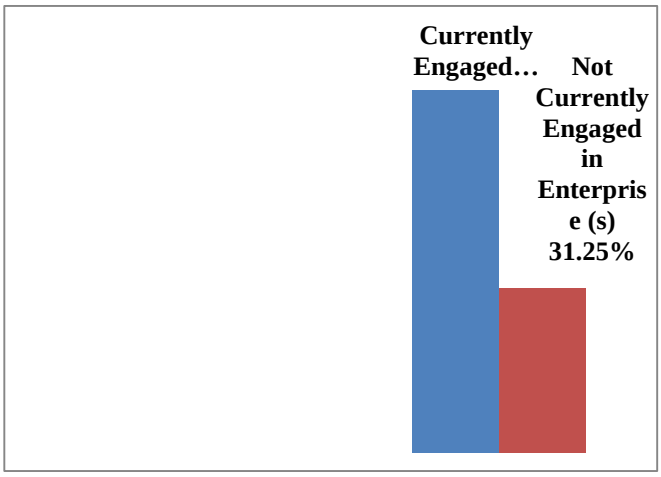

Figure 3: Current Engagement of the Graduates in Technology-Based Enterprises (N = 176)

This is an improvement to Siyanbola *et al.* (2012) who found that only 27.8% among 16, 625 Nigeria undergraduate students were engaged in one form of enterprise. Some of the challenges to technopreneurship as identified by the students were poor funding, poor infrastructure, and inadequate preparation through training and weak institutional structure. Ensuring that this high level of interest is sustained should provide a strong foundation for the development of technology-based enterprises in the country. The creation of technology-based enterprises requires the efforts of

technopreneurs. Technopreneurs are individuals or corporations who create new businesses to exploit technological innovation (Siyanbola, 2012; Siyanbola *et al.*, 2012; Dada, 2016; Dada and Oyebisi, 2016). There is the need to develop entrepreneurial skills in fresh graduates of institutions of higher learning rather than job seekers.

Technopreneurship is a mind-set that results in the creation and development of economic activities through technological innovation, risk taking, and quality management of both human and material resources to accomplish a desired goal. It therefore follows that there are numerous potentials associated with entrepreneurship. Setting up a business requires that a prospective entrepreneur must have assessed his disposition in terms of need, and potentials before taking a decision of embarking on an entrepreneurship activity (European Commission. 2004; Oyefuga, *et al.*, 2008; Siyanbola, 2013).

5.5. Nature of engaged technological enterprises (%)

Table 2 depicts the nature of engaged technological enterprises by the responding young graduates in Lagos State. Analysis revealed that majority of the graduates involved in graphic designs (78.12%), software development (72.91%), digital printing/multimedia publishing (68.46%), AutoCAD design (67.22%), 3D printing (62.78%) as well as food manufacturing (62.61%).

Table 2: Nature of Technological Enterprises (%)

Technological Enterprise	Percentage
Graphic Designs (n = 71)	78.12
Software Development (n = 77)	72.91
Digital Printing/Multimedia Publishing (n = 64)	68.46
AutoCAD Design (n = 74)	67.22
3D – Printing (n = 68)	62.78
Food Manufacturing (n = 72)	62.61
Aquaculture (n = 56)	60.82
Engineering Fabrication (n = 41)	58.79
Photoshop Services (n = 69)	56.26
Wood Processing/Furniture (n = 34)	56.05
Leather/Footwear (n = 42)	54.93
Technology Gadget Rentals (n = 42)	51.47
Automobile Engineering Services (n = 63)	49.83
Soaps and Detergent (n = 58)	48.64
Renewable Energy Production (n = 46)	42.61
Paints Manufacturing (n = 38)	39.82
Waste Recycling (n = 31)	38.17

*** Multiple Responses

Other engagements are aquaculture (60.82%), engineering fabrication (58.79%), Photoshop services (56.26%), wood processing/furniture (56.05%), leather/footwear (54.93%), technology gadget rentals (51.47%), automobile engineering services (49.83%), soaps and detergent (48.64%), renewable energy (42.61%), paints manufacturing (39.82%) and waste recycling (38.17%).

5.6. Influence of acquired critical skills on the technopreneurial and innovative engagements of the fresh graduates

The 21st century critical skills were captured by ten variables in this study. These include critical thinking and problem solving (CTPS), creativity and innovation (CI), Collaboration (COL); Analytical and Investigative Abilities (AIA), Self-Efficacy (SE), Perseverance (PERS), Verbal and Written Communication (VWC), Conscientiousness (CON), Motivation (MOT), Computer/Information Skill (CIS), and Global Relevance and Sustainability Skill (GRSS).

The fresh graduates were asked to indicate how these skills had affected their innovative and technopreneurial behaviours. The correlation between critical skills and entrepreneurial activities of the graduates is shown in Table 3. The analysis shows that out of the eleven 21st century critical skills variables considered in this study, nine variables showed significant and positive correlation with technopreneurial and innovative engagement of the graduates.

Table 3: Relationship between 21st Century Critical Skills and Graduates' Technopreneurial and Innovative Engagements (Correlation)

Nature of 21st Century Critical Skill	Graduates' Entrepr and Innovative Enga (Correlation Coefficient)	Significance (p-value)
Critical Thinking and Problem Solving (CTPS)	0.205**	0.002
Creativity and Innovation (CI)	0.126**	0.000
Collaboration (COL)	0.013**	0.001
Analytical and Investigative Abilities (AIA)	0.175*	0.041
Self-Efficacy (SE)	0.018	0.782
Perseverance (PERS)	0.204**	0.010
Verbal and Written Communication (VWC)	0.021**	0.000
Conscientiousness (CON)	0.209**	0.008
Motivation (MOT)	0.106*	0.033
Computer/Information Skill (CIS)	0.034*	0.000
Global Relevance and Sustainability Skill (GRSS)	0.005	0.542

*Correlation is significant at 5% level of significance

**Correlation is significant at 1% level of significance

These variables are CTPS (r = 0.205, p≤0.01), CI (r = 0.126, p≤0.01), COL (r = 0.013, p≤0.01), AIA (r = 0.175, p≤0.05), PERS (r = 0.204, p≤0.01), VWC (r = 0.021, p≤0.01), CON (r = 0.209, p≤0.01), MOT (r = 0.106, p≤0.05), and CIS (r = 0.034, p≤0.01) been with Binary Logistic Regression Analysis (Table 4), an attempt was made to establish the influence of the correlated 21st century critical skills on the technopreneurial and innovative actions of the graduates. The outcome of the regression analysis indicated that not all the nine critical skills factors significantly contributed to the graduates' technopreneurial and innovative behaviour of the respondents.

Table 4: Relationship between 21st Century Critical Skills and Graduates' Technopreneurial and Innovative Engagements (Binary Logistic Regression)

Nature of 21st Century Critical Skills	Unstandardised Coefficients		Standardised Coefficients	t	Significance (p –value)
	Beta	Std. Error	Beta		
Constant	0.316	0.395	0.573	0.799	0.428
Critical Thinking and Problem Solving (CTPS)	0.098	0.116	0.110	3.901	0.002
Creativity and Innovation (CI)	0.019	0.107	0.035	3.672	0.001
Collaboration (COL)	0.078	0.149	0.087	4.521	0.000
Analytical and Investigative Abilities (AIA)	0.098	0.046	0.267	2.147	0.036
Verbal and Written Communication (VWC)	0.197	0.142	0.228	2.386	0.014
Conscientiousness (CON)	0.375	0.114	0.398	3.284	0.002
Computer/Information Skill (CIS)	0.071	0.047	0.182	2.516	0.031

* Significant at 95 percent confidence level (p ≤ 0.05) **Significant at 99 percent confidence level (p ≤ 0.01)

Variables that had significant impact were CTPS (β = 0.421, p≤0.05), CI (β = 0.175, p≤0.01), COL (β = 0.031, p≤0.05), AIA (β = 0.027, p≤0.05), VWC (β = 0.191, p≤0.01), CON (β = 0.160, p≤0.01), CIS (β = 0.141, p≤0.01). Information technology contributes to entrepreneurship and innovation growth as source of job creation. Interviews with some of the respondents revealed that personal exploits were borne out of traditional and inherited education. For instance, an Economics graduates claimed that his interest in fabrication was born out of his interest in his father's glass cutting business. Participation in an entrepreneurship programme significantly increased perceived feasibility of starting a business among graduates. Entrepreneurship education is likely to foster risk taking creation of new venture business. Donald (2005) and Frazier and Niehm (2008) attempted to quantify the effect of education on entrepreneurs' success and they found that entrepreneurs who invested more time and money in knowledge acquisition are more successful.

Entrepreneurship education when effectively and efficiently taught has the likelihood to precipitate self-employment among learners and accelerate sustainable growth and development. This is evident in a number of developed nations like Singapore, Japan and America that utilised entrepreneurial education for improving their human capital as opposed to the traditional approach teach-and-listen approach, which is prevalent in third world nations like Nigeria. In most traditional societies of Nigeria, vocational skills in agriculture and industry were acquired through the apprenticeship systems.

Results from the regression analysis from Table 4 revealed that critical skills have positive influence on technopreneurial and innovative capacity of the graduates in the study area. The R^2 value reveals how well the regression line fits the data as an important indicator of the predictive accuracy of the regression equation (Table 5). The adjusted R^2 value of 0.678 indicated that 67.8% of the variation in technopreneurial and innovative capacity of the graduates is explained by variation in the critical skills for 21st century of the graduates.

Table 5: Regression Model

R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics		
			R^2 Change	F Change	Sig. F Change
0.703	0.678	0.394	0.678	3.476	0.004

Description of Variables

Dependent Variable (Y_0): Graduates' Technopreneurial and Innovative Conducts (GEIC)

Independent Variables (X_i)
CTPS = Critical Thinking and Problem Solving Skill
CI = Creativity and Innovation
COL = Collaboration
AIA = Analytical and Investigative Abilities
VWC = Verbal and Written Communication
CON = Conscientiousness
CIS = Computer/Information Skill

Critical skills can then be said to be a good predictor of technopreneurial and innovative engagements of these graduates. The overall outcome of the analysis implied that the graduates' technopreneurial and innovative engagements (GEIC) depend, to a large extent, on their acquisition of the 21st century critical skills. The model is significant and therefore good for prediction. Moreover, the analysis of variance (ANOVA) test was used to test the statistical significance of the effect of critical skills of fresh graduates on their technopreneurial and innovative engagement (Table 6).
The results showed that the technopreneurial and innovative characteristics of the graduates were significant ($F = 2.311$, $p \leq 0.05$) contributors on the technological entrepreneurship engagements of the fresh graduates.

Table 6: Anova Model

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	0.547	1	0.547	2.311	0.012
Residual	43.057	92	0.237		
Total	43.603	93			

6.0. Future Research Directions

Nigeria is known as a nation with an ever increasing youth population. While the Nigerian government has introduced several initiatives to get graduates employed, research has shown that there is a significant gap in entrepreneurship activities of young graduates relative to their interest. With the high investment in tackling issues surrounding graduate employment in Nigeria, there is the need to take attractive steps towards business opportunities, and produce talent that can compete globally. If Nigeria is to stand on a global scale, the stakeholders in the economy- including the government, academic institutions, start-ups, local and multinational businesses need to address the skills gap that is widening in such a time when Nigeria is undergoing economic recovery from recession. There is the need to direct research towards the needed skills in an individual who can see business opportunity, gathers necessary resources and takes advantage of them to satisfy a need and makes profit. Such entrepreneurs that can create value and opportunity in all fields of endeavour, such as Agriculture, Manufacturing, Information Technology, Construction, Transport as well as Education in Nigeria. Consequently, Studies on the framework for deepening technopreneurial behaviour of fresh graduates, becomes inevitable in order to spur the growth of innovative enterprises in Nigeria economy. Youth must be taught on how to visualise the future which is the ability to think about, or plan the future with great imagination and intelligence. Nigeria needs a technopreneurial state – a smart state that supports innovation and generates critical public goods that support creativity and high level of productivity. Moreover, the study in this study should be carried out in other geo-political zones of the country in order to establish the peculiar critical skills that can influence the technopreneurial and innovative behaviours of young graduates.

7.0. Conclusion

One of the most significant factors in entrepreneurship growth and development has been identified as the critical skills for 21st century. Overall, this study has exposed significant applicability of these skills on technopreneurial and innovative enterprises of young graduates in Lagos State. The findings from this study concluded that there is a need to adopt and adapt the skills in production processes for economic growth and development in Lagos State and Nigeria by extension. The study's conceptualisation also shed more light on the varieties of 21st century critical skills necessary for performance of new firms in competitive marketplaces. Consequently, this study recommended that government and private organisations should give more encouragement and support for the acquisition of 21st century skills for technopreneurial and innovative development of the youth. Moreover, the study recommends that graduates should be engaged in more entrepreneurship programmes and its development requires more attention than it is currently receiving. The focus on such entrepreneurial capabilities' encourages the drive beyond the

improvement in infrastructure and fighting of corruption, to industrial policies which focuses on the development of the Nigeria economy. There is also the need to fashion national policy on technological growth and creativity that can assist in the proper take-off of a development programme for technopreneurial and innovative activities.

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