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**The Role Of Tertiary Institutions In The Emergence Of Tech
Start-Ups: An Empirical And Qualitative Analysis Of The
Nigerian Ecosystem**

Master's thesis

HAGM; Technology Governance and Digital Transformation

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I hereby declare that I have compiled the thesis independently
and all works, important standpoints, and data by other authors
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List of Abbreviations

OAU	Obafemi Awolowo University
UN	United Nations
GDP	Gross Domestic Product
CU	Covenant University
TETFUND	Tertiary Education Tax Fund
ETF	Education Trust Fund
TUG	Theory of Unbalanced Growth
BGT	Balanced Growth Theory
WCED	World Commission on Environment and Development
ESL	Electronic settlements Limited
ICT	Information Communication and Technology
FINTECH	Finance Technology
CEO	Chief Executive Officer
IDI	In Depth Interviews
FGD	Focus Group Discussion

ABSTRACT

This study aimed to analyze the role tertiary institutions play in the formation of tech start-ups in the Nigerian ecosystem. An empirical and qualitative analysis of the Nigerian tech start-up ecosystem was carried out with focus on target groups such as graduate tech entrepreneurs and academic staff who are administrators of technology entrepreneurship programmes in the universities.

The study was carried out in two major tertiary institutions in Nigeria using an ex post facto research design and a cross-sectional survey research design. The main findings showed that the quality of human capital requirement for creating an entrepreneurial ecosystem to support tech start-up is low in Nigeria. This revelation was made valid as most of the lecturers charged to equip students with the technical knowledge for enterprise within the universities are far away in generation from the millennials and Gen Z, who make up 60% of the population of Nigeria.

This key finding led to the recommendation that universities in Nigeria should establish key partnerships to bridge the generational gap in entrepreneurial practice. Additionally, this study identified elements within a 5-step entrepreneurial ecosystem framework as a recommendation to get universities better positioned to support students who have tech start-up ideas. These elements are: accessible markets, quality human capital, finance availability, progressive policy framework, conducive culture, and institutional support. Subsequent work can successfully develop frameworks well suited to provide robust explanations around the interaction of these elements within specific university context.

Keywords: *Emerging economies, entrepreneurial university, Start-ups, tech, university, tertiary institutions, technology, Nigeria, technology entrepreneurship, unemployment, graduates, career, ecosystem,*

1.0 INTRODUCTION

The University, usually referred to as the third tier or tertiary institution along the cadre of education in every nation of the world, is expected to be a formidable and reliable merchant of knowledge and skill enhancement across all identifiable areas of discipline (Ajah & Ononiwu, 2021; Klofsten, M., Fayolle, A., Guerrero, M., Mian, S., Urbano, D., & Wright, M., 2019; Laužikas & Miliūtė, 2020).

Many tertiary institutions run academic programs that are aimed at driving enlightenment and capacity building towards entrepreneurial potentials (Adiak & Katura, 2014). Entrepreneurial skills are becoming more and more acceptable across many spectra of professions. In fact, reports generated by top campaigners for the advancement of business capacity identified lack of entrepreneurial potential as the root of most challenges facing the global society, and if solved, could be a crucial element in facilitating tomorrow's job opportunities (GBSN, 2013). It is no surprise that in recent times, some undergraduate students and a lot of fresh graduates have developed entrepreneurial inclinations. Empirical findings on entrepreneurial ecosystems with special attention to rapid-growth ventures point out issues such as local environment influences, political apathy, traditionalist educational system, which emphasizes teaching and learning in abstraction and at a reduced cost outlay, and several other factors that have limited the contribution viz-a-viz the effectiveness of universities to the larger society (Mason & Brown, 2014).

Apparently, innovative ideas and progressive inventions are farfetched in a country where the capacity of its universities are limited. A key aspect of the innovation ecosystem in the educational institution, which exists not only to impart knowledge but to shape students' thoughts and attitudes, is the cross-fertilization of ideas through seminars, conferences, students' work experience and industrial attachments, and continuous training and retraining of professors and lecturers (Clark, 2006). In a country like Nigeria, venture capitalists, who are also majorly government administrators (OC & C Consulting, 2018), have crumbled the public institutions. The argument that private universities might produce better graduates than their public counterparts has not been justified as many outstanding graduates have been produced from the latter. However, a recent technology news feature on the top five Nigerian universities producing start-up founders suggests that "while it is not considered as a major factor, the university one attends has an impact on the formation of an entrepreneurial and innovative mindset" (Alabian, 2021 par 1). This is because supportive learning environment and inclusion

of entrepreneurial activity as part of the school program can help prepare students for a life of business after graduation (Chinsinga et al., 2014a; Priyono et al., 2021; Suleiman et al., 2020). This could be the case with the Nigerian youth and Universities today. Thus, the central question of whether the current tertiary education has any role to play in students becoming techno-entrepreneurs in Nigeria waits to be answered.

A common theme discovered from watching #Foundersconnect, a segment in Peace Itimi's YouTube channel which focuses on interviewing Nigerian startup founders, is the student/graduate to founder stories that begin with getting into the university or graduating out of the university with no clear career path, to successfully building their own tech startups (Itimi, n.d). This entrepreneurial capability, which has created a new wave of jobs/career paths for many unemployed graduates in the country has been triggered by many factors. One of such factors over the years is job scarcity. According to (Bassey & Atan, 2012) there are more rising jobless graduates searching for jobs than there are employment opportunities. The implication is many of Nigeria's university students graduate to add value only when they have found the appropriate work prospects to which they may apply their skills (Oluwatobi et al., 2018).

Arguably, in recent years the returns on investment for higher education degrees has drastically reduced and conventional education does not seem to deliver significant economic benefits and opportunities for many millennials and generation Zs. According to (Pritchett, 2001), all of the development in educational opportunities since the 1960s, has not produced the predicted rise in economic growth particularly in emerging nations. Sadly, for Nigeria, this statement still rings true as articles featuring headlines such as 'graduate starts clothing stores to survive' are quite common within the region (Financial Times, 2021). Nonetheless, recent studies on entrepreneurship education in Nigeria in the past decade shows there are a significant number of students that have passed through Universities in Nigeria to establish a viable career path as entrepreneurs. According to (Ekpoh & Eket, 2011), the careers of graduates does seem to benefit from entrepreneurship training. In a handful developing and emerging economies, equipping individuals with the right education and support is considered the herald of entrepreneurship (Chinyamurindi, 2016). The result of these studies leads one to the discussion of more weighing factors within the higher education context that influences the graduate's ability to engage in the formation of new ventures.

From a human capital perspective, Nigeria is ranked 7th among the world's most populated countries (World Population Review, 2021). Africa's most populous nation is an oil-dependent

economy that has many other untapped resources such as its lively youth demographic. Seventy-four per cent of the Nigerian populace is below the age of thirty-five, and 45.46 per cent of this group are between the ages of 15-35 years (National Bureau of Statistics, 2020). With tech talent being viewed in some corners as the next oil for Nigeria and technology giants like Microsoft, Meta establishing developer outposts in Lagos (Meta, 2020), the density of thriving startups hints at great future potentials. The latest rankings from the Global Startup Ecosystem Index 2021 released by Startup Blink, puts Lagos as the leading startup hub in Africa (Startupblink, 2021).

Today, there is a huge human capital flight in Nigeria. Uche (2017) observed the Nigerian ecosystem and discovered that a good portion of the country's talented developers are employed by foreign companies despite the dearth of quality in the ecosystem. In Nigeria, a plethora of factors coupled with the pandemic is seen to be responsible for this phenomenon. There are a variety of reasons why people are leaving their jobs, including low pay, terrible working conditions, lack of flexibility and quality training from employers (Eleanya, 2021).

However, the biggest concern for this human capital potential should be the institutions of higher learning that are not structured to produce startups and graduate/career entrepreneurs for the future. For example, Ekebafé et al. (2010), argues that many Nigerian universities are not set up to produce high-quality graduates which is why the country's leading industry is short on qualified local professionals. To avoid the accompanied impacts these threats pose to innovation supply and local startup growth, it is important that academia and innovators are strategically coordinated to reskill the youth and make entrepreneurship a career path for tertiary institution students (Financial Times, 2021).

Pritchett (2001) opined that when looking at human capital, the quality of education and the institutions that provide it should be taken into account. Moreover, there are recent insights which suggest that innovation cannot be fostered without a strong university ecosystem (Angelis, 2017). Therefore, any state action towards a successful entrepreneurial drive should be focused on a strong university ecosystem (Mohamad et al, 2015). Given the above stated, it is still likely for stakeholders to neglect these insights, that incentives to a successful startup ecosystem cannot thrive away from educational institutions. OC and C Consulting (2018) observes that the Nigerian tech ecosystem is characterized by a short-term focus and a culture of fast wins, as seen in the expectations of various stakeholder groups within the ecosystem, and by its very nature has only a few numbers of innovation centers which are considered as

its prominent network resource. Also, there seem to be more informal interactions among tech entrepreneurs at networking events, hubs and workspaces rather than industrial interoperability, geographical and institutional cooperation (Venture Capital for Africa, 2018). Other findings on innovation clusters in Nigeria showed that many clusters function without an active research and development department, coupled with weak partnerships among universities, corporations, government tech labs and researchers (The African Institution of Technology Inc., 2015). Furthermore, since clusters tend to be more concentrated in regions with well-developed infrastructure, Lagos is considered the country's most lively cluster (The African Institution of Technology Inc., 2015).

Despite the challenges facing the ecosystem, the entrepreneurs have been resilient and so far, Nigeria has recorded some good growth in the innovation and technology ecosystem. The interventions by ecosystem support organizations, mostly composed of actors from the private sector backed by government support in terms of infrastructural policies, growth in mobile penetration, funding and urban regeneration have contributed to the venture growth achieved in this little time (Venture Capital for Africa, 2018)

Presently the tech ecosystem in Nigeria has produced five of the seven unicorns in Africa, with scores of foreign investments (Adepetun, 2022). Therefore, to consolidate the government's investments and the private sector participation in the ecosystem, the interaction between universities and the private sector should be encouraged and well-structured.

This is a critical step for Nigeria, with a huge population, a large talent pool and access to technology, it is an ideal launchpad. The country is a test case for where the next major innovation in Africa will come from and more investment in education is critical to successfully unlocking its venture growth.

Flowing from the premise above, there is a clear need to step up efforts to encourage tertiary institutions to support the startup ecosystem from within the universities and influence the local economy. Considerably, the first step of this journey is to investigate the influence the universities have and their role in the formation of tech startups founded by their alumni.

According to ALabian (2021), the following are the Nigerian universities which have produced the most startups created by their students and former students.

- Obafemi Awolowo University, Ile-ife- produced a good number of bright minded startup founders in the country who have formed startups like Kudi, Electronic settlements Limited (ESL), a parent company of CashEnvoy and Paypad
- Covenant University, a private university ranked top for having the best software developers in Nigeria.
- University of Lagos, Forbes 2020 3rd most productive school in educating entrepreneurs in Africa. This school located in the heart of Lagos has been described as the startup powerhouse of Nigeria.
- Babcock university, a private university known for the creation of fintech Companies like paystack developed by its alumni.

Significance of this research

As Angelis (2017, P. 9) puts it, “an innovation ecosystem is the product of innovation demand – corporates that need innovation in order to thrive – and innovation supply – the amount and quality of researchers educated in an economy”. Recently, many African countries are beginning to create environments to protect high growth startups on the continent by enacting Startup Acts. Thus, this research will be a significant contribution towards the development of a government and non-governmental policy intervention in innovation supply in the country. In the long run this will help create a path towards reducing the high level of unemployment among graduates in the country.

Also, it is important to understand that the form of entrepreneurship education matters, as Ezeani (2018), claims it is not a given that the application of expert ideas on entrepreneurship training from one community to another will bring success. Therefore, having this study focus on the Nigerian context, means subsequent work can successfully develop frameworks well suited to the local needs.

Research gap

The role of universities and its relationship with the other actors in the startup ecosystem (in Africa) needs to be explored, given the present ambiguity and lack of more robust explanations around these interactions (Guerrero & Urbano, 2017; Neumeyer et al., 2019). This study, attempts to fill in the current gap in the literature by seeking answers to the following research questions:

Research questions

1. How does the university directly influence the formation of tech startups?
2. What are the structures or conditions in Nigerian universities that influence students to create tech ventures?

The rest of this thesis is structured in the following way: Chapter (2), covers the Literature background which examines the role of universities in local innovation ecosystems, specific challenges of the entrepreneurial ecosystem in emerging economies with a brief overview of the Nigerian case. Thereafter Chapter (3) presents the Research methodology, and Chapter (4) summarizes the findings of the research and discusses it. Lastly, Chapter (5) encompasses the conclusion and recommendation for other future studies.

2.0 LITERATURE REVIEW

2.1 The Role of Universities in Local Innovation Ecosystems

An innovation ecosystem simply models the economic dynamics of relationships between actors that enable innovation in the ecosystem (Jackson, 2011). On the other hand, local innovation ecosystems are the very environment that enables innovation (Budzyna, 2017). Both concepts are connected, and a local innovation ecosystem involves several factors to become a viable entity, de Vasconcelos Gomes et al. (2018), especially the input of academia in its many forms.

No other form of academia is as essential to the study of local innovation ecosystems as the Entrepreneurial university. Entrepreneurial University, an academic institution that serves as a natural incubator (Etzkowitz, 2003), gives academic members the ability to create enterprises through their capacity to innovate and respond to challenges (Chrisman et al., 1995; Kirby, 2002; Peterka & Salihovic, 2012). Guerrero et al. (2006) rightly puts it as “a university that has the capacity to innovate, recognize and create opportunities, as well as working as a team, taking risks and responding to challenges.” In other words, it is a university capable of innovating, recognizing and creating possibilities, building teams, taking risks, and adapting to problems.

Entrepreneurial University's activities have been found to significantly impact knowledge-based economies (Audretsch et al., 2006). However, these universities' responsibilities in academic communities and the social environment evolve throughout time as society develops (Etzkowitz, 2004). After all, universities have evolved through three cycles of missions or “generations” and two academic revolutions (Salamzadeh et al., 2011).

The first generation of universities had a clear-cut mission of transmission of knowledge, and they employed suitable methods to ensure they effectively passed on existing philosophical knowledge (Etzkowitz & Leydesdorff, 2000). However, with increasing interest in knowledge amongst more ordinary people, the first academic revolution which happened sometime in the 17th and 18th century, prompted experts to meet with academics to discuss their findings and suggest new topics while imbibing research into everyday thinking and activities (Longo, 1989).

Then came the second generation of universities. They surfaced in the mid-18th century, just as the Industrial Revolution was starting to gain some steam. Here, knowledge was not just transmitted, it was created, and innovation resulted from trials, errors, and results of artisanal inventiveness without much interaction with contemporary scientific methods and ideology (Longo, 1989). As the second generation of universities matured (until it came to a head in the middle of the twentieth century), there was a slow shift from philosophical and natural science to one that answered questions posed by the period's productive activities (Martins, 2014).

The Second Academic Revolution ushered in the era of the Third Generation of universities and encouraged “intense involvement with technological innovation” (Plonski & Carrer, 2009, p. 107). These Third-Generation universities were similar to the Second-Generation universities, but they had an additional mission of using “knowledge as a path of economic and social development” (Klein & Pereira, 2020). This meant that the institutions became active agents of innovation and were pivotal to economic growth and creativity (Audretsch et al., 2006; Redford & Fayolle, 2014).

The third generation of universities is technology-led and innovation-focused, having significant economic and social value, given its increasing engagement in the society they are embedded in. Hence, the university takes a lead role in resource transfer and technological advancement (Laredo, 2007; Etzkowitz & Leydesdorff, 2000).

The result of a system that takes such a central role in a strategic innovative position is a university that is characterized by all the traits already discussed before by Chrisman et al. (1995); Kirby (2002); Peterka and Salihovic (2012)—an Entrepreneurial University.

The entrepreneurial university capitalizes on knowledge for social and economic gains and casts the institution as a key economic player in a peculiar and vital combination of innovation, education, research, and economic development. However, this growth is tied to regions and even shows localized patterns while promoting innovation strategies and management techniques and the entrepreneurial mindset necessary to drive innovation and innovation ecosystems (Adner, 2006; Tripl et al., 2015; Pugh et al., 2018).

Mainly, the entrepreneurial university's characteristics should be capitalization, where knowledge fuels academic and institutional growth; interconnectedness, between business and government; continuous improvement; autonomy and interdependence (Silva, J.P., Guimaraes, O.L., Junior, E.I., & de Castro, J.M., 2021; Etzkowitz, 2004). Other descriptions of an

entrepreneurial university included Clark (2006), a structural and cultural view which suggested that an entrepreneurial university should have “a motivated academic nucleus that stimulates entrepreneurial culture throughout the organization” (p.15).

More recent descriptions highlighted objectives and aspirations, leadership, partnerships with industry and community as well as technology transfer as the key requirements for a university to be entrepreneurial (Tornatzy& Rideout 2014).

In conclusion, the significant role the universities have played has evolved from knowledge dissemination to knowledge generation and research. These days, its role is with the added mission of using knowledge as a path of economic and social development.

2.2 Specific Challenges in Emerging Economies

Ahlstrom and Bruton (2006) describe emerging economies as “rapid-growth countries that are reforming their economies to increase the number of transactions governed by market forces” (p. 303). Recent literature on entrepreneurial ecosystems in emerging economies have observed institutional constraints, resource, and structural gaps as the major challenges of entrepreneurial activities in these economies (Cao & Shi, 2020). This is not odd, considering that entrepreneurial ecosystems in emerging economies have been described to have distinctive institutional characteristics such as “institutional voids” or constraints, poor market conditions, limited resources, family businesses, influential diaspora and returnee entrepreneurs that have led to increasingly personalized networks, few and low capacity supporting organizations, etc (Arruda et al., 2013; Cao & Shi, 2020; Djankov et al., 2002, Manimala & Wasdani, 2015). Few studies have given specific attention to the characteristics of the ecosystems in emerging economies. The first characteristic emphasizes the issue of the presence of institutional voids (Cao & Shi, 2020; Khanna & Palepu, 2000). Across political, cultural, economic, regulatory, or legal dimensions, institutions are considered to play a vital role in the entrepreneurial ecosystems of emerging economies (Arruda et al., 2013).

According to Junior et al. (2016), a huge challenge in the Brazilian entrepreneurial ecosystem is the absence of strong interaction among tertiary institutions, corporations, and entrepreneurs. Similarly, Guerrero and Urbano (2017) found the Mexican entrepreneurial ecosystem to be affected by institutional conditions such as informal marketplace, government bureaucracy, unfavorable tax regime, corruption, and lack of political will to support the ecosystem. Comparably, political apathy is a factor found to make tertiary institutions less prepared to

enhance skills for tech start-ups in Nigeria (Suleiman et al., 2020). As such, it could be considered the reason the national budget would carry less than 5% in allocation to education year-on-year and a huge sum of funds will be unavailable to drive domains for the emergence of a formidable tech ecosystem in Nigeria. Furthermore, other similar studies observed that deficiencies in institutional conditions cast a limit on the emergence of entrepreneurial new ventures, access to resources, access to markets and enforcement of labor laws especially for intellectual property rights (Manolova et al., 2008).

Another specific challenge of the entrepreneurial ecosystems in emerging economies is the inherent limited resource or simply put the resource scarcity. As stated by Cao and Shi (2020), resource scarcity indicates the challenges in resource provision, mobilization, and access that cuts across the financial, knowledge, human and physical dimensions. In other words, limited resources are quite noticeable characteristics in emerging economies. For example, Sheriff and Muffatto (2015) observed that the lack of funding and physical infrastructure has resulted in failed startups in many emerging economies. Also, investments in emerging economies are the type where private local investments such as venture capital and angel investing are not only an uncommon concept but are forms yet to be fully adopted (Cao & Shi, 2020; Guerrero & Urbano, 2017; Goswami et al., 2018). Another example of resource scarcity noticed in terms of knowledge and labor gap vis-à-vis culture include necessity-driven rather than opportunity-driven entrepreneurs, stakeholders with a culture of quick wins and short-term gains, difficulty in attracting high skilled talents, absence of relevant entrepreneurship mentoring (Cao & Shi, 2020). Many emerging economies, Nigeria not an exception, have been known to have their governments as venture capitalist that provide support for various sectors of their economies. The appropriation of funds to entrepreneurship, innovation, science and technology, education, like the Education Trust Fund (ETF) and the Tertiary Education Tax Fund (TETFUND), Graduate Entrepreneurship Fund through the Bank of Industry in Nigeria are amongst host of other financial supports from the government (Oraka et al., 2017; Suleiman et al., 2020). However, the prevalence of institutional gaps and in other cases, the absence of personal connections with government officials, make government financing inaccessible for new ventures (Adly & Khatib, 2014; Cao & Shi, 2020).

Oraka et al. (2017) found out, in a quantitative investigation, that capacity through fund availability, provision of standard teaching and learning equipment, and the right facilitators within the faculty members had significantly affected student enrolment into technology and

innovation courses in Nigerian tertiary institutions. Capacity building has been described as an actionable agenda directed towards a course with a predetermined output (Bradley et al., 2012; Day, 2009; OECD, 2004; Stafford-Smith et al., 2017). An intention to drive entrepreneurial explosion requires a focused, monitored and appropriately directed capacity building programme through the hubs and accelerators where knowledge of expertise is dispensed. Hubs and accelerators as attributes of emerging economies are usually attached to tertiary institutions (Oraka et al., 2017), regional headquarters or industrial districts. However, they are few, limited in supply and low in capacity (Manimala & Wasdani, 2015).

Finally, on whether the universities can become entrepreneurial, Klofsten et al. (2019) found out that the lack of research on what it takes to build either an entrepreneurial university or an entrepreneurial institute within a tertiary institution has led to “passivity”, especially in emerging economies or developing nations like Nigeria. Borissenko and Boschma (2017); Klofsten et al. (2019); Oraka et al. (2017); Priyono et al. (2021); and Suleiman et al. (2020) agreed that the lack of decisive capacity building for the emergence of entrepreneurial ecosystem in tertiary institutions has been significant in the slow pace of development of tech entrepreneurial start-ups.

2.3 Overview of The Nigerian Technology Ecosystem

In 2021, the Nigerian tech ecosystem raised 1.8bn dollars in venture capital funding, more than Kenya and South Africa combined (Famoroti, 2022). Producing 5 out of the 7 unicorns on the African continent, it is among the fastest emerging ecosystems in the world (Startupblink, 2021). The increased number of internet users, international partnerships - diaspora network, which has given rise to a good network of entrepreneurs and innovation support network, regulatory endeavors from government and the private sector have all contributed to the creation of a favorable environment for the growth achieved thus far (OC&C Consulting, 2018).

Certain government initiatives have been launched to give support for a new wave of technology and entrepreneurship in the country. One of such government led initiatives which had a direct impact on the tech ecosystem was the National Information Development Technology Agency, NITDA.

The National Information Technology Development Agency (NITDA) was formed to implement the Nigerian Information Technology Policy by coordinating general IT

development in the country and ensuring that IT resources are readily available, through the programs and initiatives of the Office for ICT Innovation and Entrepreneurship (OIIE), the main organ of the agency (OC & C Consulting, 2018, p. 14).

The small and medium enterprises development agency of Nigeria, SMEDAN is another initiative between the government and the private sector that supports small and medium enterprises with sources of funding and technology for young entrepreneurs in the country (Startup Universal | Nigeria, 2020).

A recent report shows SMEs contribute about 50 percent of Nigeria's GDP and make up eighty percent of business in the country (PWC Nigeria MSME Survey, 2020). Now market applications and using online platforms to sell products and services is prevalent, making E-commerce and fintech the largest fields for startups in Nigeria (OC&C Consulting, 2018). Early startups like Jumia and Interswitch which have grown to become Unicorns paved the way for a growing ecommerce and digital payments industry in Nigeria. In more recent years, the Nigerian government's investments in the development of hubs in two major cities, Lagos and Abuja along with partnerships with other actors at home and abroad have bolstered infrastructure investments (OC&C Consulting, 2018). The creation of the Yabacon Valley in Lagos with its proximity to the University of Lagos, attracted a large number of accelerators, startups and incubators (OC&C Consulting, 2018). Nowadays, large domestic corporations, multinationals, and private universities are increasingly supporting tech entrepreneurship developments in Nigeria through collaboration, incubation and other events.

According to Ecosystem Accelerator (2018), there are fifty-five or more active incubators/accelerators in Nigeria. Below is a summary of well-known accelerators and incubators in Nigeria:

Table 1: Summary of Well-known Incubators and Accelerators in Nigeria

NAME	INCUBATOR/ACCELERATOR	DURATION	SECTOR
Co-Creation Hub	Accelerator and incubator.	3 to 12 months	Non-specific
She Leads Africa	Accelerator, support female entrepreneurs	3 months	Non-specific
Hebron labs	Incubator, university based, offer student entrepreneurs, product development trainings, mentorship, and network resource	3 to 6 months	Non-specific
Passion	Incubator privately owned. Offers workspace, mentorship and support network.	3 to 6 months	EdTech, HealthTech, mobile, computer software
Roar Nigeria Hub	Incubator, university based	undisclosed	Non-specific
Wennovation Hub	Incubator, privately owned, located in several cities; Lagos, Abuja, Ibadan, Kaduna.	4 months	Agriculture, Healthcare, Education, clean energy

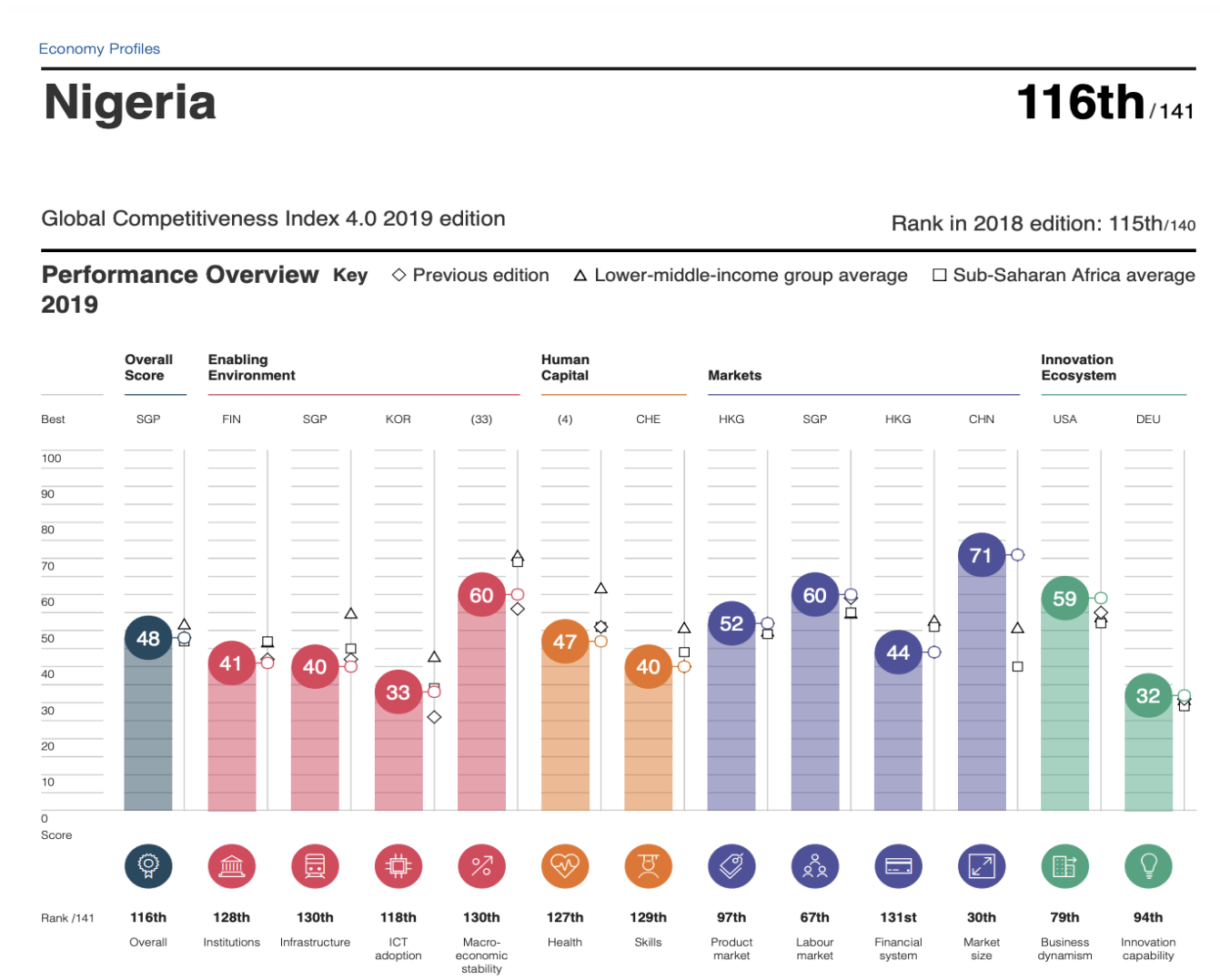
Tony Elumelu Entrepreneurship Programme, TEEP	Privately owned, offers training and mentorship, funding, access to networks.	3 months	Non-specific
Google Launchpad Africa	Accelerator, offers specialized training and mentoring, equity-free support, product development, access to networks	3 months	Non-specific
Others; ARM labs, Africa Fintech Foundry	Accelerator, private sector initiatives, offers support for the growth of financial tech services	3 months	Fintech, consumertech,

Source: adapted from Startup Universal | Nigeria (2020) and Lena (2022).

Today, the Nigerian tech ecosystem has consolidated its gains and in 2021 added three more unicorns, Flutterwave, Opay and Andela (Adepetun, 2022). Other promising startups like Paystack and Piggyvest founded a few years ago by some Nigerian university students, have also attracted valuable tech foreign direct investments (Oparada, 2021). All these achievements paving the way for more startup success stories and investments shows great promise. However, some others observe that the ecosystem still lags in other key metrics (Olasoji, 2021).

The fDi Intelligence (2021) report on Africa's nascent technology ecosystems and their potentials observe that Nigeria, while having the highest number of startups, is ranked sixth in terms of the most competitive tech ecosystems on the continent. The report indicates that countries like South Africa, Kenya, Egypt, Ghana, Tunisia which ranked higher in the competitiveness category reflected their strengths in terms of economic potential, business climate, cost effectiveness, connectivity, and worker experience (Olasoji, 2021). Assessing Nigeria along other key indicators like the global competitiveness index reflects the need to improve the country's level of productivity.

Figure 1: Nigeria's Global Competitiveness Index 2019



Source: World Economic Forum, 2019

2.4 Industrial Districts Hypothesis- Alfred Marshall

The concept of industrial district was the brainchild of the legendary Economist, Alfred Marshall. It emphasizes an intentional creation of a place, like a hub, where talents meet appropriate companies, whose specialization are the main and auxiliary industrial products or services, and where livelihood and living are equally possible (Amin & Thrift, 1994). It advanced the creation of a new economic order that borders on empowering and harnessing local capacities to solve peculiar socio-economic challenges on ground (Stafford-Smith et al., 2017). This theory is similar to the creation of tech hubs across tertiary institutions in major cities where the youth population is highest and where motivation for entrepreneurial

development can easily be advanced. This Marshallian theory, as described by Piore and Sabel (1984), has the attributes of identifying such locations that can be referred to as business hubs, similar to today's Silicon Valley, Orange County, and several others. It was built on the premises of "external economies" and "economies of agglomeration". In today's arrangement, a number of organizations could establish footprints through supply of support like equipment, technologies, building, finance, and other forms of progressive motivation that will advance growth (Bagnasco, 2013; Becattini, 2017).

The theory, which is relevant to the study, advances the opportunity for multiple small and micro firms to be conceived, created and centered at the industrial districts to provide technical support and outsourcing engagements for bigger manufacturing and service delivery corporations. Such big corporations include banks, who might need extra hands, per term, for computer application enhancement, integration of two systems, supply of parts, training, and several other demands. In the early years post-independence Nigeria, proximity to a tertiary institution was a priority so companies could train undergraduate and graduate students and use them for per-term jobs, which eventually qualified those students for immediate employment after graduation. This confirms the idea that perhaps tertiary institutions could have some significant roles to play in the emergence of a formidable ecosystem, enough for tech start-ups.

2.5 Theory of Unbalanced Growth (TUG)

To investigate the role of tertiary institutions in the emergence of tech start-up in Nigeria, a dissection of practical development theory is essential. This will directly appeal to the problem statement of the study. It will also show clearly where the weight of the distributional impact of the variables lies (Benzeval et al., 2014). No doubt, entrepreneurial activities drive a lot of economic gains as found out in the previous chapter. However, the strategy of over-reliance on a foreign method of birthing it, with all its attendant ills, has not paid off for most developing countries (Holden, 2013; Ogunleye, 2008; Uwasu & Yabar, 2011). When it comes to translating economic gains into sustainable development in developing countries, there have been two broad schools of thought. This division was between "the Hirschman's, (1981) theory of unbalanced growth (TUG) and the Nurkse's, (1959) balanced growth theory (BGT)". The former was more relevant to this study.

Hirschman, (1981), with the major assumption hinged on limited resources in developing countries, he recommended the unbalanced growth strategy to economic development in the poorest of world nations. Having studied the rush of importation of western ideas into developing countries, he submitted that there was a need to redirect investment decisions into strategic areas with the characteristics of each country in mind, and not a simultaneous investment approach in all sectors while forcing foreign procedures. Hirschman's, (1981) posited the following premises on the theory of unbalanced growth:

- limited supply of resources;
- inefficiency at resource allocation;
- investment decision towards “the leading sectors” alone
- “The leading sectors” must possess backward and forward linkages to other sectors; and
- these linkages enhance further positive externalities

Therefore, development of an ecosystem will always follow the course of imbalanced procedure, given all these conditions (Hirschman, 1981).

TUG comes with externalities as linkages are established from the leading sectors. It also suggested that development would follow the identified linkages across social, economic, and political spectra in such economies. These catalysts are further divided into productive, consumptive, and fiscal linkages (Bastida, 2014). The latter is the key that ties the investigation of Hirschman, (1981) to the study. This is because decision-making around sustainable development requires an efficient deployment of the available limited resources.

TUG suggests that before investing in either Social Overheads Capital (SOC) or Direct Productive Activities (DPA), the state should first identify the sectors with the most forward and backward linkages (Hirschman, 1981). TUG growth model's connection is significant to the study of tertiary institutions' involvement in fiscal planning for technology firms which is widely regarded as a leading sector in the 21st century. Several studies such as Bastida (2014); Bature (2013); Emami and Adibpour (2012); Kassie et al. (2017); Li (2013); Mehrara (2008), have proposed diversification of wealth from a booming sector to a leading sector to boost development, in this case, the tech start-ups, towards a sustainable growth. Therefore, TUG proposes that with the technology industry as the target, linkages could be established to other

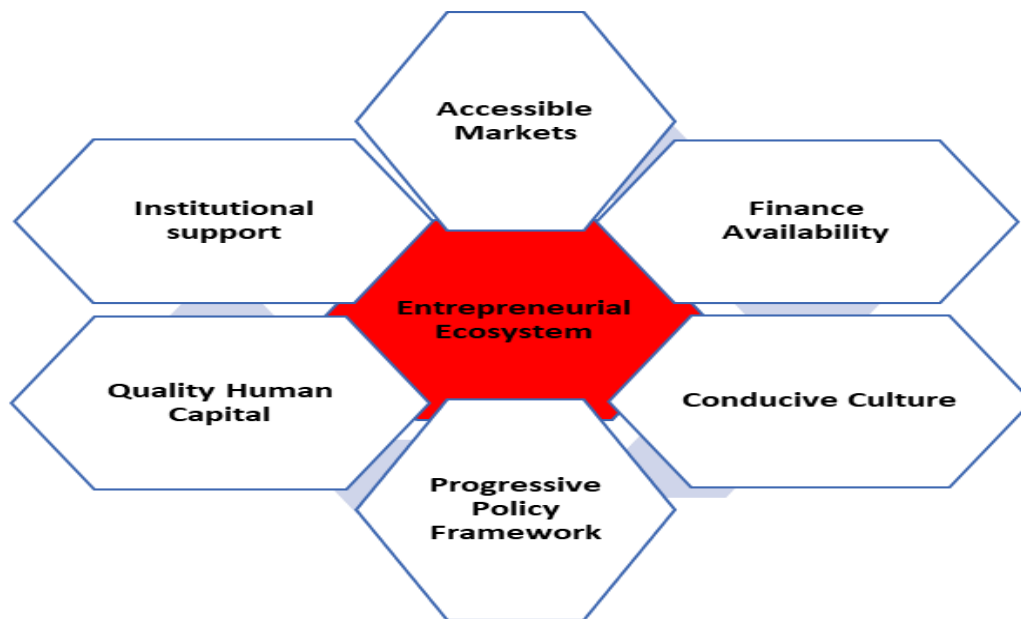
important sectors. This is achievable by extending digital outputs from tech companies to those sectors because it has both forward and backward linkages to other sectors.

2.6 The emerging framework of entrepreneurial ecosystems

Jha (2018) noted that entrepreneurial ecosystems around the world, especially in emerging economies like India, which bears multilateral resemblances with Nigeria, were being mis-defined. In his study titled, “Entrepreneurial ecosystem in India: Taking stock and looking ahead”, Jha, (2018) opined that value creation rather capacity valuation should be the preoccupation of economic administrators and policymakers. This was justified in a scenario which played out in Nigeria between 2019 and 2021 where a tech start-up named, “PayStack”, was popular for its valuation of over \$200 million in less than five years of existence. Truly motivating but highly distracting from what an ecosystem is expected to achieve. This expectation could only be achieved through creation of an enabling and educational environment for the population of the young people, who are digital natives, and create a tolerance level for the wastages required for start-up failures and revamping. This view was supported by Alinovi et al. (2010); Borissenko and Boschma (2017); Ndovela & Chinyamurindi (2021); Deventer and Mlambo (2009); Roundy (2019). They all agreed that a developing or an emerging economy should be intentional about creation of an entrepreneurial ecosystem. It should not be left to natural causes because of the value it is capable of creating in terms of GDP contributions, crime reduction among young people, reduction of unemployment claims as jobs grow, multilateral foreign direct investments as the shares of such ventures are listed on the stock exchanges.

Meanwhile, for an ecosystem to emerge appropriately and become formidable, there are six domains from which it is viewed Jha, (2018). These domains are explained below.

Figure 2: Domains of Entrepreneurial Ecosystems



Source: Jha (2018).

Going by the entrepreneurial ecosystem, each of these domains is made up of many factors that work together in highly complex and individualistic ways (Mason & Brown, 2014). These domains, as listed in Figure 2 above were first elicited in the works of Isenberg (2011). Every one of the domains is very important. However, **access to markets, finance and quality human capital** have been found to be the most important domains (Jha, 2018). Meanwhile, all domains are mutually inclusive – they work together to create the expected output and impact the quality of other domains. In an instance, market accessibility would make companies present in that ecosystem become more attractive to venture financing more quickly. In the same vein, finance availability could attract talented individuals with ideas, attracting high-potential entrepreneurs and skilled professionals. In summary, the constituents of an ecosystem reinforce one another, setting up a pattern or a cycle that creates a formidable ecosystem, which can withstand unforeseeable economic changes (Jha, 2018).

Meanwhile, Ajah and Ononiwu (2021) explained that an entrepreneurial ecosystem can take different routes to evolve. There is no hard and fast rule to it, except the process must fit into the socio-economic realities within the country of domiciliation. This is where effective tech hubs, entrepreneurial institutes, and business schools of various tertiary institutions become germane (Ajah & Ononiwu, 2021; Chinsinga et al., 2014b, 2014a; Chirchietti, 2017). In fact, Chirchietti (2017) and Jha (2018) agreed that large businesses would usually go into

partnership with tertiary institutions to create what was referred to as “a critical mass of skilled labor”, from bottom-up, usually government owned at first but later joined by private corporations mostly from the community service route. It is at this point that skilled staff members and motivated graduates, who are likely beneficiaries of grants and scholarships, bud out of the current organizations and universities programmes to start entrepreneurial outfits. This was evident with the creation of the ecosystem in Seattle because Boeing, Amazon, and Microsoft all have presence there (Ajah & Ononiwu, 2021; Jha, 2018).

In summary, the emergence of an entrepreneurial ecosystem takes the route of an intent, investment, and implementation, with no relevance to a specific timeframe. This evolution or emergence takes into consideration local realities and conditions. However, for the cycle of the identified six domains to continue, existing corporations, public and private, will have to combine intent with investment to ensure implementations of interventions and support that will enhance motivation of mostly bright young minds into starting a tech entrepreneurial outfit in the long run. Therefore, when corporate intentionality leads to actual investment, then an ecosystem emerges through the implementation of that intent and progresses through entrepreneurial recycling (Jha, 2018).

3.0 RESEARCH METHODOLOGY

3.1 Introduction

The research method implemented in this study is an outline of all research processes such as data collection, data analysis, and interpretation (Antwi & Hamza, 2015; Bryman, 2012; Tracy, 2013). The research method should be aligned to the topic under research in order to inform how the data can be drawn. The most common and broad classifications of research methods are quantitative and qualitative research methods. This study used the qualitative research method. This chapter covers the (1) study area; (2) research design, (3) research approach, (4) population, (5) sample and sampling technique, (6) data collection process, (7) research instrument/instrumentation, (8) instruments' validity and reliability, (9) data analysis process, ethical issues, and conclusion (Babbie, 2011; Bryman, 2012; Taherdoost, 2018; Tracy, 2013).

3.2 Research design

This study adopted an ex post facto research design by conducting an in-depth interview with different knowledge experts around the variables of interest. Ex post facto simply implies to go after the facts, or in other words, to be retroactive. It is a design that uses descriptive research techniques, which are useful whenever there exist two or more groups with disparity on independent variable(s) and to test hypotheses concerning their differences on dependent variable(s) within a qualitative data analysis framework (Kerlinger, 1964). This is a non-experimental research design that is useful whenever there is comparison between pre-existing groups and on some dependent variables. "The ex post facto research method seeks to establish causal relationships between events and circumstances" (Lord, 1973, p. 3).

Comparatively, cross-sectional research is a research method which requires studying per time the difference that exists between a large cross-section and the differences that lie between individual groups within the population compared (Setia, 2016). It adopts different groups of people who differ along the variable of interest but share some other peculiar characteristics such as educational background, socioeconomic status, geography, and many more, to define cause-and-effect relationships. It can also be used in conjunction with both experimental and correlational studies as supported by some literatures (Eriksson & Kovalainen, 2017; Powoh, 2016; Valenzuela & Shrivastava, 2002)

The essence of the study was to investigate the role of tertiary institutions in the emergence of tech startups by conducting an empirical and qualitative analysis within the Nigerian tertiary education system and innovation ecosystem. As such, adopting an ex post facto research design is best as the research could not be carried out using either quasi-experimental or experimental designs as it was considered costly, time and money wise. Also, research focused on indicators of evaluation of the competence of specific individuals, who occupy positions of influence and decisions to determine how the selected universities were able, or contrariwise, to support tech start-ups in the country. Therefore, ex post facto design was a suitable and satisfactory technique for the study to provide insights into the live experiences of these individuals.

Qualitative methods of research require the use of first-hand information, obtainable through interviews, observations, recordings, and other forms of face-to-face interactions within natural settings (Mertens & Hesse-Biber, 2012). It is used for testing hypotheses by looking into the association among dependent and explanatory variables from small samples across many units within the sample population (Creswell, 2014). It involves inferential simulation and non-experimental approaches to research. This research made use of an inferential qualitative research approach. The goal of this type of research creates and utilizes non-numerical models, speculations and theories relating to natural phenomena. Qualitative research approach was used for both the practitioners, academic and students to generalize results because of the small sample size of the respondents and the method is well structured. Also, it is less expensive and has a high return rate due to the follow-ups that can be made to the respondents (Noble & Smith, 2014; Palys, 2008; Rahi, 2017). To get a deep understanding of the experiences of the respondents, we utilized a strategy for naturalistic enquiry.

3.3 Population, Sample, Sampling Strategy

Population refers to a group of individuals that lend resemblance to common attributes from which a sample can be selected and to which the outcomes of the investigation will be generalized (Bowling, 2009; Bryman, 2012; Lim & Ting, 2013). The study population comprised students, academics and practitioners/ start-up founders from selected schools and institutions within the Nigerian ecosystem. Due to the large and non-concerted sizes of the population, we frequently cannot test each person in the population, especially since it is excessively costly and tedious. This is the motivation behind why researchers rely on sampling techniques (Sunders, 2010). A sample is simply a subset of the population which is selected to participate in the study and from which conclusions about the entire population could be

drawn (Bernstein, 2016; Sunders, 2010). The samples used for this research were drawn from Covenant University (CU) and Obafemi Awolowo University (OAU). In-depth interview was adopted for five (5) practitioners and academics altogether; they were digitally interviewed using Zoom video conferencing technology.

The sampling technique adopted for this study was non-probabilistic sampling called purposive sampling technique. The sampling technique is based on the published and acquired understanding of the population of the respondents (Creswell, 2009). The use of purposive sampling in the study was because of the particular characteristics or features exhibited by the sample (Al-Sulaiti et al., 2010). It is chosen considering a pre-chosen criteria pertinent to a specific research question in selecting the practitioners, academics, and the students (Palys, 2008). In this method, careful consideration, learning, and familiarity was involved to pick the interviewees which best suited the motivation behind the investigation. This was because it was practically impossible at the time to obtain the lists of all academics, practitioners/start-up founders and students from each of the schools and within the Nigerian ecosystem as of the time of this study. Special focus was given to the startups, whose founders are former students, who in the past had some form of contact with their alma mater's entrepreneurship faculty or currently maintain a relationship with the faculty. This way, the selection of sample participants provided explicit instances where the phenomenon under study is likely to be found (Zach, 2006). Also, asking knowledgeable people within the network of relations in the startup ecosystem about qualified 'Techpreneurs' was considered to get the required candidates for the study.

3.4 Data Collection Methods

Sapsford and Jupp (2006) define data collection as "the process of gathering the desirable information carefully, with least possible distortion, so that the analysis may provide answers that are credible and stand logic". Source triangulation approach was adopted for the credibility of the research. Source triangulation involves collecting data the same way but from multiple sources by interviewing the same persons at various times or places or interviewing people with different perspectives on the subject of interest (Ellis, 2019).

The data for this research were collected through the use of in-depth interview guides and responses recorded using a computer or mobile phone device (Valenzuela & Shrivastava, 2002; Al-Sulaiti et al., 2010). The study focused on three sets of participants; the practitioners,

residing/working within or outside academic environment as non-academics, the academics, which are professionals that dispense knowledge of innovation and technology within the university for entrepreneurial empowerment, and the students, who received or did not receive knowledge and relevant motivation that empowered them for practicable ventures. Given this, the respondents were contacted through their telephones and social media handles and presented with ethical clearance for the research, with a follow-up pre-engagement meeting on Zoom video conferencing.

3.4.1 In-depth interview (IDI)

In-depth interview is defined as an interview that involves an array of suppositions, combined with previous understanding, about a subject matter, which is not normally associated with a casual conversation (Denscombe, 2014). An in-depth interview is one of the qualitative research procedures that requires that an intensive person-to-person interview be conducted with a small number of persons, to explore their perspective on a particular ideology, concepts or problem (Al-Sulaiti et al., 2010). The in-depth interview was considered appropriate to determine the psycho-social challenges view of the participants in relation to the emergence of start-ups. We have chosen the in-depth interview technique because at the root of in-depth interviewing there is an interest in collecting the live experiences of the interviewees and the meaning they attach to these experiences.

3.5 Data Analysis Method

Data Analysis involves breaking down data and transforming it to meaningful and understandable logical findings (Bryman, 2012). Data analysis can guide further data collection in elaborating and testing preliminary findings and conceptualisation (Antwi & Hamza, 2015; Noble & Smith, 2014).

This was done using a computer assisted qualitative data analysis software (CAQDAS), especially the Atlas Ti (Al-Sulaiti et al., 2010; Smit, 2002). This tool uses relations to connect the thoughts and findings of authors from their individual work thereby setting contrasts and establishing similarities. It involves the process of scanning materials – textual, graphical, audio, video, maps, etc. – and intelligently creating comments, quotations and codes which are linked using applicable relational expressions to generate a network of views and conclusions that dissect the content of those materials (Al-Sulaiti et al., 2010).

The data collected from the in-depth interviews was processed through tabulation, coding and finally grouped into themes. The results of the findings from the study will be discussed in the next chapter, and an informed conclusion is drawn from the responses given by the participants during the interview and discussion in full.

3.6 Validity, Reliability and Trustworthiness of The Instruments

According to Hammersley (1987) “the validity of a measuring instrument is defined as the property of a measure that allows the researcher to say that the instrument measures what he says it measures” (p. 73). Reliability is defined as a measure of the consistency with which the measuring instrument measures (Al-Sulaiti et al., 2010). The purpose of validity and reliability of research findings is solely looked at in terms of presenting findings and conclusions that are much more convincing and accurate, instead of generalization of the information (Yin, 2003). The purpose for employing multiple data collection was to improve the accuracy of the information and expand through the richness of the information and answers obtained to all research questions.

4.0 FINDINGS AND DISCUSSION

4.1 Introduction

This chapter provides a clear description of the cases used during data collection and the eventual production of relevant analytics to answer the research questions posed in the introductory chapter of the study. It also provides succinct revelation into the analysis done using Atlas Ti version 22, a computer-based qualitative data analysis software (Smit, 2002; Friese, 2019). The explanations of the results from the investigation are explained in 4.3 as a) tech start-ups and the role of tertiary institutions, b) emergence of entrepreneurial ecosystems in Nigeria, c) tech start-ups, finance availability and institutional support d) access to market and conducive culture for tech start-ups in Nigeria and e) Supply-side Quality of human capital for tech start-ups in Nigeria.

4.2 Case description

History tells us that the need that was investigated in this research had been in existence far before the amalgamation of the Northern protectorate with other parts of the Queen's colonies in 1914 (Mohammed, 2013; Oji, 2015). People were freely engaged in entrepreneurial activities with the entire nation as the hub for training and retraining, though informally. With crude oil discovery in 1978, Nigeria, a legacy of colonization introduced and rebranded the legacy systems of teaching and learning into a new but unknown way (Alexeev and Conrad, 2009). Hence the need for everyone to embrace western education. The farmers, the artisans, the goldsmith, the blacksmith, the butcheries, and other forms of entrepreneurial activities became disdainful and classless even with western technology. This country, Nigeria, sank further into systemic illusion when it accepted the fourteen conditionalities of the International Monetary Funds (IMF) to bail take loans and for acquisition of technology that were not backed with requisite technical know-how (Heidhues and Obare, 2011; Logan, 2015; Abah and Wilfred Naankiel, 2016). Many things happened post the Structural Adjustment Program (SAP) of the World Bank and the IMF. One of which is the consequence is brain drain and the disruption of the natural entrepreneurial inclinations of the people; everyone, suddenly, now wants to be paid in Oil (Hassan, Meyer and Kot, 2019).

Thus, this bad decision led to several other bad decisions, which included incompetent leadership and Nigeria emerging as the poverty capital of the world at some point. To correct these ills, one of which is the poor-quality output received from the education sector over the

years, it is necessary to find out what the role of the tertiary institutions are in the emergence of tech start-ups in the country. This study aims to contribute to the Nigerian ecosystem through sustainable development of MSMEs across all sectors, especially technology, which is the sector with the highest forward and backward linkages to other sectors in every country of the world. So, the cases that were addressed in this study is to find out how far apart government-controlled and privately-owned Universities are when it comes to playing the minimum expected role in the emergence of the start-up ecosystem in Nigeria.

Nigeria is blessed with multilateralism at every level of the society. However, the focus of this research is just the disparity between private and public tertiary institutions. Five in-depth interview sessions were held across the two outstanding tertiary institutions when it comes to producing start-up owners and supporting their emergence from within the academic systems. These are:

Table 2: Focused Tertiary Institutions

SN	Name	Description	Count of Interviewees
1	Obafemi Awolowo University (OAU)	Public	3
2	Covenant University (CU)	Private	2

Source: Author

From Table 2 above, three and two respondents were interviewed from the Obafemi Awolowo University (OAU) and Covenant University (CU) respectively. These were people who either were part of the team that set up their tech laboratory or were products of the universities, having benefited from the entrepreneurial initiatives coming from the tech laboratories. Some of these are academics, still working and contributing to the laboratories. Others are seasoned entrepreneurs with start-up experience across several years and different businesses. Also, these two Universities are best suited for this research because they have been the most awarded

and recognised when it comes to real contributions to national development in terms of production of most skilled labor, business founders, and top-notch research.

4.3 Presentation of Findings

This section is dedicated to explaining and evaluating the many inferential results from the investigation when the data collected was analyzed. The data was collected from in-depth interviews with five academic administrators and entrepreneurs that have direct experience of tech start-up emergence in Nigeria and especially from the Universities being reviewed. The first categories of questions (see appendix 1) were structured to examine the validity of the interviewees' responses, while succeeding parts focused on obtaining responses relevant to the objectives of the study. The data collection took the form of a zoom video conferencing and audio recording, with an average time of 40 minutes with each of the interviewees (see appendix 2 for catalogue of interview). The results as categorized are discussed as follows:

1. Tech start-ups and the role of tertiary institutions
2. Emergence of entrepreneurial ecosystems in Nigeria
3. Tech start-ups, finance availability and institutional support
4. Access to market and conducive culture for tech start-ups in Nigeria and
5. Supply-side Quality of human capital for tech start-ups in Nigeria.

4.3.1 Tech Start-ups and the Role of Tertiary Institutions

In Nigeria, there are publications that support the emergence and sudden demise of many start-ups. Most have argued that the government should have bailed them out considering the number of jobs and money they brought on the table. Other schools of thought posited that those companies were too big to fail except that their founders had no requisite technical wherewithal to manage a start-up. Some even said that their sizes did not matter at the point of their collapse; it was the kind of market where they found themselves that did not afford them the needed conducive culture and access to market required for stability of their growth. In Jha, (2018), all of these factors were enumerated when the emergence and development of entrepreneurial ecosystem was modeled in India. However, the place, period, people and purpose are focused on Nigeria in this research. The results presented in the table below elaborate on the network diagram of the coded comments. (see appendix 3).

Table 3: Tech Start-ups and the Role of Tertiary Institutions

Programs	Comment Schedule	Capacity	Description	Comments	Type of Institution	Interview Code
Hands-on programs	First Year	Structured FinTech Lab and partnerships	All students were mandated to have yearly hands-on experience of their discipline	A private university is more likely to expose a student to more hands-on experience and also enjoy a good support system for a tech start-up to emerge	Private	003
Hands-on	Terminal	Sponsored Tech Lab	On personal interest and enrolment basis	The partnership between MIT and OAU is indication that public universities too can play a big role in the emergence of tech start-ups	Public	002
Hands-on	Business	Self-funded	School, private sector support networks	Tech start-ups require the capacity they can get from an entrepreneurial university to become well-established	Private	004

Programs	Comment Schedule	Capacity	Description	Comments	Type of Institution	Interview Code
Hands-on	Terminal	Sponsored	On interest and enrolment basis	It is the role of public tertiary institutions to improve on the curriculum of the school to accommodate entrepreneurial development; not necessarily the government.		005
SUMMARY	Interview 005 stood at the center to propose that tertiary institutions must take the first initiative to play a role in the emergence of tech start-ups in Nigeria. Interviews 002 and 004 justified this position in their comments, while 002 was justified by 003. Interview 004 further explained 005 on how universities can be positioned to support emergence of tech start-ups.					

Source: Author using Atlas Ti

The result above was generated from Atlas Ti version 22, which shows the computer-assisted qualitative data analytics of the responses of the interviewees using relations. The table also captured the opinion of a tech start-up administrator in OAU's MIT/iLab in interview 005. The network diagrams can be seen in the appendix 3, while the summary of the discussion is presented in the next paragraph.

Interviewees 001,004,003 and 005 responded to the question on tech start-up and the role of tertiary institutions (appendix 1). They all agreed by either justifying the position of interviewee 005 or explaining it.

The comments from the results of the interview suggests that foreign partnership is a key factor that can help tertiary institutions to play significant roles in the emergence of a tech start-up in Nigeria and that, in fact, that has been the case in the renowned MIT/iLab located in OAU, where students were prepared. Comments from interview 005 explained that public tertiary institutions should never have to wait for the government to take the lead. That it is their responsibility as a public university to improve on teaching and learning to accommodate the best curriculum that caters for entrepreneurial development through partnerships. This was also justified by the response of interviews 002 and 003, suggesting that a tertiary institution with a deliberate intention to develop entrepreneurs by enhancing innate abilities of some of the prospective founders is a good foundation for a tech start-up. Interview 004 with a graduate of a public university and also a start-up entrepreneur, found out that there were some people who desired to go into entrepreneurship just for money and not because they are cut out for it. It closed by saying that this category of people will later discover the need for the support a university like CU and OAU can offer.

Therefore, tech start-ups are affected by the environment the founders find themselves in terms of family background, academic society and the intention to actually be an entrepreneur or not. Also, tech start-up is heavily dependent on acquisition of the right kind of knowledge. This knowledge can be managed and dispensed by the tertiary institutions because of their access to human capital and capacity to access other resources much faster than an individual on his or her own. These are some of the gaps a tertiary institution can bridge to support tech start-ups. This position was in line with literature such as Chirchietti (2017); Ajah (2021); Jha (2018); Malecki (2018); Roundy (2019); and Ndovela et al. (2021).

4.3.2 Emergence of entrepreneurial ecosystem in Nigeria

As mentioned in the introductory background to this chapter, entrepreneurship is not new in Nigeria and to Nigerians, however it must re-emerge from legacy systems. This research went on a quest to find out about factors that are responsible for the emergence of the entrepreneurial ecosystem in Nigeria, from the view of tertiary education. The result of the study was captured in the discussions below.

Comments from interview 004 showed that the provision of an Information Communication and Technology center does not necessarily lead to entrepreneurial advancement and eventual emergence in any country. This view was expressed by the Fintech entrepreneur, who is also a

product of OAU, a public University. He said that factors such as environment, family background, and education are not enough for the emergence of an entrepreneurial ecosystem. The intention to include the element that makes it entrepreneurial makes the difference. In his words, “not all footballers’ children will naturally take after their parents”. But with conscious and deliberate efforts, the mind-condition will be positively affected and directed towards a predetermined objective; in this case making sure the entrepreneurial ecosystem is birthed.

However, another Entrepreneur, also a graduate of OAU, posited that the human environment has a lot to do with the emergence of an entrepreneurial ecosystem. This position was found to have agreed with the MIT/iLab administrator’s response which supports the claim that the environment can be evolved through predetermined acceleration programs to meet the needs of the society by scaling the laboratory for entrepreneurial advancement (Ajah, 2021). This was evident when OAU’s computer club was up-scaled with equipment and entrepreneurial programs to jolt the minds of the participants – college students, lecturers, and other stakeholders in the school’s immediate community – towards a creative career in and around technology. Therefore, factors such as local and foreign partnerships, development of acceleration programs, installation of the right sets of equipment, and participation of all stakeholders will enhance the emergence of entrepreneurial start-ups in Nigeria. This position was empirically supported by Ajah (2021).

4.3.3 Tech start-ups, finance availability and institutional support

It is not enough to research the role tertiary institutions play in driving tech start-ups within the entrepreneurial ecosystem. It is important to also find out about those factors that affect their ability and capacity to deliver. According to Jha (2018); Olokundun (2019); Roundy (2019); Ajah (2021); Ndovela et al. (2021); and Priyono et al. (2021), finance and the weight of public and private institutions behind these colleges and universities are indispensable elements required to ensuring that they play their roles as the harbinger of tech start-ups in any country of the world, especially Nigeria.

Asked about how availability of finance affects the capacity of tertiary institutions to function effectively and efficiently in advancing tech start-ups, the interviewees responded largely divergently across the type of institutions and their individual experiences. These responses have been described below.

Comments from the administrator in the public university revealed that the government has been provided finance through one of its departments called Technical Education Training Fund (TETFUND), which was largely justified and expanded by other stakeholders in public universities; those in private institutions contradicted the position. The Covenant University entrepreneurial administrators believed the fund from TETFUND did not specifically support entrepreneurial development. In fact, the administration of it is so poor that the department can hardly measure the effect on science and technology in Nigeria. However, apart from the points of division and contradictions, they agreed that access to credit facilities, provision of tax rebates, tax forgiveness, scholarships, and trade relationships that produce grants will enhance the financial capacity of tertiary institutions to be able to deliver on the role aimed at development a formidable tech-ecosystem that favors tech start-ups in particular.

The question is how much money is just enough for a university to be properly positioned to drive entrepreneurial hubs that can facilitate emergence of formidable tech start-ups viz-a-viz the founders? In the section on finance availability on the in-depth interview guide (see Appendix 1), there were questions posed to the interviewees on finance.

Additionally, the response of the entrepreneur of an educational technology company, also a graduate of the Obafemi Awolowo University (OAU), believed that the best that is obtainable to drive a start-up business, either from the demand side – established firms – or from the supply side, that is tertiary institutions seeking to provide the enabling environment for development of entrepreneurs in Nigeria, is access to credit facility. This can take the form of easier access to student loans and solicitation for funds in return for talent flight abroad, which is a human capital concern for a serious country (Chirchietti, 2017; Roundy, 2019; Ajah, 2021). This position was expanded when he said that lack of grants and support funds was mentioned as a generic factor to Africa. This is clear as corporates and foreign investors in business or tech do not believe the region's effort is meaningful until it gets to the market and beats other products. Meanwhile, in Covenant University, funds were always available for staff and students to explore new climes or to develop an idea into a start-up entrepreneurial outfit (Ajah, 2021). Meanwhile, a lot of institutional gaps have marred the process of application and timing of disbursement of government support funds through TETFUND. The framework behind the mandate of the agency is not well-aligned with the implementation. This leads us to consider another factor affecting the ability of tertiary institutions from effectively playing the roles in

tech start-ups emergence within the Nigerian ecosystem. This next paragraph shows some insights from the comments of stakeholders on institutional support and progressive policies.

The Administrator in OAU explained that the university did not start on the back of a predetermined institutional support system, geared towards entrepreneurial development for tech start-ups. The support grew as the idea of a computer internet laboratory transformed into a tech lab for entrepreneurial growth. The university started seeking to include entrepreneurship in every academic program, especially Engineering and Sciences, establishing mentorship programs and raising funds internally and externally.

Though one of the OAU-produced start-up founders acknowledged the effort of the organized elites, mostly from private sectors, in providing the required mentorship, but he concluded that it would be a bad idea to be mentored by Nigerian entrepreneurs because of the rate at which big and small tech start-ups have folded up in the past fifteen years in the country. OAU, though not initially positioned to support entrepreneurship, has greatly received the support of government in terms of approval for curriculum expansion, provision of buildings and equipment, and indirectly backed by executive order titled, “Ease of Doing Business”. The situation is different in private universities. For example, in Covenant University, the support system is hundred per cent; this is because the intention is driven like a business venture. Also, the school seems to be affected by the parliamentary provisions for entrepreneurship; that their academic and non-academic staff members can access government research funds, though more difficult for them than the colleagues in public tertiary institutions.

4.3.4 Conducive Culture for Tech start-ups in the Nigeria

Another set of variables considered for measuring the capacity of tech start-ups in the Nigerian entrepreneurial ecosystem are access to market and conducive culture among the players. Jha (2018) says that the element of profit and freedom is defined by the presence of a market big enough for everyone to be expressive. Training and retraining are good, but having the end in mind is a strong factor that motivates a community of students and a society of people to subject themselves happily for the process. In the same vein, issues such as class differentiation, one-sidedness policy, and career discrimination could impede the progress of the intention to develop an ecosystem where tech start-up thrives. So, access to market and conducive culture are two inseparable twins that can affect tech start-ups in Nigeria. This was expressed in the analysed responses on these two variables from the interview:

Five of the interviewees (001, 003, 004, 005 and 006) responded, directly or indirectly, to the question on conducive culture for the promotion of tech start-up within the Nigerian university ecosystem. Responses of interviewees from the private university with foreign start-up experience criticised the notion that the Nigerian society, especially its university ecosystem, advanced conducive culture towards the development of tech ecosystem system that could drive thriving tech start-ups. He cited a number of start-ups that were not protected from the antics of existing businesses and competitions by the Nigerian government, thereby leading to their premature bankruptcy. Such start-ups include OLX, Go-Kada, and several others.

Similarly, the OAU-produced FINTECH CEO identified the presence of accelerator programs, void of discrimination, as helping factor to push a culture of acceptance, irrespective of background, academic qualification, affluence status, etc. However, the CU EduTech entrepreneur believed that there is no such thing as conducive culture in Nigeria, as class and connection prevail over plans and purposes. Contrary to the last opinion, the OAU MIT/iLab Administrator believed that the laboratory has brought together, not just students and lecturers from all disciplines, it has extended its impact to secondary school students and their teachers to facilitate early knowledge transfer and development of capable human capital. Generally, the interviewees concluded that having a conducive culture is akin to entrepreneurial development. Moreover, Nigeria is improving but still far from an internationally acclaimed culture. However, the intention to grow tech start-ups requires access to the market, within which a conducive culture must be enshrined. To promote this, it was revealed that value must be enhanced through visible access to the market. The next paragraph explains how access to the market is an important factor in tech start-up enhancement in Nigeria.

Access to the market is conceptualized as having forward and backward linkages to tech start-ups. Market access has a forward linkage to the tech start-up process in that the latter sources for capable talents to execute the entrepreneurial agenda. Meanwhile, the backward linkage is a demand-side relationship, where the output of the process becomes profitable enough for gains. In the result, CU home-grown FinTech entrepreneur opined that individuals with business family background never really know what to do with what they are naturally endowed with until a market opens up for them to see value. The OAU FinTech entrepreneur supports the last submission by saying all kinds of markets are available in Nigeria but has no value until the tech start-up process crystallizes the opportunities. They all agreed that access to the market is as important as actually developing the intention to raise intervention hubs for

tech start-ups within any entrepreneurial ecosystem. Therefore, access to market and conducive culture are positively related to tech start-up development in the Nigerian ecosystem (Roundy, 2019; Priyono et al., 2021).

4.3.5 Supply-side Quality of human capital for tech start-ups in Nigeria

A country is as poor or wealthy as the quality of its human capital. That is why for a country in the process of rebuilding or recovering on the platform entrepreneurship, it must ascertain the quality of its human capital. This was why this was included as a variable in the model that was qualitatively analyzed using Atlas Ti version 22. Below is the result of the discussion of the quality of human capital with respect to the tech start-up process, within the framework of tertiary institutions' capacity to play their roles effectively.

Family background was identified as a factor that shapes natural entrepreneurial inclination in an individual, which eventually gives birth to start-ups. This is a major contributory factor that cannot be overlooked in the development of tech start-ups in a country like Nigeria. Though business technology lecturers are important in the process, the generational gap should be addressed while pitching at them to teach a younger generation. The closer the generation, say millennial to Gen Z, the clearer the lessons will resonate across. This is because the FinTech CEO concluded that the quality of human capital required for tech start-ups within the Nigerian entrepreneurial ecosystem are no longer among lecturers and traditional trainers. They are young people who have transcended the conventional classroom scenario to acquire and deploy relevant knowledge. However, the quality of the current human resources within the university systems can be enhanced if the lecturers can be exposed to mentorship. Summarily, they all agreed that the Nigerian tertiary institutions cannot provide the human capital requirements for tech start-up development because many are of the bloomer generation and have been sticking to old theory-based curriculum, which does not suffice (Laužikas & Miliūtė, 2020).

5.0 CONCLUSION

This chapter is devoted to drawing the summary of the findings in the course of this academic investigation. The aim is to suggest the adoption of a framework for building capacity for universities in Nigeria. In this chapter the views of each interviewee analyzed per question is summarized and recommendation is given based on the various views.

5.1 Framework for Building Entrepreneurial Capacity for Tertiary Institutions

This study attempted to understand the role of tertiary institutions in the emergence of tech start-ups within the Nigerian ecosystem. By investigating this phenomenon, the study attempted to answer the research questions: (RQ1) ‘How does the university directly influence the formation of tech startups?’ (see section 4.3.2) and (RQ2) ‘What are the structures or conditions in the universities that influence students to create tech ventures after school?’ (see sections 4.3.4).

To understand clearly the role played by these universities; an in-depth interview was carried out covering the experiences of academic administrators and founders of tech startups in the country who are alumni of the universities. The research adopted a six-step framework for which the universities can be better positioned to support students who have tech start-up ideas. The results of the study are in line with the framework adopted at the beginning of the study (figure 2).

At the conceptual stage of the research, the six domains within which an entrepreneurial ecosystem can be established were illustrated (section 2.6). Now, these domains which have been validated for the Nigerian context, are considered as the elements for capacity building within tertiary institutions to support students in the drive for the formation of tech startups. These elements are: access to markets, finance availability, conducive culture, progressive policy framework, quality human capital, and institutional support. The study discovered that apart from the two universities investigated, there are other tertiary institutions in Nigeria that have facilities from past grants that can be converted to entrepreneurial development centers with tech capacity.

Recent developments such as the Nigeria startup bill and the Office of the Vice President securing an Executive Approval to turn Nigeria to a digital country with funds made available to facilitate that decision shows the drive for the institutionalization of a conducive culture for entrepreneurship in the Nigerian ecosystem.

The study further revealed that some tertiary institutions have created multiple computer laboratories that are only used for assignment and to gain access to school-sponsored internet. Therefore, many schools are still at the phase of non-realisation or quasi-entrepreneurial development, usually referred to as empowerment projects with the real empowering activities going there besides access to the internet. These tertiary institutions can take a clue from the Obafemi Awolowo University (OAU) and Covenant University (CU), to begin scaling their capacities to prepare the ground for tech entrepreneurship. The application of the knowledge of partnership establishment, trans-border tools and equipment purchase, exchange programs for students, lecturers and non-academics from industry, and bilateral and multilateral trade relations, many more, can be used to building a solid and formidable capacity for each and every tertiary institution to be able to play the roles in this process more effectively and efficiently.

In the course of the research, it was found that the quality of human capital requirement for creating an entrepreneurial ecosystem to support tech start-ups is low in Nigeria. This revelation is valid because most of the lecturers in the education system are far away in generation from millennials and Gen Z, who account for 60% of the population of Nigeria. This generational gap has been advised to be bridged to speed up understanding of the process. This is because most of the current education administrators and lecturers are digital aliens and very few of them are trying to catch up. However, the study showed that academics within the universities understand the urgent need to train students with relevant and up-to-date knowledge on enterprise and are willing to embrace innovative approaches geared towards promoting entrepreneurial drive among students through established partnerships with experienced partners like alumni of the universities who actively run successful tech startups in the country.

To confront the challenges identified and enumerated in this academic investigation, there are a set of recommendations posed here for possible adoption. With the main objective of this research in mind, these recommendations are amplified and can be developed into a framework

that could guide the adoption and implementation of capacity building within tertiary institutions for the emergence of tech start-up for the Nigerian entrepreneurial ecosystem.

Given an understanding of the current situation regarding the role of universities in the Nigerian technology ecosystem, the following recommendations have been presented below in stages, to fit into the Nigerian context:

1. Intention documentation & Information gathering stage
2. Inspection & Institutionalization stage
3. Train-the-trainer (TTT) stage
4. Development and deployment stage
5. Review and resourcing stage

Overall, beyond investigating the role Nigerian universities play in the creation of tech startups, this study has highlighted the factors affecting the role of these institutions through the live experiences of the stakeholders in the ecosystem. For future research areas, this study provides a basis for developing a framework for Nigerian universities to optimally operate as entrepreneurial universities.

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APPENDICES

APPENDIX 1: Interview Questions

Table 4: Interview Questions

SN	VARIABLE	Type	DESCRIPTION
1	Entrepreneurial Emergence	Dependent	
2	Tech Start-up	Dependent	
3	Role of Tertiary Institution	Dependent	
A	Finance Availability:	Independent	
B	Institutional Support & Progressive Policy Framework	Independent	
C	Conducive Culture	Independent	
D	Accessible Markets	Independent	
E	Quality of human capital: academics and trainers	Independent	

Background Information

Gender:

Age:

Marital Status:

Occupation:

Educational Qualifications:

Number of Years as Entrepreneur:

Estimated Valuation of Business:

Opening Questions

Tell us about yourself

Did you have any training in entrepreneurship at any level before college graduation?

Do you have practical knowledge of tech business development while in school?

Do you think early access to tech business development is a dependable means of economic growth?

Can tech business take Nigeria out of the list of the poorest countries of the world?

QUESTIONS ON FINANCE AVAILABILITY TO TERTIARY INSTITUTIONS TO FULFILL THEIR ROLES IN THE EMERGENCE OF TECH START-UPS IN NIGERIA

1. Do you think there is enough financial appropriation in the yearly budget of Nigeria at all levels of government?
2. How would you describe the rate of financial support undergraduate and graduate students receive while studying towards an entrepreneurial discipline?

3. Can you tell me about the estimated amount received in scholarship compared to the number of students in an entrepreneurial academic programme?
4. How would you describe the psycho-socio impact of lack of funds on students' academic performance in entrepreneurial discipline?

QUESTIONS CONCERNING THE EXTENT OF INSTITUTIONAL SUPPORT & PROGRESSIVE POLICY FRAMEWORK A UNIVERSITY RECEIVES FOR SETTING UP A FORMIDABLE ENTREPRENEURIAL TECH HUB

1. To what extent do tertiary institutions receive legislative support to drive entrepreneurial disciplines?
2. Are there properly legislated policy frameworks that provide the enabling environment for tertiary institutions to set up a self-reliant entrepreneurial tech hub?
3. Is there an aligned institutional support across Federal, State and Local governments for tertiary institutions in Nigeria?
4. How supportive are non-governmental agencies towards driving policies and laws that fortify the ability of tertiary institutions to provide an effective entrepreneurial tech institute or hub?
5. Are the recent releases of fund from TETFUND used towards development of tech hubs and institutes in tertiary institutions?

QUESTIONS ON HOW DEVELOPED A DRIVE FOR INSTITUTIONALIZATION OF CONDUCIVE CULTRE IN THE NIGERIAN ENTREPRENEURIAL ECOSYSTEM

1. Are students and academics on scholarship targeted for financial exploitation by the system?
2. Do available funds get distributed on merit and on first-come-first-served?

3. Is merit defined as past academic performances alone or does it include practical exposure and understanding of tech entrepreneurship?
4. Do you think information about opportunities around funding, scholarships, sponsorship for students and academics are given the right transparency and visibility to allow for equal access?

QUESTIONS ON ACCESSIBLE MARKETS FOR TECH ENTREPRENEURS AND THE SKILLS

1. Do you think the Nigerian market is big enough to encourage huge investment in tech entrepreneurship?
2. Is the government doing anything to ensure that the market for entrepreneurs grows in commensurate size in relation to would-be graduates and trainees in tech entrepreneurial hubs or institutes?

QUESTIONS ON THE QUALITY OF HUMAN CAPITAL IN ACADEMICS AND NON-TERTIARY INSTITUTION TRAINERS

1. Do you think lecturers, trainers and students receive the best of knowledge required for a profitable tech entrepreneurial venture in Nigeria?
2. Do you think the current crop of teachers, lecturers and non-tertiary institution trainers have been adequately prepared to train others?
3. Do you think the quality of humans in the Nigerian tech entrepreneurial schools, hubs, and institutes can match international standards, like those in Silicon Valley?

APPENDIX 2: Catalog of interview conducted

Count of Interviews	Description of Interviewees	Duration of Interview
Interview 001	Academic – Head of CU Hebron Lab	00:43:42
Interview 002	Academic – Administrator, MIT iLab, OAU.PT1	00:49:36
Interview 003	Entrepreneur – a graduate of Hebron lab, CU	00:25:27
Interview 004	Entrepreneur – a graduate of MIT iLab, OAU	00:45:12
Interview 005	Entrepreneur – a graduate of MIT iLab, OAU	00:59:43
Interview 006	Academic – Administrator, MIT iLa, OAU.PT2	00:25:06

Source: Author

APPENDIX 3: Network diagram of the coded comments

Figure 3:: Tech startups and the Role of Tertiary Institutions

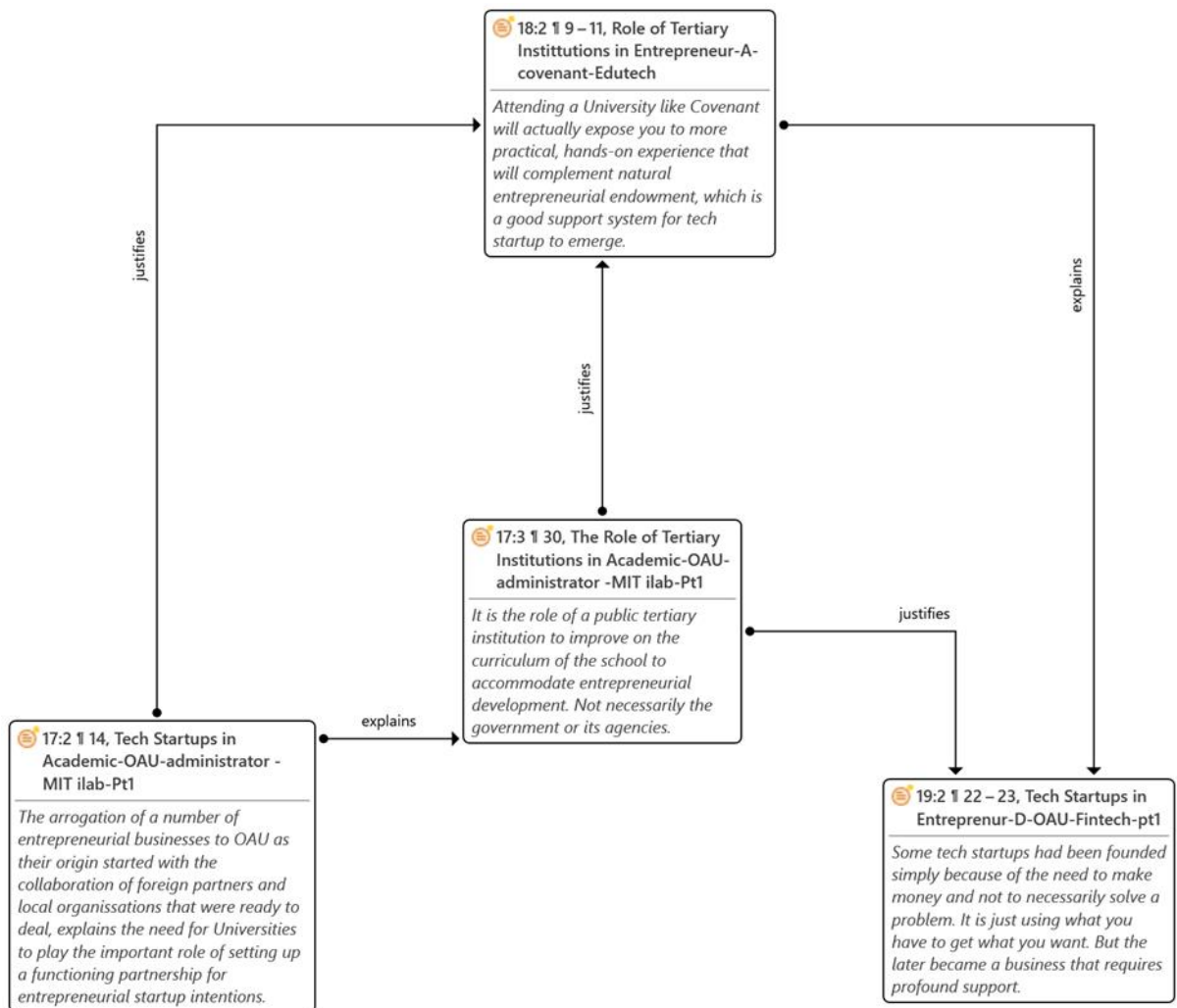


Figure 4: Emergence of Entrepreneurial startups

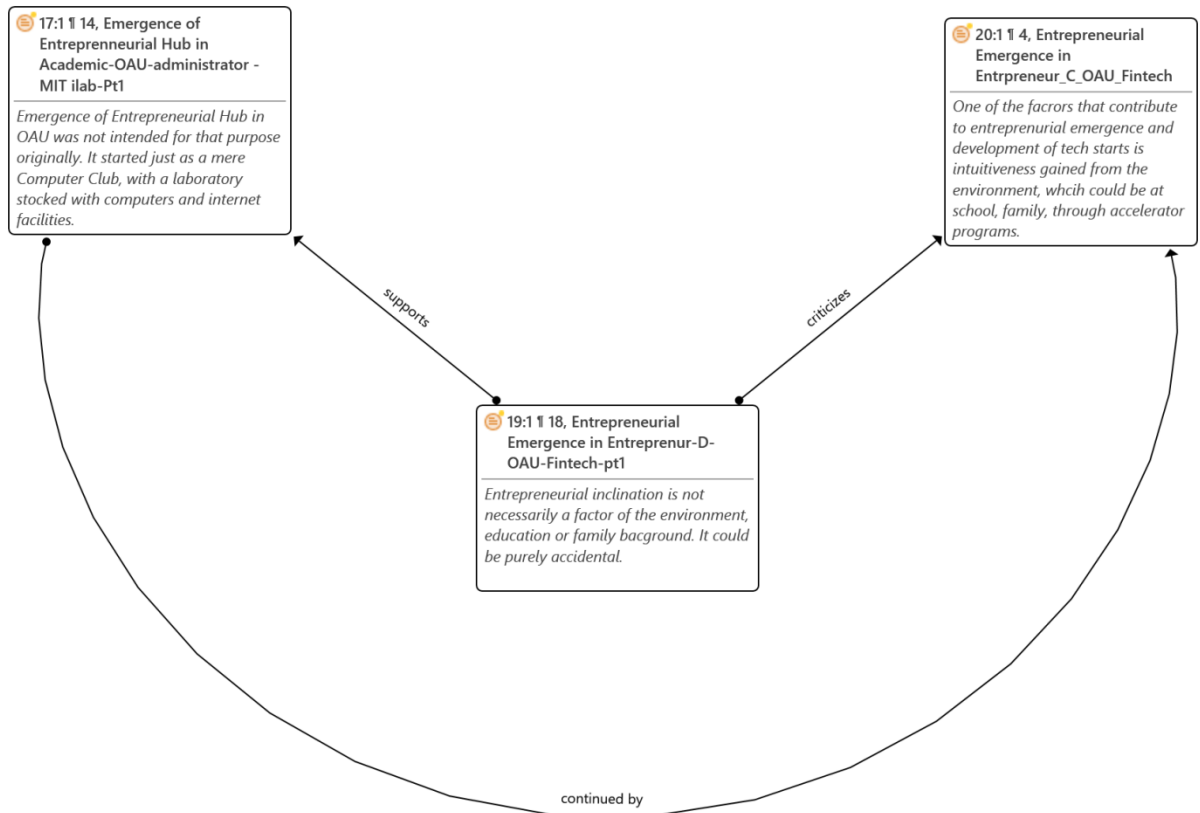


Figure 5: Tech Start-ups and finance availability

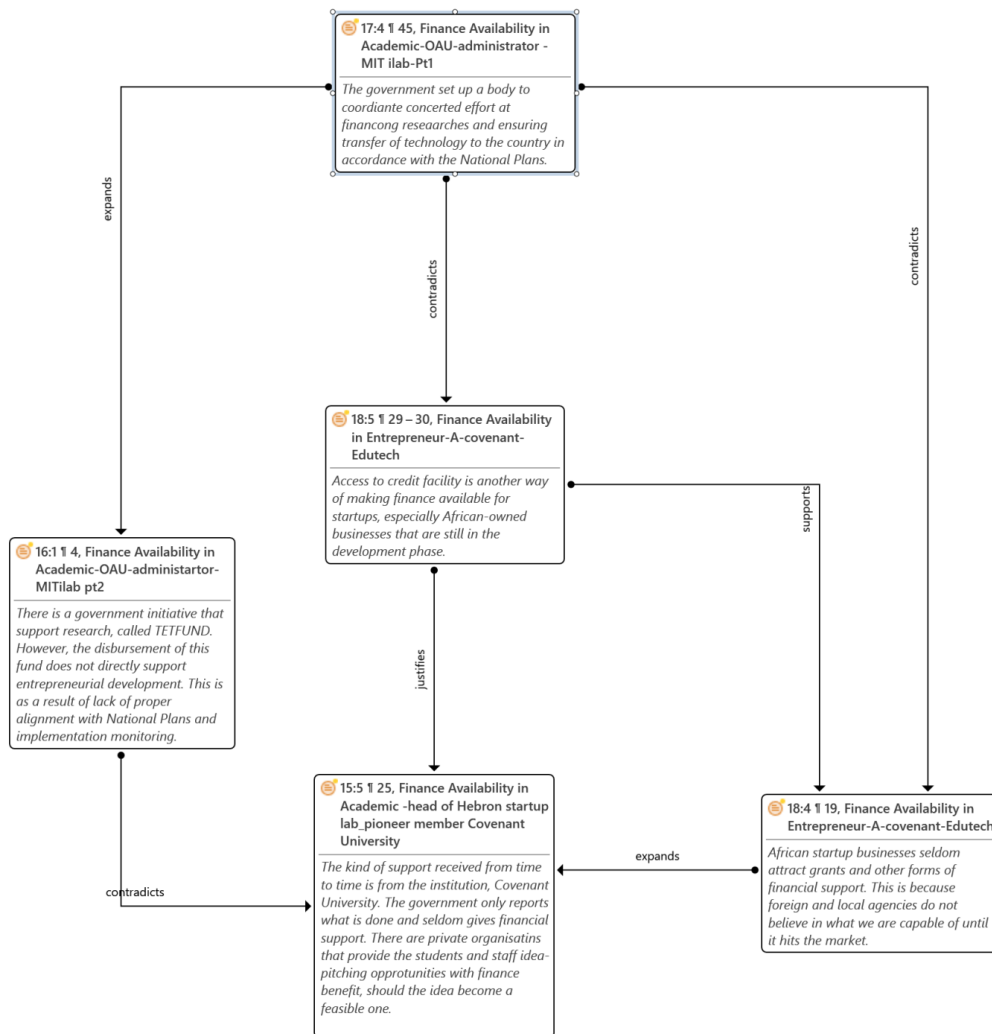


Figure 6: Tech start-ups and institutional support

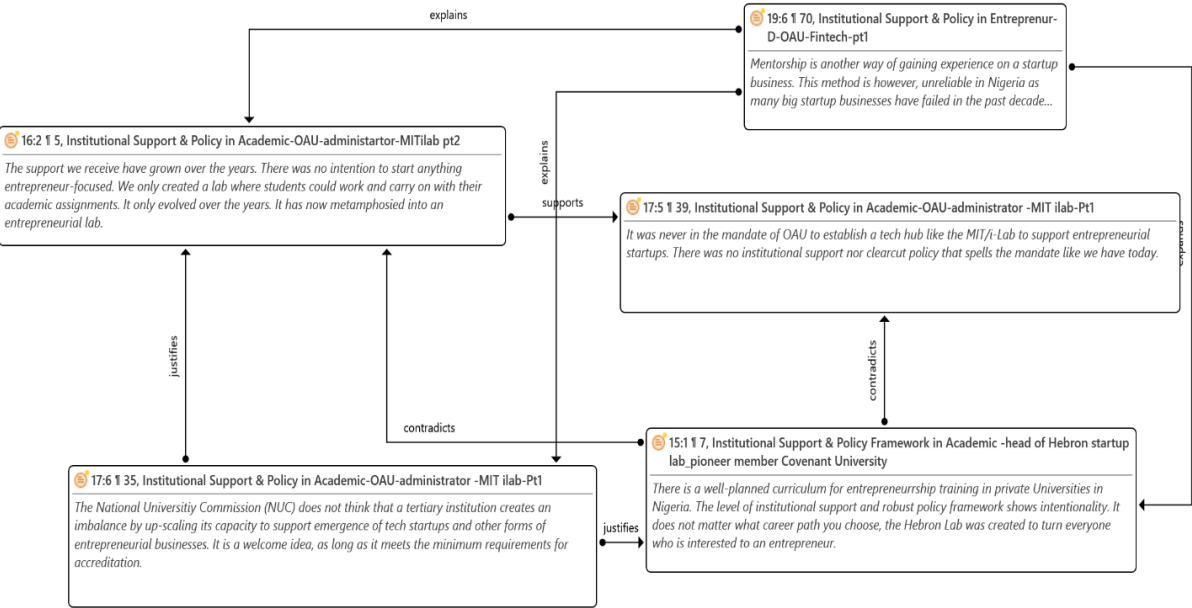


Figure 7: Access to Markets for Tech startups in Nigeria

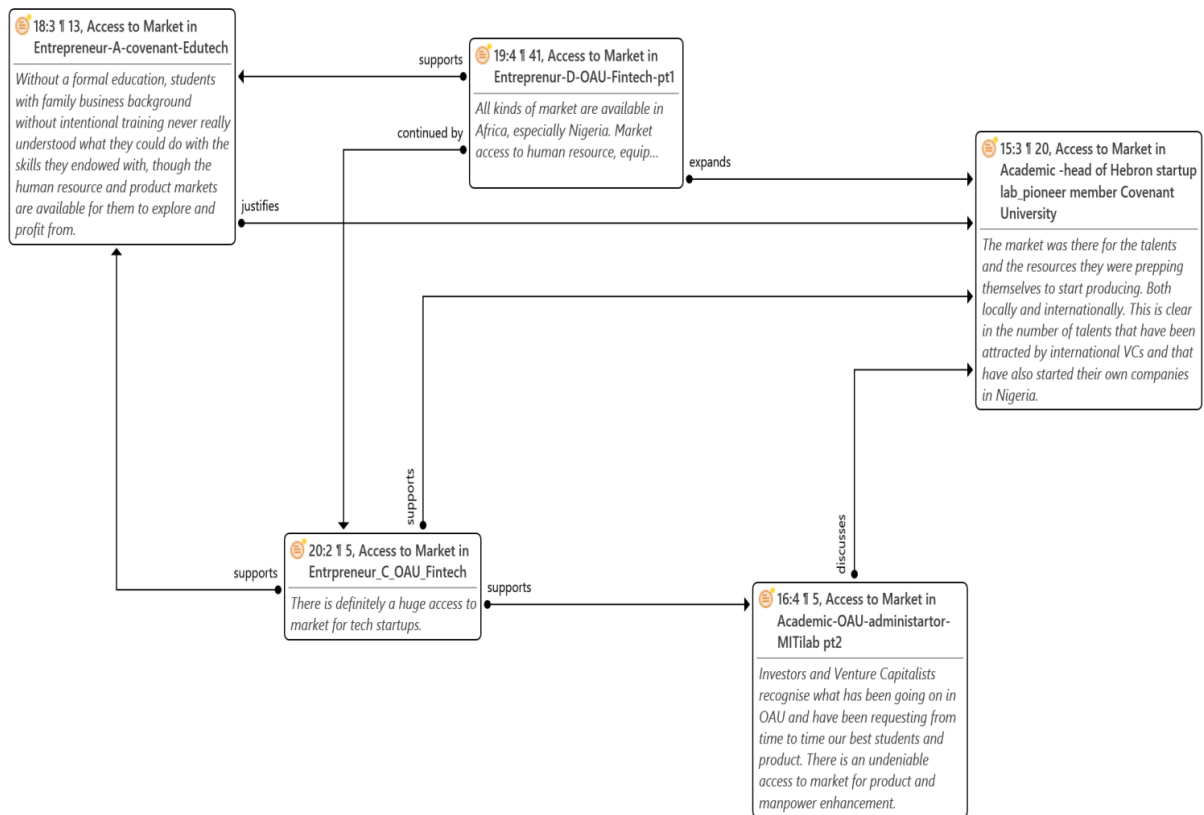
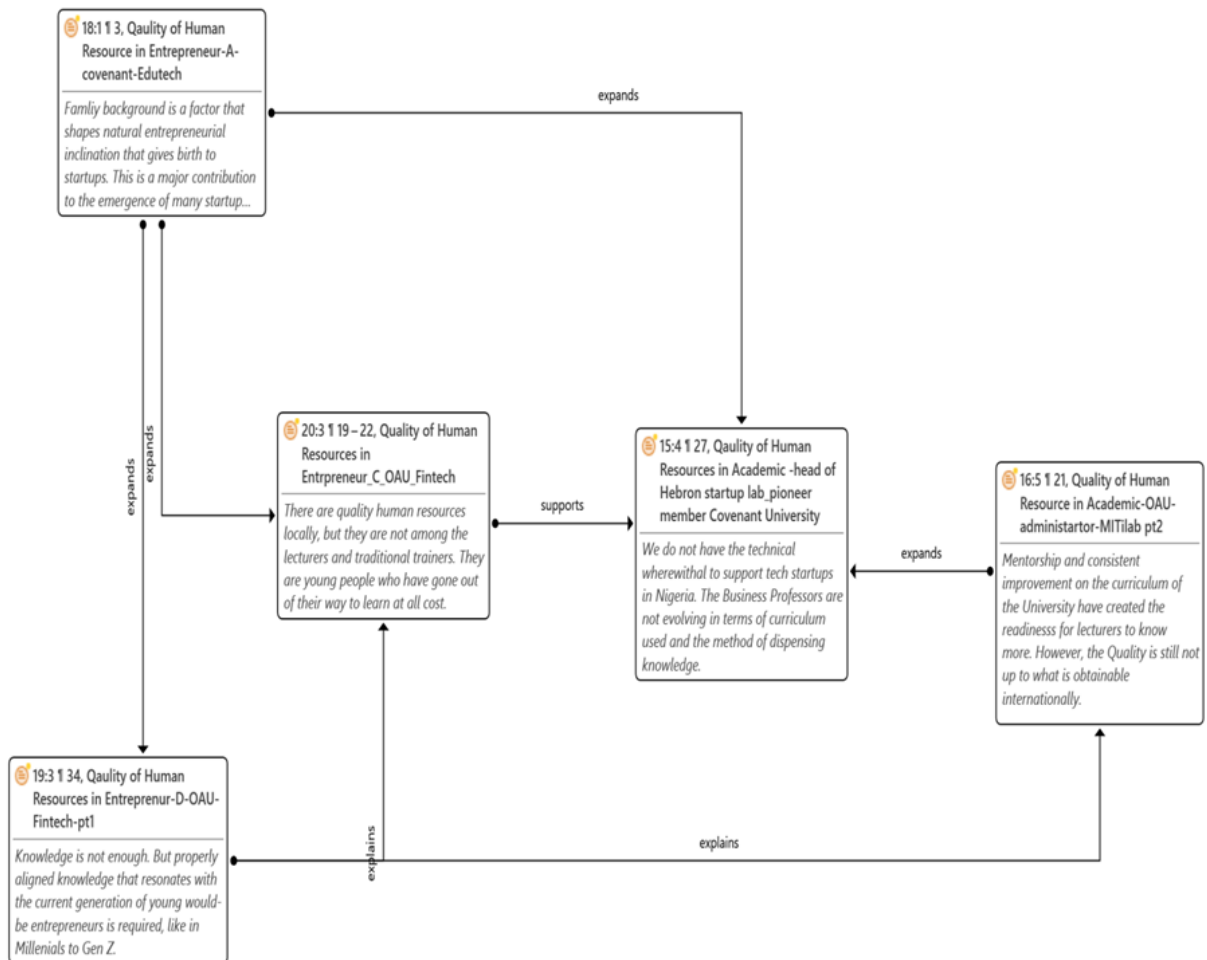


Figure 8: Supply-side Quality of human capital for tech start-ups in Nigeria



APPENDIX 4: Interview Transcripts

Link to Interview recordings: [HERE](#)

Link to Interview transcripts: [HERE](#)