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DIGITAL ENTREPRENEURSHIP DEVELOPMENT IN NIGERIA: A PANACEA FOR HARNESSING EMERGING TRENDS IN TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT IN AFRICA.

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Abstract

The globalization of the world calls for the whole world embracing digital entrepreneurship as a fast approach to delivering achieving goal towards industrialization. It has become clear that the production of goods and services is being made easier and simple through digital application. This study explores the various types of digital entrepreneurship developments, their characteristics and benefits. E-Views software was used to carry out the analysis. The study adopted ordinary least Square (OLS) and co-integration techniques auto-regression distributive lag (ARDL) techniques were utilized to estimate the degree to which the variables were co-integrated with one another using data between 1992 to 2021 (30 years). Gross Domestic Product was used to measure the development, while the explanatory variables were measured using patent application, trademark application, secured internet access, mobile subscription, and access to electricity. The result revealed that the countries studies are still developing, digital entrepreneurship should be seen as an essential tool towards positive economic development. It was also discovered that there is relationship between digitalization of entrepreneurship space and development of counties. It was recommended that countries should implement policies that can increase access to internet, ease access to patent and trademark application and provide a universal access to clean energy. Skills that are apparently geographically marketable should be thought in schools teaching entrepreneurship programs as a skill. There is the need for the government to knowledge computer application which is an enhancement to anything digital should be adopted when teaching entrepreneurship lessons.

Keywords: Digital Entrepreneurship, Panacea, Harnessing, Emerging Trends, Technology, Sustainable Development.

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Introduction

Computer advancement was a launching pad to digitalization of the economy towards the end of world war. This impetus was as a result of personal computer commercialization in the 1980s and subsequent evolution of wide web in the early 1990s. it is disappointing to observe that till 21st century people are yet to key into digital entrepreneurship development. The digitalization of the economy may change the very concept of entrepreneurship. The revolution of digital space gave rise to technological advancement such as connectivity, computing, digital device, artificial intelligence, biodata and others (Reuschke, Mason, & Syrett, (2021). The advent of digital space has introduced a new innovation in entrepreneurship development. The infusion of digital technologies into entrepreneurship, entrepreneurial processes become more has made entrepreneurial outcomes become increasingly competitive. The result effect is digital transformation which harnessed technological entrepreneurship and made it more competitive.

Entrepreneurship development discuss is evolving and calls for concerted efforts by government to harness all the factors that encourage the development of entrepreneurship in the society. Entrepreneurship study cannot be undertaken by the private individuals alone but requires synergy by both government and the private sector to involve the young and talented youths in the society ready to spill out the ingenuity in them. The word digital entrepreneur is a new development within the innovative environment to find a new area that has hidden innovations to offer the society. Digital entrepreneurship involves the adoption of different technological tools to create an internationally marketable skill that can be acceptable for the purpose of enhancing life for the humans to exist (Reuschke, Mason & Syrett, 2021). The background of digital entrepreneurship is adaptability to economic challenges in the thirty first century. It must consider the place of the youths in innovative climate for which the developing countries must play a part and co-exist with people of other climes. Digital entrepreneurship must consider the students mindset in achieving skills that must stand for the future (Anca & Mircea, 2024).

Digital entrepreneurship is beyond construction skill it has to do with skills that are visible online and internet enabled innovations. This is true as the world today is a global village and coverage is more of internet enabled skills. Amadi, et. al. (2021) defined digital entrepreneurship as online businesses that individuals create and run. Online entrepreneurial ventures can be sources of passive income or active sites for selling goods and services. This can offer an entrepreneur new ways of finding customers, reducing costs and collaborating with others. Digital entrepreneurs combine business, market knowledge and network technology to reinvent traditional business practices through digitization. It acknowledged as an geographically acceptable and marketable skills. These skills are self employed with the addition of operating via digital platforms. They rely on Information Technology (IT) and digital media tools to find potential customers. These tools have given digital entrepreneurs the opportunity to promote their business outside of their local community. Digital entrepreneurship is like an enabler to cloud businesses such as e-commerce, software engineering, networking, programming and others. It ensures that possibility of reaching people in the comfort of their homes and sometime does not require physical mobility. It is highly acknowledged that mobile entrepreneurship development that propels other entrepreneurship businesses.

Statement of Problem

Digitalization of entrepreneurship has long not been given the appropriate recognition in the business environment. World all over, individuals seem to be excelling in their pursuit of entrepreneurship without knowing that promoting digitalization of the business world and

making reference to digital entrepreneurship. In the past much time research on entrepreneurship has dwelt on both primary and secondary entrepreneurship. Digital entrepreneurship research is in its infancy among the stock of literature on entrepreneurship development in Africa. Digital entrepreneurship research is in its infancy. There is a well-recognized need for more research on digital entrepreneurship. Not much studies are available on digital entrepreneurship. There is the need for well-recognized research on digital entrepreneurship to ascertain economic activities that constitute digital entrepreneurship and its relevance to the economic space. There is also the need to widen the knowledge of digital entrepreneurship within the academic cycle to introduce a new concept of entrepreneurship to students, academia and the society at large. If this is true, this paper unveils the concept of digital entrepreneurship by trying to resolve pertinent questions such the types, characteristics and benefits of digital entrepreneurship to the society.

Objective of the Study

Objective of this paper is to address the concepts and challenges of digital entrepreneurship in selected African countries. Specific objective of the study is to investigate the following;

(i) Types of digital entrepreneurship
(ii) Characteristics of digital entrepreneurship
(iii) Benefits of being a digital entrepreneur
(iv) What is Different in the Digital Economy?
(v) Digital Platforms and Digital Entrepreneurship
(vi) Implications for entrepreneurship of the nature of the digital economy?
(vii) Regulating Digital Entrepreneurship
(viii) Challenges of Digital Entrepreneurship in Africa

Clarification of concepts

(1) Digital Entrepreneurship:

Digital entrepreneurship is the practice of pursuing “new venture opportunities presented by new media and internet technologies” (Davidson & Vaast, 2010: 8). It is similar to traditional entrepreneurship in the sense that “digital ventures aim at generating a financial profit and are directly inscribed into the economic realm, such as creation of a new company or commercialization of an innovation” (Davidson & Vaast, 2010: 2).

The digitalization of the economy may be changing the very concept of entrepreneurship. For example, Sussan and Acs (2017) ask \what about Uber drivers and AirBnB renters? Are they digital entrepreneurs?"

To Le Dinh et al. (2018) digital entrepreneurship means the combination of the conventional entrepreneurship combined with the new innovative way of using technology in businesses

Digital entrepreneurship ventures range from large “established firms that develop hardware, software, and networking technologies” to small start-up firms that use information and communication technologies (ICTs) to undertake their businesses activities (Rosenbloom et al., 1993).

It is also the spotting and pursuit of business opportunities based on the production of digital artifacts, platforms, and infrastructures that, when applied, enable the delivery of services by means of technological means and a powerful tool for local innovation and economic revolution. (Ndemo, & Weiss, 2017).

Kraus et al, (2018) views digital entrepreneurship as entrepreneurship of discovering new profit opportunities) that works within the borders of already existing platforms. Meaning

they may not be digital in themselves but are engaging in activities that require participation via digital means, for

Digitalization of entrepreneurship is long not given the appropriate recognition in the business environment. World all over, individuals seem to be excelling in their pursuit of entrepreneurship without knowing that promoting digitalization of the business world and making Digital entrepreneurship is the practice of pursuing "new venture opportunities presented by new media and internet technologies" (Davidson & Vaast, 2010: 8). It is similar to traditional entrepreneurship in the sense that "digital ventures aim at generating a financial profit and are directly inscribed into the economic realm, such as creation of a new company or commercialization of an innovation" (Davidson & Vaast, 2010).

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Conceptual clarification

Panacea; Panacea explains the solution to a critical situation be it economic, political or religious occurrences in a country. It is a condition or attempt to provide a solution to issues that call for concern in an economy.

Harnessing; this explains harmonization of facts and streamlining of concepts. It is an attempt to put facts in order and make it meaningful. It is a solution to an ongoing discuss. Academics, discuss, a panacea entails remediation of a contending issue. A suggested fact or recommendation aimed at solving challenges.

Emerging Trends; this is assumed to mean an ongoing activity. A trend means a going event which its solution is being sort after. It could be a new issue in the area of a discipline. When an issue becomes a trend, it means it may have lasted for quite a decade, more or less.

Sustainable Development: sustainable development explains the continuity in development. Consistent development of improvement in lining standard for period of time more than a period of three decades. It is a continued improvement in the living standard of the people in the area of social infrastructure such as the provision of water, electricity, good road network, health facilities and other areas of human advancement,

(2) Types of Digital Entrepreneurship

As an evolving concept, digital entrepreneurship has been considered to involve online entrepreneurial ventures can be sources of passive income or active sites for selling goods and services such as:

1. E-commerce
2. Blogging & content creation
3. Online courses and Education platforms
4. App and software developments
5. Affiliate marketing
6. You tube channels & video content creation
7. Drop-shipping businesses
8. Digital marketing agencies
9. Video Editing
10. Virtual assistants & freelancing
11. Web development & design services
12. Podcasting & audio content production
13. E-book publishing & self publishing
14. Online coaching & consulting
15. influencer marketing
16. Subscription box services
17. Digital product creation (template, presets
18. Online fitness & wellness coaching
19. stock photography & video-graphy
20. Niche community forums & platforms
21. Analysis of mathematical data
22. Online loan Apps
23. Uber-App
24. Software Development

Source: Desk research, 2024

(3) Characteristics of digital entrepreneurship

Digital entrepreneurship ventures posses a few defining characteristics such as follows;

1. They're typically sole proprietorships or businesses with small teams.
2. They usually operate entirely online, but some may also offer their services locally via digital hubs and internet distribution.
3. These businesses may have lower average overhead costs, which can help them to be more resilient to changes in markets.

(4) Benefits/gains of digital entrepreneurship economic activities

Digital entrepreneurship ventures have several benefits which made it a worthwhile economic activity. These gains are as discussed below;

(i) Accessibility

While location can be a primary factor in determining the success of a physical store, online shops and businesses are typically accessible from customers' homes. This means that the potential customer base for an entrepreneurial endeavor is initially much larger, though it may rely more on advertising to get website traffic. This factor can help smaller size operations compete with larger companies for customers without the necessity of growing to the same size as their competition.

(ii) Scalability

Most digital entrepreneurs start by fulfilling a niche market or inventing a product or service, then scaling the business to a wider audience once it's achieved some measure of success. Working with digital markets can allow an entrepreneur to scale a company in a way that's both productive and cost-effective. This potential for growth without having to expand a business physically or rent additional space may encourage digital entrepreneurs to take more opportunities to scale the business, since the level of risk may be lower than with a traditional business.

(iii) Profitability

Starting a business on the internet can allow a company to scale its earnings, such as by earning revenue from advertisements online by receiving a percentage of profit each time a user clicks, views or interacts with the advertisement. A digital company can also market to potential customers by creating content, such as videos detailing products or services. With a website, it may also be easier to implement subscription payment methods for services or renewable products, which can help secure a consistent customer base.

(iv) Adaptability

Digital entrepreneurship also allows businesses to pivot their services, branding and pricing without adding significant turnaround time. For example, a venture of this sort may adjust its pricing by altering online marketing information rather than investing in changing physical advertisements. It could also rebrand by focusing on changing aspects of its website, marketing materials and products rather than adjusting the layout or design of a physical location.

(5) What is Different in the Digital Economy?

What is different in the digital economy from an entrepreneurial perspective? This includes asking sub-questions such as: How do digitization and digital artifacts affect the nature of business and of new venture creation? What is the implication for entrepreneurship of the nature of the digital economy? it has to do with understanding digital economy from the angle of its marketability and its global acceptability compared to other types of entrepreneurships and their impact on the economy.

(6) Digital Platforms and Digital Entrepreneurship

Digital platforms have become one of the most discussed forms of and influence on digital entrepreneurship, as a growing literature attest to. This literature has studied the design and development of such platforms, their social, business and economic impacts, and the regulatory challenges that they pose. A universally accepted definition of a digital platform is lacking. Similar to traditional platform business models, such as newspapers that bring together readers and advertisers, a digital platform fulfills an intermediate, or matching function, between various users, but in the digital economy. Nambisan, Wright and Feldman, (2019) defined a platform as business strategy as much as an organization", and many scholars share the idea that digital platforms are both form and market (Ghezzi & Cavallo, 2018). Generally, digital platforms contain four kinds of participants (who often switch roles or fullfill more than one role at once): the owners of the platform, the producers of content, the customers who consume the content, and the providers of the interfaces between producers, customers and the owners (Van Alstyne et al., 2016). A distinction can be made between one-way digital platforms (such as Spotify) and two-sided (such as Uber App) and multi-sided platforms (such as Microsoft) (Litan, 2016).

Multi-sided platforms t and to be intermediaries or matchmakers, and often do not even produce their own content such as Face book (Nuccio & Guerzoni, (2018). Digital platforms have themselves changed the nature of competition in markets, and disrupted many traditional, pipeline business models. Often-quoted examples are of Amazon upending traditional booksellers such as Borders, or Netix upending traditional video-rental forms such as Blockbuster. This has led Van Alstyne, Parker and Choudary, (2016) to warn that when a platform enters a pipeline form's market, the platform almost always wins." While digital platforms are prone to dominate their market, they lead to further disruption through enabling 3rd party entrepreneurs to start new digital ventures on the platform. For this reason, Litan (2016) considers digital platforms as launching pads for new and potentially disruptive forms". Thus, digital platforms are an essential phenomenon in digital entrepreneurship. Digital entrepreneurs pursue opportunities to produce and trade in digital artifacts on platforms, and create these platforms.

(7) Implications for entrepreneurship of the nature of the digital economy?

In order to answer the question, what is different in the digital economy from an entrepreneurial perspective, it is also necessary to consider the broader context of the digital economy. Here, there are two aspects that are most crucial. The first is the presence of (indirect) network effects (Rysman, 2009), and the second is the implications for business models when certain costs fall substantially and perhaps approach zero," due to digitalization (Schrage, 2020).

Network effects arise when the number of participants in a market affects the value then everyone obtain on that market. There are both direct and indirect network effects, and they can be either positive or negative (Rysman, 2009). The most familiar example of a (positive) direct network effect is possible of a telephone network, where it becomes more valuable to own a telephone the more people are connected to the network. Indirect network effects refer to network economies where the value to the network increases for one side of the market (or platform, as will be discussed below) if there are more users on the other side of the market platform. For instance, the value of the ride-hailing platform Uber, increases for taxi drivers if there are more rider users on the platform (and vice versa).

(8) Regulating Digital Entrepreneurship

The unique regulatory challenges posed by the emergence of digital entrepreneurship are due to the characteristics or features and consequences of digital infrastructures and entrepreneurial ecosystems interacting. This sub-section will explain these features and indicate the conundrums they pose for regulators. The first challenge is how to defined digital entrepreneurship, and moreover how to defined a digital platform for the purposes of regulation. As was argued by Bortolini, Cortimiglia, and Danilevicz, (2018). digital entrepreneurships distinctive due to the centrality of digital artifacts and their influence on the process of entrepreneurship.

In the case of traditional entrepreneurs who sell goods online or (for example) drive a taxi as part of the Uber ride-hailing platform, they do not produce or sell digital artifacts and merely uses a digital artifact (e.g. the Uber app) to facilitate a part of their business. The owners of the Uber platform, however, are digital entrepreneurs, as they have created a digital artifact and used this to establish and grow a form. Regulating the Uber platform as distinct from regulating the self-employed drivers is a challenge. The Uber example given here is representative of the challenge. For instance, while the self-employed drivers are competing against each other, Uber may or may not be a monopoly, or it can become a monopoly if it should drive competitor taxi forms out of the market. Therefore, the difficulty that the regulator face is to determine whether a digital platform is a monopolist or not?

(9) Challenges of Digital Entrepreneurship in Africa

1. It has been linked with a high risk of failure, despite the fact that there are many great opportunities in digital entrepreneurship due to radical change in technology especially in the developing countries. Inadequate technological development and innovation in Africa is mostly attributed to weak institutions and inadequate resources (Acemoglu, 2010; Sachs, 2010) and affordability. Therefore, the absence of the appropriate structure makes it difficult for entrepreneurs to scale through.
2. Institutional voids are prevalent in developing countries. Institutional void is the absence of intermediaries that connect buyers and sellers efficiently, which create a unnerving difficulties for companies making effort to operate in an emerging markets. Institutional voids are categorised into internal and external institutional void.
3. The internal institutional void includes depends on how well someone uses ICT, how well they comprehend technology, how well they can afford to use it, and how they feel and perceive technology. In addition, the external institutional voids includes government regulations, market Challenges, weak digital infrastructures like internet, level of trust in society, inadequate support for e-industries.
4. The findings of Samara and Terzian indicate that weak digital infrastructures affect digital entrepreneurship which results to lack of policies and regulations and inaccessibility of start-up funds.
5. Hair et al., (2012) studied the advantages and challenges of the digital entrepreneur by examining the role of digitalized community and how successful digital entrepreneurs benefit from electronic community technologies to simplify effective communication with the related stakeholders. Ngoasong (2017 explored how context and technological background influences digital entrepreneurship in a resources scarce country of enormous resources.

Fig. 1. Digital Entrepreneurship Activity per country as % of African total

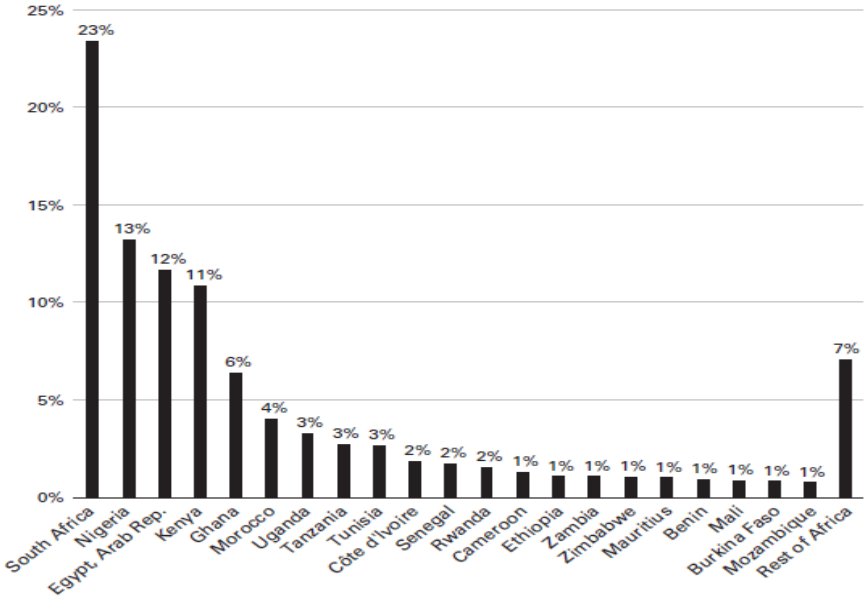


Figure 1 revealed that in Africa, South Africa has the highest adaptability to digital entrepreneurship development reflecting 23%. This is followed by Nigeria, Egypt and Arab with 23, 23 and 12% respectively. Other African countries with adaptability to digital adaptability entrepreneurship are Kenya, Gambia, Morocco and Uganda showing 6, 4, 3, 3 per cents respectively. The least in the adaptability to digital entrepreneurship are Cameroun, Ethiopia, Zambia and others reflecting 1 per cent for the rest selected nine countries in Africa. It could be deduced that in Africa, Nigeria is the highest African country that has to a large extent adopted digital entrepreneurship development to facilitate the internationally and geographically acceptable entrepreneurship.

Emerging sectors of digital entrepreneurship in Africa

Our analysis highlighted that the most promising sectors are those with the greatest potential to support the development agendas:

(i) Educational technology (Ed Tech): the use of digital technologies to facilitate learning;

(i) Financial services technology (Fin Tech): the use of digital technologies to provide financial services to enhance its use and delivery to customers;

(ii) Health technology (Health Tech): the use of digital technologies to improve all aspects of the health care system; and

(iii) Agricultural technology (Agri Tech): the use of technology in agriculture, horticulture and aquaculture, for increasing profitability, crop quality, harvest volume and productivity.

Promising Sectors and their Contributions to Africa's Development Agendas

Goal 1: End poverty in all its forms everywhere

1. Ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

2. Ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.
3. Ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.
4. Ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.
5. Double the agricultural productivity and incomes of small-scale food producers.
6. Ensure sustainable food production systems and implement resilient agricultural practices.
7. Increase investment in rural infrastructure, agricultural research and extension services to enhance agricultural productive capacity.
8. Correct and prevent trade restrictions and distortions in world agricultural markets.

Goal 2: Ensure healthy lives and promote wellbeing for all at all ages

1. Double the agricultural productivity and incomes of small-scale food producers
2. Ensure sustainable food production systems and implement resilient agricultural practices
3. Increase investment in rural infrastructure, agricultural research and extension services to enhance agricultural productive capacity.
4. Correct and prevent trade restrictions and distortions in world agricultural markets

Potential challenges to digital entrepreneurship in Africa

a) **Internet access and affordability:** Connectivity to the Internet plays a huge role in digital entrepreneurship. However, across Africa, Internet coverage is particularly low, with only 26 percent coverage in sub-Saharan Africa, as of the end of 2019, based on the compound annual growth rate.61 Such low connectivity impacts the usage and scale up of the key digital tools driving the fourth industrial revolution. Efforts must be made to ensure universal Internet access across the region. Although the cost of mobile Internet is gradually falling on the continent, its affordability is still questionable. For instance, a 1 GB plan in sub-Saharan Africa is equivalent to 6.8 percent of monthly income, while in South Asia, it is about 1.2 percent of monthly income.

b) **Inadequate infrastructure:** Inadequate infrastructure is a fundamental issue that could prevent digital entrepreneurship from reaching its full potential. In the health care sector, energy access is a vital enabler of health care service delivery, but sub-Saharan Africa has the lowest energy access rates in the world. Within homes, the unavailability of energy promotes the use of unhealthy traditional fuel sources such as kerosene and other combustible fuels. Provision of national address systems and infrastructure across the continent is crucial to facilitate the delivery of goods to clients and consumers. Although the prospects of e-commerce in Africa are bright, this is an important bottleneck that could undermine efficiency and effectiveness, and ultimately prevent the continent from benefiting from the yields of digital transformation.

c) **Lack of sufficient data sets for precision agriculture:** The limited availability of data sets for artificial intelligence is a challenge for precision agriculture on the continent. Africa generally lacks sufficient tailored low-cost publicly available data sets to train algorithms and identify patterns in images meant for detecting crop diseases. If these data sets are made accessible and tailored/labeled and classified according to local crops, the use of precision agriculture will become more prevalent across Africa.

d) **Lack of awareness related to intellectual property:** Insufficient intellectual property access and protection constrains participation in digital trade. A large proportion of entrepreneurs in developing countries are not aware of how to protect their ideas and earn income from them through commerce. The legal framework of African countries should be strengthened to protect copyrights and trademarks in the digital era. Enterprises that embrace intellectual property rights stand a better chance of realizing growth, income and employment than enterprises that are unaware of how intellectual property can enhance their businesses, according to the World Intellectual Property Organization (WIPO).

Potential opportunities for digital entrepreneurship in Africa

(1) Optimism of the African youth: A sense of 'Afro-optimism' remains high among young people on the African continent, a trend reported in a survey conducted by the Ichikowitz Family Foundation. This optimism is mainly driven by the strong sense of individual responsibility, entrepreneurialism and confidence in an African identity. Sixty one percent of survey respondents believed that their respective countries are creating a culture of innovation and entrepreneurship.70 Young Africans are determined to shape the destiny of their continent, and this optimism should not be underestimated.

(2) Mobile money usage: Digitalization through e-commerce and digital financing has provided Africans with an exceptional opportunity for reducing trade costs and leapfrogging into the fourth industrial revolution. Sub-Saharan Africa has been at the forefront of the mobile money industry for over a decade, with 605 million registered accounts in the region by the end of 2021.71 Sub-Saharan Africa had the highest number of registered and active mobile money accounts globally as of 2021. Sub-Saharan Africa also has the highest transaction volumes and value compared with any other region in the world.72 This is an asset for Africa's sustainable development, as it will ensure financial inclusion and innovation in an already-developed financial infrastructure. The result could be more innovative financial products and services.

(3) Increase in digital literacy: Basic digital skills provide many advantages, including capacity to operate computers and smartphones; set up online accounts and profiles; access and store information online; access online resources and communicate digitally.73 Digital literacy rates go hand-in-hand with access to digital means.74 This suggests that an increase in Africa's access to the Internet represents (at minimum) an increase in the basic digital skills rate. Although Africa has one of the lowest Internet access rates in the world, there has been a steady growth of Internet users in recent years. From 2013 to 2020, the number of Internet users has more than doubled, from 240.15 million to 566.14 million users.75 These 2020 figures surpassed North America and Latin America and the Caribbean, which registered approximately 467.82 million and 332.91 million users, respectively

Opportunity–Based Entrepreneurship Theory (OBET)

This paper is predicated on Opportunity-Based Theory propounded by Peter Druker & Howard Stevenson, (1995). This is explains the hub of entrepreneurial management is the pursuit of opportunity without regard to resources currently controlled. An opportunity-based approach provides a wide-ranging conceptual framework for entrepreneurship research (Shane, 2000). Entrepreneurs exploit the opportunities that change (in technology, consumer preferences and creates (Drucker, 1995). He further explains that entrepreneur always searches for change, responds to it, and exploits it as an opportunity. What is apparent in Drucker's opportunity construct is that entrepreneurs have an eye more for possibilities created by change than the problems. Stevenson (2006) extends Drucker's opportunity-based construct to include resourcefulness. This is based on research to determine the differences between entrepreneurial management and administrative management.

Empirical Literature

Several scholars in their studies have tried to expand the concept of digital entrepreneurship. This was further broadened by the work of lungu and Mircea, **(2024) on** digital entrepreneurship: an empirical approach on students' perceptions and attitudes. Focus of the study is on changes on entrepreneurship development. The study widened understanding of the concept of digital entrepreneurship development. Ordinary Least Square was adopted in the analysis.

The hypotheses were analyzed using Ordinary Least Square regression model. It was discovered that there is a general trend in using the ICT tools for the entrepreneurial intention. It was also found that there is permanent connection between digital entrepreneurship and skills, attitudes, perceptions, motivation and educational background. Paulinus, et al, (2021) in a Systematic Review conducted a study on digital entrepreneurship in the Last Decade. The study focused on utilization of ICT in forecasting the rate of new enterprises in the Digital Entrepreneurship sector sustainability, in the twentieth century. The study adopted a *Systematic Quantitative Assessment Technique (SQAT)*. It was discovered that existing research has been both empirical and conceptual in equal measure with only one instance in mixed mode.

Another systemic review was carried out by Campos, (2024). The focus was to make a comparative theoretical analysis of the various theories relating to digital entrepreneurship. The study adopted epistemological approach in analyzing the various theories relating to digital entrepreneurship. It was discovered that in conceptual terms digital entrepreneurship incorporates the same characteristics of search for opportunities and innovation as in the conventional form when considered from the perspectives of economics, psychology and management. Result also revealed that digital entrepreneurship has a different specificity than conventional entrepreneurship, necessitates more study to better understand it. Another literature study on comparative theoretical analysis of the digital entrepreneurship characteristics was carried out by Campos, (2024). The study focused on characteristics of entrepreneurship on the perspective of economics, psychology and management. Systematic analysis was carried out using a review of other studies. It was revealed that in conceptual terms digital entrepreneurship incorporates the same characteristics of search for opportunities and innovation as in the conventional form when considered from the perspectives of economics, psychology and management.

An empirical approach on student's perception s and attitudes to digital entrepreneurship was conducted by Anca Elena L and Mircea R. G. (2021). The study focused on students' attitude and perception to understanding of digital entrepreneurship. Analysis was carried out through

the use of Smart PLS 4 statistical software. In the result, it was argued that It was found that there is significant relationship the relationship between motivation and attitudes and between motivation and digital entrepreneurship. Aishatu and Murni, (2019) conducted a study on Challenges of Digital Entrepreneurship on Development of Africa. The study focused on developing digital entrepreneurship. The paper adopted regression analysis by EViews for the analysis. it was discovered that there is significant relationship between the development of a country and technology. It was also found that there is inadequate technological facility in African countries for the development of digital entrepreneurship.

The place of digital entrepreneurship in developing countries was studies by Jonas, Nadine, K. and Darwin, (2021). The study focused on institutional voids and foster entrepreneurship. The study adopted descriptive statistics in analyzing the data, it was discovered that in rural India, both the families and communities (in particular self-help groups) of entrepreneurs have a positive and significant effect on entrepreneurship that is strengthened when digital technologies are used. It was also found that support from business partners, is negatively associated with entrepreneurship in developing Africa.

Research Methodology

3.1 Data

Africa is the largest continent in the world and second to Asia in population but none is on top chart in terms of digital technological advancement even with the available vast opportunity. It is within the confines of this paper that study of selected large economies of the world is selected (with emphasis on Africa's GDP) including Nigeria, Egypt and South Africa. Gross Domestic Product (GDP) helps in the measurement of determination of a country's economic performance and growth rate (Brinkman & Brinkman, 2011). One of the most populous countries in Africa is Nigeria with about 211miliion people with large market and technological possibilities. This is followed by Egypt with also 104 million. The third economy in Africa is South Africa with a population of about 58 million. World Bank provided data for the variables used for this study.

3.2 Research Design

Annual data from selected countries covering a period of thirty (30) between years between 1992 and 2021 were made available by World Bank were utilized and subjected to analysis. The study adopted a correlated research design. The study utilized a quantitative data method. Therefore, the dependent variable in the regression model of the study was developed representing Nigeria, Egypt and South –Africa' GDP. The reason is because GDP is widely used to measure economic growth and indicates that the higher the GDP, the higher economic growth.

The independent variable is the digital entrepreneurship represented by application, trademark application, subscription of mobile cellular secure internet server and electricity access. The variables represented digital finance. Control of inflation (INF) was utilized in order to check causality of variables to facilitate accurate conclusion.

Analysis of the linear regression is stated clearly as follows;

$$GDP = f(PA, TA, SI, MS, AE, INF) \text{ - - - - - - - - - - -} \quad (1)$$

The function form of the model is presented as follows:

$$Y = \beta 0 + \beta PAPAt + \beta TATAt + \beta SISIt + \beta MSMSt\ \beta AEAEt + \beta INFINFt\mu t \quad (2)$$

Where;
GDP = Gross Domestic Product,
PA = Patent Application,
TA = Trademark Application,
SI = Secured Internet Servers,
MS = Mobile Cellular Subscription,
AE = Access to Electricity, and
INF = Inflation.

3.3 Data Collection Method

Because of the nature of this paper, data employed was secondary data in other to access the digital entrepreneurship challenges and Africa's development. Data for this study was generated from World Bank (1992 to 2021).

3.4 Data Analysis

Evaluation of the interaction between digital entrepreneurship and the development of Africa, the study utilizes the approach of co-integration. This techniques is acceptable due to the time series data at (1), and the unit, root, which can lead to spurious regression

To evaluate the interaction between digital entrepreneurship and the development of Africa, the study uses the co-integration approach. This technique is justified because time series data frequently have a unit root, which can lead to spurious regression. Furthermore integrating time series data at I(1), also known as order one, indicates that the data is non-stationary and therefore at I(0). There are various methods of co-integration techniques available. Nevertheless, in this study, the auto-regression distributive lag (ARDL) techniques were utilized to estimate the degree to which the variables were co-integrated with one another. ARDL technique overcomes the weakness present in other tests of co-integration. Narayan (2004) ARDL technique overcomes the challenges associated with autocorrelations and variables omissions, and all the variables in the model are assumed to be vector or endogenous variables. The ARDL model consisting of the digital entrepreneurship and African development from the model are presented below:

$$\begin{aligned} \Delta \ln(GDP)t = {} & a0 + \lambda 1 \ln(PA)t-1 + \lambda 2 \ln(TA)t-1 + \lambda 3 \ln(SI)t-1 + \lambda 4 \ln(Ms)t-1 \\ & + \lambda 5 \ln(AE)t-1 + \lambda 6 \ln(INF) + \lambda \ln(PA)t-1 + _ P\ 1{=}0\ \beta 1_\ln(PA)t-1 \\ & + _ Pi-0\ \beta 2_\ln(TA)t-1 + _ P\ i-0\ \beta 3_\ln(SI\ )t-1 + _ P\ i-0\ \beta 4_\ln(MS)t-1 \\ & + _ P\ i-0\ \beta 5_\ln(AE)t-1 + _ P\ i-0\ \beta 6_\ln(INF)t-1 + + \varepsilon 1 \end{aligned}$$

The lengthy model showed in the first operator difference in the model lag is the intercept with the elasticity while the coefficient where lag length of the model is denoted by ln λβ1 to λ β6, and εt = the error term, the first difference operator as the intercept by_, α as being the co-efficient. Use the ordinary least square (OLS) approach to was adopted to check if the variables are co-integrated in the equation estimation before estimating co-integration under ARDL and the combined significance of the variables was estimated using F-statistics to determine their long-term relationship with one another.

4. Analysis Results and Discussions

4.1 Test of Stationarity (Unit Root) and Co-integration Test

Con-integrating the ARDL techniques, it became important to determine if the variables are integrated in the same order. It was also important to test stationarity to prove non-variability of merging at level two, which classifies the F-statistics computed as invalid. Table 1 unit

root revealed dependency of the variable for the three countries in a mixture of stationarity at a level and first difference. This mixture justifies ARDL selection for the study co-integration. In a further ARDL bound test, the ARDL con-integration as provided in table 1 established in order to determine there is no long run relationship between the variables.

4.2 Results in table 2 revealed that digital entrepreneurship factor affect development in Africa

Table 2 result showed a Patent application (PA) positively and significantly affecting development in Nigeria and south Africa, while negatively affecting development in Egypt. With coefficient of 0.0168, 0.5812 and 0.2013 for Nigeria, Egypt and South Africa respectively. This showed that an increase in application of patent for new start-ups results to an increase in the number of entrepreneur therefore development and this conforms to the findings of Saini & Jain (2011). Patent is reflected to be a technological output of innovative activity (Schmookler 1966). Trademark application (TA) positively and significantly affect development in Nigeria and Egypt, while negatively affecting development in South Africa. With coefficient of 0.0002, 0.0006 and 0.0002 for Nigeria, Egypt and South Africa respectively. This explains that an increase in trademark application will increase development in Nigeria and Egypt while decreasing in South Africa.

This indicates the importance of trademarks which gives a company the exclusive right to use its products while averting others from using identical products or services. This confirms the study of Benny (2020),whose study affirms the importance of trademark and patent in developing the Indian economy . Furthermore, the result shows a negative effect of access to internet (AI) with development in Africa. With coefficient of -0.7303, -0.089 and -0.0357 for Nigeria, Egypt and South Africa respectively. This means that an increase in internet access reduce development. This finding contradicts the study of Lapatinas (2019), and Sichel (1999). However, the negative effect in this study could be due to the high cost of internet in most countries in Africa. Additionally, mobile subscription (MS) also shows a negative and significant effect on development of Egypt and South Africa while showing a positive and significant effect in Nigeria. With coefficient of -0.0000, -0.0000 and -0.0000 for Nigeria, Egypt and South Africa respectively. The result indicated this contradict the finding of Kyem & LeMaire (2006) that found a positive relationship between mobile subscription and development. Access to electricity (AE) indicated a positive and significant impact on development in Egypt and South Africa, however the result shows a negative effect on development in Nigeria. With coefficient of -0.0430, 0.2113 and 0.0671 for Nigeria, Egypt and South Africa respectively. Which could be due to lack of access to adequate and affordable electricity. Lastly, inflation (INF) shows a negative.

Table 1. Results of Bounds F-Test and Unit Root Test

	Nigeria		**Egypt**		**South Africa**	
Level of Significance	Level	First Diff.	Level	First Diff.	Level	First Diff.
1%	-2.57	-2.57	-2.57	-2.57	-2.57	-2.57
5%	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86
10%	-2.51	-2.51	-2.51	-2.51	-2.51	-2.51
Unit Root Test (ADF Test)	0.0767	0.0000	0.1240	0.0001	0.0270	0.0000

Source: E-view

Table 2. Results of ARDL

	Nigeria		Egypt		South Africa	
	Coefficients	t-Statistics	Coefficients	t-Statistics	Coefficients	-Statistics
GDP (-1)	0.2671***	1.242735	0.471205***	3.055617	0.201328***	0.865345
PA	0.0157**	1.007037	-0.002765**	-1.203511	0.0013275**S	1.046182
TA	0.0002**	0.212260	0.000522**	.514413	-0.000262**	-0.672417
A1	-0.6202***	-1.736202	-0.078221**	-1.363231	-0.024673**	-0.617532
MS	5.43E-07***	0.870712	-8.38E-07***	-1.765063	-3.52E-07*** -	0.442227
AE	-0.0320** -	0.162748	0.211237***	0.675181	0.056112*	0.583664
INF	-0.0163	-0.513382	0.022125**	0.688068 -	0.285204***	-1.671752
C	-14.17278	-0.745234	-16.78160	-0.572254	14.54071	1.673545

Note: *,** and *** represent statistical difference at 10%, 5% and !% respectively.
Source: E-Views

Table 2 reveals that digital entrepreneurship factors affect development in Africa, with patent application (PA) positively and significantly affecting development in Nigeria and South Africa, while negatively affecting development in Egypt with coefficient of 0.0168, 0.5812 and 0.2013 for Nigeria, Egypt and South Africa respectively. This implies that an increase in patent application to buy new start-ups will bring an increase the number of entrepreneur and hence development this affirms the findings of Ndemo & Weiss, (2017). Patent is reflected to be a technological output of innovative activity. Trademark application (TA) positively and significantly affect development in Nigeria and Egypt, while negatively affecting development in South Africa with coefficient of 0.0002, 0.0006 and 0.0002 for Nigeria, Egypt and South Africa respectively. This implies that an increase in trademark application will increase development in Nigeria and Egypt while decreasing in South Africa. This indicates the importance of trademarks which gives a company the exclusive right to use its products while averting others from using identical products or services. This confirms the study of Benny (2020),whose study affirms the importance of trademark and patent in developing the Indian economy (Campos, 2024).

Table 3. Test Statistics

	Nigeria	Egypt	South Africa
R-squared	0.5586	0.721020	0.588339
Adjusted R-squared	0.3821	0.566031	0.359638
S.E. of regression	2.5648	0.985175	1.323122
Sum squared resid.	131.56	17.47025	31.51171
F-statistic	3.1640	4.652070	2.572527
Prob. (F-statistic)	0.0174	0.002319	0.038970
Durbin-Watson stat	2.1166	1.468715	2.294153

Table 3 shows the test statistics with R-Squared of 0.55, 0.72 and 0.58 for Nigeria, Egypt and South Africa respectively which are higher than 0.05%. This indicates that the model is fit to be used for policy commendations. Furthermore, the result shows a negative effect of access to internet (AI) with development in Africa with coefficient of -0.7303, -0.089 and -0.0357 for Nigeria, Egypt and South Africa respectively. This means that an increase in internet access reduces development. This finding contradicts the study of Lapatinas (2019), and Sichel (1999). However, the negative effect in this study could be due to the high cost of internet in most countries in Africa. Additionally, mobile subscription (MS) also shows a negative and significant effect on development of Egypt and South Africa while showing a positive and significant effect in Nigeria with coefficient of -0.0000, -0.0000 and -0.0000 for Nigeria, Egypt and South Africa respectively. The result indicated this contradict the finding of Kyem & LeMaire (2006) that found a positive relationship between mobile subscription and development. Access to electricity (AE) indicated a positive and significant impact on development in Egypt and South Africa, however the result shows a negative effect on

development in Nigeria. With coefficient of -0.0430, 0.2113 and 0.0671 for Nigeria, Egypt and South Africa respectively perhaps due to lack of access to adequate and affordable electricity. Lastly, inflation (INF) shows a negative effect on development in all the three countries. This finding agrees with the work of Oladeji1, et al, (2023).

4.3 The Place of Digital Entrepreneurship Development in the Global World

Digital entrepreneurship development, apart from playing an indispensible part in the overall strategy of developing a nation, it has been considered as essential condition for economic growth and development via inter-sectorial linkages such as:

1. Provision of foreign exchange through export earnings.
2. Provision of employment for the teeming population.
3. It is makes production and manufacturing processes easy.
4. Makes availability of technological products possible.
5. It is a yardstick for measuring a nation's ranking among developing and developed nations.
6. It fastens economic growth of a country by increasing her gross domestic product. (Nwanyanwu, 2017).

5.1 Conclusion

Entrepreneurship as a country's economic engine cannot be over-emphasized, especially in emerging economies of the African continent. Digital entrepreneurship is regarded as a vital pillar for job creation, innovation and economic growth by many countries. Digital entrepreneurship gives easy access to products and services. This study explores the impact of digital entrepreneurship on development of Africa. The model in this paper suggests that patent application, trademark application, access to internet, mobile subscription an access to electricity significant impact on economic growth.

5.2 Recommendations

Since it is obvious that digital entrepreneurship development is an internationally marketable skill, it will be useful to any individual that possesses any related skillss if the following recommendations are pursued:

(i) Countries should implement policies that can increase access to internet, ease access to patent and trademark application and provide a universal access to clean energy.

(ii) Skills that are apparently geographically marketable should be thought in schools teaching entrepreneurship programs as a skill.

(iii) Knowledge of computer application which is an enhancement to anything digital should be adopted when teaching entrepreneurship lessons.

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