

Technology Based Business Start-Ups and Youth Employment in Nigeria

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ABSTRACT

This study examined the nexus between technology-based business start-ups and youth employment in Nigeria. The specific objectives of the study were to determine the individual effects of number of technology-based start-ups, value of web-based start-ups, government ICT investment, inflation rate and literacy rates on youth employment in Nigeria. Data were sourced from the CBN Statistical Bulletin, National Bureau of Statistics and Africa Start-up List 2023 publications. The data were analysed using Error Correction Model. The results indicated that the number of technology-based start-ups and government ICT investment significantly decreased youth employment in Nigeria, while the value of web-based start-ups decreased youth employment but not significantly. Further analysis revealed that inflation rate and literacy rate exerted significant negative effects on youth employment in Nigeria. The study concluded that technology-based business start-ups have not contributed positively to youth employment in Nigeria during the period under review. Also, rising inflation continues to weaken the job-creating capacity of businesses, while the negative effect of literacy reflects persistent skill mismatches and the inability of the labour market to absorb the growing pool of educated youths. The study recommends that government should make their expenditure on ICT to be targeted towards technology based firms especially start-ups, develop national database of technology-based start-ups, ensure macroeconomic stability and align digital literacy in the country's education system.

Keywords: Business Startups, Government Investment, Inflation Rate, Literacy Rate, Technology-based, Youth Employment.

INTRODUCTION

Kawira, Mukulu, and Odhiambo (2019) define a technology or web-based start-up as an early-stage business that focuses on technology-based goods and services or provides business and general solutions to people by utilising online resources. According to Nana and Akaeze (2019), startups are typically founded by one person or a small group of people, and they typically rely on investment from friends, family, unseen investors, or even crowdsourcing. Start-ups in Nigeria have benefited greatly from technology (web) as they use it to better serve the public, streamline operations, enhance supply chains, and improve logistics. Nigeria has one of the most prominent rising web-based business ecosystems in Africa, according to a recent Forbes (2023) analysis. Nigeria is a leader in developing internet-based businesses in West Africa and is ranked 64th in the world, according to the Global Startup Ecosystem (2023).

Due to the fact that the majority of start-up businesses are technology-driven, there has been a rise in the utilisation of digital marketing platforms (Ilesanmi and Oyedepo, 2023). According to Forbes (2023), over 80% of Nigerian startups are in the FinTech sector. This led Fiderikumo (2021) to argue that the high cost of doing business in Nigeria is mostly caused by low technology, high capital costs, inadequate infrastructure, etc.

The Nigerian government has dedicated itself to a number of employment initiatives over the years with the goal of enabling the country's youth to participate in business start-ups and make use of online resources. In order to empower youth and diversify the economy, the Nigerian government implemented the Microfinance Policy, Regulatory Framework, and Supervisory Framework for Nigeria between 2006 and 2008, in addition to the NYSC Sensitisation, Venture Prize Competition, and NYSC Entrepreneurship Training Programs (CBN, 2022). Africa Youth Empowerment Nigeria (AYEN), Graduate Internship Scheme (GIS), Youth Initiative for Sustainable Agriculture in Nigeria (YISA), Youth Enterprise with Innovation in Nigeria (YouWIN!), Youth Entrepreneur Support Programme (YES-P), and N-Power Empowerment Programme are just a few of the government's initiatives (Omeje, Jideofor, & Ugwu, 2020). These programs have been designed to increase young employment in Nigeria, particularly through digital skills and technology start-ups, according to Newo, Oladipo, Ayankoya, and Olanrewaju (2023).

According to Yinusa (2023), technology-based startups are transforming into micro, small, and medium-sized businesses and are controlling Nigerian local marketplaces. Between 2 and 199 persons are employed by these MSMEs together; as of December 2022, they created 59.65 million jobs, which increased to 68 million in 2023. Additionally, SME startups created around 2.89 million (or little more than 5%) of those jobs, and they are probably responsible for the creation of 85% of Nigeria's industrial employment (MSME report, 2023; Mohammed, 2024). It is noteworthy that even if the number of web-based business startups in Nigeria is growing, most of them are failing and closing down every day due to related issues such as adverse government regulations, finance, many tax issues, and the challenges of conducting business in Nigeria. The number of small businesses dropped dramatically from 4,670 in 2021 to 1,793 in 2023, representing a 61% reduction rate, according to the MSME national survey report from 2023.

Government spending on ICT infrastructure increased from N40.7 billion in 2019 to N50.6 billion in 2023. According to data from the National Bureau of Statistics (NBS, 2023), youth unemployment in Nigeria for those between the ages of 15 and 24 went up to 53.4% in 2020 but somewhat decreased to 51.6% in 2023. There were 5,543,360 technology-based start-ups in 2023, while 57% of people aged 25 to 44 were unemployed (Africa Start-up List, 2023; NBS, 2023). According to the National Bureau of Statistics (NBS, 2023), despite significant government assistance for ICT infrastructure and a rise in technology-based start-ups, 21.0% of young people with post-secondary education were unemployed in 2023. Since the unemployment rate for young people aged 15 to 24 increased by 8.6% at the end of 2023 (NBS, 2023), attention has turned to start-ups and their role in youth employment. Nigeria saw a 59% growth in the number of technology-based start-ups in 2023, making it the country with the highest number. Because it examines the relationship between technology-based start-ups and how they affect young employment in Nigeria, this study effort is therefore useful at this time.

Statement of the Problem

Technology-based startups are defined by Fiderikumo (2021) as companies with an internet-based business model. These firms typically provide an internet platform or service rather than a tangible product. The Nigeria Startup Portal (www.startup.gov.ng) lists Uber, Patricia, Flutterwave, Paystack, Sendbox, Andela, Opay, and other businesses as examples of technology-based enterprises. According to Yinusa (2023), five out of every fifty established startups folded up. The reasons for these businesses' closure and lack of sustainability are not limited to funding and unfavourable business conditions; they may also be influenced by other factors pertaining to skills and expertise. Web or technology-based start-ups in Nigeria have reached considerable number in excess of 5 million (NBS, 2023) with estimated value of \$27.7 billion as at 2023. Given this recent statistics, employment generation by these technology-based start-ups is expected to improve rapidly. However, information on the relationship between value of start-ups in Nigeria, number of start-ups and youth employment in Nigeria remains sketchy owing to shortage of quality research on start-ups sustainability in Nigeria. This study is aimed at solving this problem of sketchy information by providing robust analysis of the nexus between web-based start-ups and youth employment in Nigeria.

Additionally, several authors including Ado and Mallo (2019), Nana and Akaze (2019), Santarelli and Vivarelli (2017), Shane (2019), etc. have questioned whether startups really play an important role for

sustainable job creation especially in developing countries like Nigeria Nigeria's ranking as one of the leading countries in technology start-ups (Forbes, 2023). While Newo, Oladipo, Ayankoya and Olanrewaju (2023), Kalagbor and Harry (2019), Egunjobi (2024) focused their research on entrepreneurship and youth development in Nigeria, Mohammed (2024) and Fiderikumo (2021) focused on SMEs and employment creation in Nigeria. That direct linkage between technology-based or web-based start-ups and employment generation is still missing in empirical literature, and this can result in policy inconsistencies and lack of attention to web-based start-ups. This creates a problem in research which this present study stands to solve.

Consequently, the main objective of the study is to examine the relationship between technology-based business start-ups and youth employment in Nigeria. Specifically, the objectives of the study are to:

- Determine the extent to which number of technology-based start-ups affects youth employment in Nigeria;
- Examine the value of technology-based start-ups and how they affect youth employment in Nigeria;
- Investigate the effect of government ICT investment on youth employment in Nigeria;
- Ascertain the effect of technology-based business start-ups variables on youth employment in Nigeria using inflation rate and literacy rate as control variables.

The following research hypotheses are tested in the course of this study:

H₀₁: The number of technology-based start-ups has no significant effect on youth employment in Nigeria.

H₀₂: The value of technology-based start-ups has no significant effect on youth employment in Nigeria.

H₀₃: Government ICT investment has not significantly affected youth employment in Nigeria.

H₀₄: There is no significant effect of inflation rate and literacy rate on youth employment in Nigeria.

LITERATURE REVIEW

Depending on the concept, profitability, finance, and creativity of the product or service being offered, different people in the business and information and technology sectors have varying ideas about what constitutes a startup. A startup, according to Bader (2021), is a group of individuals who conceive an idea, create a product, and either acquire capital or begin producing money from nothing. Posterous, Airbnb, Dropbox, etc. are a few examples. In contrast, Ramanujam (2019) states that "while there is no standard definition of a startup, think of it as an early stage venture which is still trying to figure out their product strategy, go to market and sales processes." According to Ries (2021), a startup is a human organization created to provide a novel good or service in a highly uncertain environment. Sindra (2022) supports Ries's (2021) description by stating that a startup is a human organization created to provide a novel good or service in a very uncertain environment. To put it another way, a startup is a business that is developing a product or service based on strategy and study, yet it has an equal chance of succeeding or failing.

A start-up is essentially a brand-new, entrepreneurial business created to market a novel idea, good, or service to the broader public. A start-up is a business founded by an entrepreneur with the goal of finding, creating, and validating a scalable business model (Katila, Eric & Piezunka, 2021). Additionally, according to Olokundun, Dishon, Ibidunni, and Ogbari (2022), a start-up is a business that is just getting started. According to Bone, Allen, and Haley (2017), the term "start-up" naturally refers to young, creative companies that are driven to develop and often operate in situations of significant uncertainty, such as an unproven technology or a novel business concept.

According to Gameli (2019), technology start-ups, also known as technology entrepreneurship or digital entrepreneurship, are a global movement in entrepreneurship that is typified by tiny businesses that are focused on using technology to solve issues and developing rapidly without regard to geography. The phrase "technology" is crucial in distinguishing a start-up from a technology start-up, and this has led to "no

consensus" over what constitutes a technology start-up. According to Adamo (2020), there appears to be a severe shortage of creativity in our technological scene, offering a different but more lucid viewpoint on the idea of a technology start-up. Most of the time, it seems like we start new "businesses" that are perfect replicas of already-existing ones. These kinds of businesses are just not startups. According to Anaba (2018), a technology startup must develop technology to address issues rather than merely employ it.

New businesses in Nigeria are using the country's digital culture to launch, grow, and expand their operations, sell goods, and offer services to Nigerians and the international community as the Nigerian government highlights the importance of entrepreneurship among young people. Through online advertising or Internet marketing, which today targets online users through applications, web browsers, and emails, the Internet and social networking sites give these startups virtual visibility (Adebayo, 2018). Innovative hubs, which are tech start-ups engaged in digital skills training, website development, website and domain hosting, programming, and application development, are a crucial aspect of the Nigerian ecosystem (Ezema et al., 2021). Nigeria's digital culture, which has characteristics like speed, interactivity, convergence, pull media, and interconnection, among others, is what makes these start-ups successful (Ibrahim, 2023).

Theoretical Framework: Schumpeterian Growth Theory

Schumpeter (1934) proposed this theory in his book "theory of economic development: an inquiry into the business cycle." The idea of creative destruction—the process by which new inventions supplant outdated technologies—is supported by Schumpeter's theory of growth. Schumpeter emphasised the role of entrepreneurs who implement novel combinations. According to him, the essence of "economic development" is the occurrence of abrupt and "revolutionary" change, which shifts the economy from its static mode of "circular flow" and places it on a dynamic route of intermittent fluctuations. According to Schumpeter, development is a historical process of structural changes that are primarily fuelled by innovation, which he classified into five categories:

- Introduction of a novel product or a new variety of an existing product;
- The implementation of novel production or sales techniques that have not yet been proven in the industry;
- the opening of a new market for which a branch of the industry was not yet represented;
- the acquisition of new raw material or semi-finished goods supply sources; and
- the development of new industry structures, such as the establishment or dissolution of a monopoly position.

According to Schumpeter's theory, entrepreneurs can generate entirely new prospects for investment, growth, and employment by using the findings of scientists and innovators. This notion can be connected to the current study since technology-based start-ups are creative companies that aim to challenge the status quo and discover novel approaches to human problems. New opportunities are generated during this creative destruction period, and it is anticipated that these will increase the number of individuals actively involved through the creation of jobs.

EMPIRICAL REVIEW

Kalagbor and Harry (2019) investigated the connection between youth employment and the growth of entrepreneurship in Nigeria. It concentrated on two empowerment initiatives: the Youth Initiative for Sustainable Agriculture in Nigeria (YISA), which supports web-based start-ups, and the Youth Entrepreneurship Development Programme (YEDP). Through content analysis, they came to the conclusion that the programs had given young people all throughout the nation jobs and several start-ups. However, these initiatives have not substantially produced the intended results of creating a large number of jobs for young people.

In order to investigate the appearance and strategy of tech centers in Africa and its consequences for knowledge production and value creation, Atiase, Kolade, and Liedong (2020) applied the idea of new

production of knowledge. Five case studies of digital clusters in Nigeria, South Africa, Kenya, and Uganda were used in their investigation. They discovered that tech hubs are setting the standard for producing new knowledge and creative solutions, especially for those at the bottom of the pyramid, while traditional universities struggle with resource limitations, insufficient industry engagement, and the restrictions imposed by the institutional organization of disciplinary knowledge.

Matyek (2021) evaluated the contribution of digital start-ups to Nigeria's overall development. The study employed an online survey research design and a quantitative approach. The study's main conclusion demonstrated how technology start-ups support Nigeria's growth in terms of employment generation. According to the survey, Nigeria boasts a thriving digital culture, which serves as a catalyst for the emergence of several technology start-ups, innovation hubs, and incubators within the Nigerian ecosystem.

Nana and Akaeze (2021) investigated startup funding for the expansion of the web-based small company sector and its consequences for reducing young unemployment and creating jobs in Nigeria. Their study's goal was to investigate the experiences of a few entrepreneurs who, in spite of obstacles brought on by a lack of institutional and informal funding sources, were successful in their small business endeavours. The study's data came from semi-structured interviews with fifteen successful small business owners in Lagos who were once jobless young people. The descriptive study revealed that the main obstacles facing new business owners were (a) incapacity to provide collateral, (b) reliance on inadequate private funds and short-term overdrafts, and (c) bureaucracy.

Guanah and Okowa-Nwaebi (2022) looked at the perspectives and experiences of young people in Delta State regarding the factors influencing their choice to start their own business. The fundamental goal of this study, which focused on motivation theory, was to examine how motivation and social media may increase young people's involvement in entrepreneurship initiatives. According to the study, the motivation theory has a significant role in motivating young people to participate in the many entrepreneurship programs that are provided by organisations, governments, and individuals.

Akhuemonkhan, Raimi, and Sofoluwe (2023) investigated employment stimulation and entrepreneurial education in Nigeria. The authors collected quantitative data in a methodical manner and used econometric analysis to draw well-informed conclusions. They found that entrepreneurial development could be useful instruments for reducing poverty, creating jobs, accelerating the realisation of universal primary education, and advancing gender equality in Nigeria based on the robustness of the evidence they collected, examined, and assessed.

Yinusa (2023) investigated the relationship between internships and mentoring and business beginnings among young people in Lagos State, Nigeria. The study's participants included coordinators of training and development units at the Bank of Industry (BOI) and Lagos State Chamber of Commerce and Industry (LSCCI), as well as graduates of a training program with an emphasis on prospective entrepreneurs. Thematic analysis was used to examine the qualitative data. The study's conclusions showed that internships have a connection to start-ups among young people in Lagos and that mentoring has enhanced young people's orientation and abilities towards start-ups.

In order to lower Nigeria's youth unemployment rate and create new jobs, Egunjobi (2024) investigated digital entrepreneurship and concentrated on how ICT affects job development/ The study revealed that in Lagos State, ICT and e-commerce have significantly boosted employment creation and helped spread business activities to a diverse clientele. Metu, Ajudua, Eboh, Ukeje, and Madichie (2020) investigated the role of Information and Communication Technology (ICT) development in reducing youth unemployment across 48 Sub-Saharan African countries between 1991 and 2018. Using a dynamic panel model estimated with the System Generalized Method of Moments (System-GMM), the study found that improvements in mobile phone subscriptions, broadband penetration, Wi-Fi subscriptions, and internet bandwidth significantly reduced youth unemployment. Ogbonna, Adediran, Oloko, and Isah (2022) examined the effect of ICT development on youth unemployment in 41 African countries over the period 2003–2018. Using

GMM estimator, they found that ICT development significantly reduced youth unemployment by expanding access to digital employment opportunities and improving labour market outcomes.

Odom and Azu (2026) examined the influence of ICT on youth economic participation in Nigeria from a gender perspective. Using the Autoregressive Distributed Lag (ARDL) technique, the study showed that internet penetration significantly increased youth employment in the short run, particularly among female youths, although the long-run effect became negative due to structural adjustments and labour market skill mismatches. Dwivedi (2024) conducted research on training young people in India to establish and grow businesses. Using the systematic literature review (SLR) technique, the study discovered that young people nowadays have a great desire to start their own business. In actuality, students' desire to own a start-up has significantly altered academic institutions, leaving them with nothing more than teaching responsibilities. In a post-Covid age, Opara and Nna-Emmanuel (2024) examined the degree to which technopreneurship stands out as a cure-all for youth unemployment in Nigeria. A correlational survey design was used. The degree of unemployment among young people in Nigeria is significantly impacted by app creation and online advertising/marketing, according to Pearson's product moment correlation study.

There is ample evidence to prove that no previous study have linked web-based business start-up to employment generation in Nigeria. The literature reviewed focused mainly on SMEs and entrepreneurship in general and how it affects youth unemployment in Nigeria which is from a wider perspective (Mohammed, 2024; Agbonna et al, 2022; Arogundade, 2021; Eferakeya & Ifuruze, 2016; etc.). This study fills this knowledge gap by narrowing down the study to web-based start-ups and how they affect employment generation in Nigeria using econometric model.

Again, most of the previous studies employed primary data (Opara and Nna-Emmanuel, 2024; Yinusa, 2023; Egunjobi, 2024; Kalagbor & Harry, 2019). Exploring the nexus between web-based start-ups and employment generation using secondary data and econometric procedures is still considerably lacking in economic literature. This study fills this gap in knowledge by obtaining data on the number of technology-based start-ups, their value as well as data on youth employment from International Agencies recognized by the Word Bank and from the World Bank as well.

METHODOLOGY

The research design adopted in this research is the quasi-experimental research design. This research design aims to establish a causal relationship between web-based business start-up variables and employment generation in Nigeria without being able to interfere with the data. The study focuses on technology-based business start-ups that utilize internet resources in offering daily services to the people and are valued above ₦50 million (NBS, 2023; MSME report, 2023). Therefore, technology-based business start-ups in Nigeria that are valued below this figure are not included in this study. The time scope of this study is from 2009 – 2023 estimated quarterly (2009:Q1 – 2023:Q4).

The secondary data on number of web-based start-ups and the value of web-based start-ups are obtained from the 2024 publication of 'Africa Start-up List', a compendium of start-ups in Nigeria and other African countries and recognized by the Word Bank (Available on: www.startuplist.africa/location/nigeria). Also, data on government ICT infrastructure investment is obtained from the Central Bank of Nigeria Statistical Bulletin (2023) while data on youth employment rate was obtained from the National Bureau of Statistics 2024 Annual Publication. These data are time series in nature and they cover the period 2009 through 2024 expressed quarterly in order to fit the time series analysis i.e. 2009:Q1 – 2024:Q4.

The method of data analysis is the Error Correction Model (ECM), after conducting unit root and cointegration tests. Specifically, Augmented Dickey Fuller Unit root test is used to ascertain the stationarity status of the data while the Johansen Cointegration test tests for the presence of long run relationship amongst the variables. The test of hypotheses is based on the p-value of the t-statistic. If the p-value is below 0.05 critical value, the stated hypothesis (H_0) is rejected. But if the p-value exceeds 0.05, the stated hypothesis (H_0) is accepted.

Model Specification

The model borrows clue from the specification of Opara and Nna-Emmanuel (2024) where they used correlation to establish a relationship between App development, online advertising and level of unemployment among youths in Nigeria. This study modifies their previous specification by introducing number of technology-based start-up and value of technology-based start-ups as novel variables while also adding inflation rate and literacy rate as control variables in order to expand the model. The multiple regression model is represented in the functional relationship below:

$$YEMP = f(\text{Technology-based Start-up}) \quad [1]$$

$$YEMP = f(NTB, VTB, GICT) \quad [2]$$

Where:

YEMP = Youth employment rate in Nigeria

NTB = Number of technology-based start-ups in Nigeria

VTB = Value of technology-based start-ups in Nigeria

GICT = Government investment on ICT infrastructure

Including the control variables will give the functional form of the model:

$$YEMP = f(NTB, VTB, GICT, INF, LITR) \quad [3]$$

Where INF is inflation rate and LITR is literacy rate. We further represent the equations [2] and [3] in multiple linear forms as follows:

$$YEMP_t = \alpha_0 + \beta_1 NTB_t + \beta_2 VTB_t + \beta_3 GICT_t + \varepsilon_t \quad [4]$$

$$YEMP_t = \alpha_0 + \beta_1 NTB_t + \beta_2 VTB_t + \beta_3 GICT_t + \beta_4 INF_t + \beta_5 LITR_t + \varepsilon_t \quad [5]$$

In order to standardize the data and avoid a spurious regression, the data are logged and the log-linear model is presented in equations [6] and [7] below:

$$\ln YEMP = \alpha_0 + \beta_1 \ln NTB + \beta_2 \ln VTB + \beta_3 \ln GICT + \varepsilon_t \quad [6]$$

$$\ln YEMP_t = \alpha_0 + \beta_1 \ln NTB_t + \beta_2 \ln VTB_t + \beta_3 \ln GICT_t + \beta_4 \ln INF_t + \beta_5 \ln LITR_t + \varepsilon_t \quad [7]$$

Where ‘ln’ is the natural logarithm connotation, α_0 represent the intercept of the linear equation, β_1 , β_2 , β_3 , β_4 and β_5 are the coefficients to be determined and ε_t is the stochastic error term at time ‘t’. The error term takes care of other externalities to the model not captured.

Table 1: Description of Variables

S/N	Variable	Description and Justification	A-priori Expectation
1.	Youth Employment (YEMP)	This represents the percentage of people between the ages of 15 and 44 years who are actively engaged in employment activities (World Bank, 2023; NBS, 2023).	--
2.	Number of technology-based	This represents the actual number of firms that make use	$\beta_1 > 0$

	start-ups (NWB)	of internet resources to provide services to the public.	
3.	Value of technology-based start-ups (VWB)	This represents the amount of money raised from international and other funding agencies by start-up businesses that make use of internet resources to serve the public.	$\beta_2 > 0$
4.	Government investment on ICT infrastructure (GICT)	This represents the amount of money government spends on improving ICT infrastructure. It serves as a boost for web-based start-ups in Nigeria to flourish.	$\beta_3 > 0$
5.	Inflation rate	This represents the annual percentage change in the general price level of goods and services. High inflation reduces the purchasing power of consumers and limits firms' capacity to create employment opportunities.	$\beta_4 < 0$
6.	Literacy rate	This is the percentage of the adult population (aged 15 years and above) that can read and write with understanding. A higher literacy rate increases employability, and enables more youths to participate in technology-based entrepreneurial activities.	$\beta_5 > 0$

Source: Researcher's Compilation

DATA ANALYSIS

This section presents the analysis of the data collected for the study. It begins with the unit root and cointegration tests. Thereafter, the Error Correction Model (ECM) estimates are presented and interpreted to examine the relationship between technology-based start-ups and youth employment in Nigeria, while the stated research hypotheses are tested.

Table 1: ADF Unit Root Test (p-values are in parenthesis)

Variables	ADF t-stat @ Level (p-value)	ADF t-stat at 1st Difference (p-value)	Order of Integration
YEMP	-1.89358 (0.2381)	4.89764 (0.0042)	Stationary after first differencing, I(1)
NWEB	0.97368 (0.7328)	-6.39467 (0.0002)	Stationary after first differencing, I(1)
VWB	-0.99749 (0.0974)	-4.94789 (0.0001)	Stationary after first differencing, I(1)
GICT	1.42453 (0.2864)	-8.64271 (0.0231)	Stationary after first differencing, I(1)

INF	-1.09764 (0.3481)	-6.97648 (0.0000)	Stationary after first differencing, I(1)
LITR	-1.68459 (0.1874)	-5.07456 (0.0000)	Stationary after first differencing, I(1)

Source: Researcher's computation using Eviews 13

Table 1 show the Augmented Dickey-Fuller (ADF) unit root test results at both level and first difference. The result indicates that none of the variables are stationary at their levels, as their p-values are greater than the 5% level of significance. Specifically, youth employment (YEMP), number of technology-based start-ups (NWEB), value of technology-based start-ups (VWB), government ICT investment (GICT), inflation rate (INF) and literacy rate (LITR) all contain unit roots at level. However, after first differencing, all the variables become stationary with p-values less than 0.05. This implies that YEMP, NWEB, VWB, GICT, INF and LITR are all integrated of order one, I(1). Hence, variables in this study had the same order of integration and there could be cointegrating relationship among them.

Table 2: Johansen Cointegration Test Results

Trace Statistic					Max-Eigen Statistic		
Hypothesized No of CE (S)	Eigen-Value	Trace statistics	5% Crit. Value	Prob**	Max-Eigen statistics	5% Crit. value	Prob**
None**	0.747814	51.86057	47.85613	0.0201*	31.68451	27.58434	0.0140*
At Most 1**	0.361779	20.17606	19.79707	0.0110*	20.32864	18.13162	0.0133*
At Most 2	0.276725	9.847420	15.49471	0.2926	7.451222	14.26460	0.4372
At Most 3	0.098939	2.396198	3.841466	0.1216	2.396198	3.841466	0.1216
At Most 4	0.369829	12.10082	15.49471	0.1522	10.62058	14.26460	0.1743
At Most 5	0.062331	1.480236	3.841466	0.2237	1.480236	3.841466	0.2237

Source: Researchers' Computation using E-view 13

Table 2 presents the result of the Johansen cointegration rank tests. The Trace and Max-eigen statistics indicate two (2) Cointegrating equations at the 5% level. The existence of at least 1 cointegrating equation(s) in the model is an indication that the technology-based business start-ups variables have long run relationship with youth employment in Nigeria. This satisfies the condition for estimating the error correction model.

Table 3: Error Correction Model Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	20.700	3.763	5.501	0.0000

Number of Technology-based Start-ups (NWEB)	-0.007	0.003	-2.333	0.0201
Value of technology-based Start-ups (VWB)	-0.001	0.009	-0.060	0.9540
Government ICT Investment (GICT)	-0.068	-0.014	4.857	0.0331
Inflation rate (INF)	-1.098	0.496	-2.217	0.0398
Literacy rate (LITR)	-0.196	0.043	-4.551	0.0061
ECM(-1)	-0.318	0.103	-3.085	0.0350
R-squared	0.904874	F-statistic		33.96549
Adjusted R-squared	0.887543	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.918173			

Source: Researcher's Computation using E-views 13

The ECM results show that the number of technology-based start-ups (NWEB) has a negative and statistically significant effect on youth employment, with a coefficient of -0.007. The value of technology-based start-ups (VWB) has a negative but statistically insignificant effect, with a coefficient of -0.001. Government ICT investment (GICT) exerts a negative and statistically significant effect on youth employment, with a coefficient of -0.068. Similarly, the inflation rate (INF) has a negative and statistically significant effect, with a coefficient of -1.098, while the literacy rate (LITR) also has a negative and statistically significant effect, with a coefficient of -0.196. The ECM(-1) coefficient of -0.318 is negative and statistically significant, indicating that the model converges to its long-run equilibrium, with approximately 31.8% of short-run disequilibrium corrected in each period.

The t-statistics from the Error Correction Model are used to assess the significance of the hypotheses while the coefficient values ascertain the direction of effect of each of the explanatory variables.

Hypothesis One

H₀₁: The number of technology-based start-ups has no significant effect on youth employment in Nigeria.

Extract from Table 3 shows that number of technology-based start-ups has a negative coefficient value of -0.007 which implies that it exerts negative effect on youth employment rate in Nigeria for the period under review. Given that the p-value = 0.0201 is less than 0.05 critical value i.e. $0.020 < 0.05$, the null hypothesis one (H₀₁) is rejected and so we conclude that the number of technology-based start-ups has significant negative effect on youth employment in Nigeria.

Hypothesis Two

H₀₂: The value of technology-based start-ups has no significant effect on youth employment in Nigeria.

Table 3 shows that value of technology-based start-ups has negative coefficient of -0.001. The p-value exceeds 0.05 critical value i.e. $0.9540 > 0.05$, therefore, the second null hypothesis (H₀₂) is accepted and the hypothesis concludes that the value of technology-based start-ups has no significant effect on youth

employment in Nigeria. Thus, monetary value of technology-based start-ups decreases overall youth employment rate of Nigerians but the decrease was not statistically significant.

Hypothesis Three

H₀₃: Government ICT investment has not significantly affected youth employment in Nigeria.

Table 3 shows that Government investment on ICT infrastructure exerted a negative and significant effect on youth employment rate with coefficient of -0.068. The third null hypothesis (H₀₃) is therefore rejected since the p-value = 0.0331 is below 0.05 critical value. Thus, we conclude that Government ICT investment has significantly decreased youth employment in Nigeria.

Hypothesis Four

H₀₄: There is no significant effect of inflation rate and literacy rate on youth employment in Nigeria.

Table 3 shows that inflation rate exerted a negative and significant effect on youth employment, with a coefficient of -1.098, while literacy rate also exerted a negative and significant effect, with a coefficient of -0.196. Since the p-values for inflation (0.0398) and literacy rate (0.0061) are both less than the 0.05 level of significance, the null hypothesis (H₀₄) is rejected. Therefore, it is concluded that inflation rate and literacy rate have significant negative effects on youth employment in Nigeria.

Diagnostic Tests

Adjusted R-squared: The adjusted R-squared value is 0.8875. This implies that 88.75% of the changes in youth employment in Nigeria are propelled by technology-based start-ups variables. This goes to show that technology-based start-ups has significant role to play in youth employment in Nigeria.

Autocorrelation Test: The Durbin Watson value of 1.9182 shows that there is no autocorrelation problem in the model since the value has close proximity to 2 rather than to zero.

Joint Test: The F-statistic value of 33.965 with probability value of 0.0000 shows that the variables have significant joint effect on youth employment rate in Nigeria, indicating that the independent variables collectively explain variations in youth employment in Nigeria.

DISCUSSION OF FINDINGS

The scope of this research work is to analyze the effect of technology based businesses start-ups on youth employment in Nigeria. The study used the number of technology based start-ups, the value of technology based start-up, government investment in ICT as the primary variables while inflation rate and literacy rate were used as control variables to control the effect of macroeconomic environment and human capital environment.

The results revealed that the number of technology based start-ups has negative and significant effect on youth employment in Nigeria. The implication of this result is that though the number of technology based start-ups has increased in Nigeria, it has not resulted in youth employment. This could imply that most technology based start-ups are small scale, automated or have not been able to employ large volume of labor force. The finding above is contrary to that of Kalagbor and Harry (2019), Atiase, Kolade and Liedong (2020), Matyek (2021) and Akhuemonkhan, Raimi and Sofoluwe (2023), who found a positive impact of technology based entrepreneurship on employment generation in their studies. This may be attributed to the fact that majority of the previous studies used qualitative or survey research, while the present research used macroeconomic time-series data and econometric technique.

The study also revealed that the value of technology-based start-ups decreased youth employment but the decrease was not significant. This indicates that the amount of funding accruing to technology-based start-

ups does not create employment in Nigeria. The result tallies with Nana and Akaeze (2021) who observed that, even with the significant growth in the arrival of funding to start-ups in Nigeria, collateral requirements, weak financial systems, bureaucratic bottlenecks, among others, remains significant constraints of growth. The analysis further reveals that government ICT investment also impacts on youth employment negatively and that it is significant. This result agrees with our expectation. However, it is contrary to several views that government ICT investment positively impacts on youth employment (Metu et al., 2020; Odom & Azu, 2026; Ogbonna et al. 2022). This result implies that the government in Nigeria paradoxically invests in its infrastructure but employment levels have not improved despite these investments. This could be due to the inefficiency of the implementation process, the absence of adequate infrastructures, the attitude of the people and the long time lag involved with realizing employment through government ICT investment. This result further confirms the assertion by Akhuemonkhan, Raimi and Sofoluwe (2023) that the efforts by the government at promoting the small business (entrepreneurship) have fallen short of expectations of stimulation of employment. This result confirms the assertion by Opara and Nna-Emmanuel (2024) that technopreneurship has not significantly curbed youth unemployment in Nigeria due to inadequate public infrastructure.

Regarding the control variables, the study found that inflation has a negative and statistically significant effect on youth employment, indicating that rising prices reduce firms' ability to expand production and create jobs. Similarly, literacy rate was found to have a negative and statistically significant effect on youth employment. Although this result is contrary to theoretical expectations, it may reflect the persistent mismatch between educational attainment and labour market requirements, as well as the inability of the Nigerian economy to absorb the growing number of educated youths into productive employment. These findings imply that macroeconomic stability and improvements in the quality and relevance of education are essential complements to technology-based entrepreneurship in addressing youth unemployment in Nigeria.

CONCLUSION

The study concludes that technology-based business start-ups have not contributed positively to youth employment in Nigeria during the period under review. Specifically, the number of technology-based start-ups and government ICT investment exerted significant negative effects on youth employment, while the value of technology-based start-ups had a negative but insignificant effect. The study also found that inflation and literacy rate, included as control variables, exerted significant negative effects on youth employment. This indicates that rising inflation continues to weaken the job-creating capacity of businesses, while the negative effect of literacy reflects persistent skill mismatches and the inability of the labour market to absorb the growing pool of educated youths. Overall, the findings imply that expanding the technology start-up ecosystem alone is insufficient to improve youth employment. There is a need for efficient utilization of start-up funding, improved ICT infrastructure, macroeconomic stability, and education policies that better align graduates' skills with labour market demands if technology-driven entrepreneurship is to contribute meaningfully to youth employment in Nigeria.

In view of the conclusion drawn from the findings, this study recommends as follows:

Government should direct its expenditure on ICT infrastructure toward technology-based firms and start-ups, particularly through the provision of digital infrastructure, innovation hubs, broadband access, and incubation centres. This will enhance the capacity and value of technology-based enterprises and improve their ability to generate employment for youths.

A comprehensive national database of technology-based start-ups should be established to monitor their funding, operations, and employment capacities. This will enable government and development partners to identify start-ups with high employment potential and provide targeted financial and technical support.

Technology-based business start-ups should be promoted through increased investment in digital entrepreneurship training, innovation, and business incubation programmes. Given Nigeria's growing ICT

ecosystem and increasing attraction of foreign start-up funding, equipping more youths with digital and entrepreneurial skills will expand the number of viable start-ups and create more employment opportunities.

Government should pursue policies that maintain macroeconomic stability, particularly by reducing inflation. Stable prices will lower business operating costs, encourage investment, improve the survival of technology-based enterprises, and enhance their capacity to create sustainable employment for youths.

The education system should be restructured to align literacy and digital skills with labour market requirements. Government, educational institutions, and the private sector should strengthen digital literacy, technical education, entrepreneurship training, and industry-academia collaboration to reduce skill mismatches and improve the employability of educated youths in the technology sector.

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