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## An empirical assessment of the determinants of digital technology adoption among selected entrepreneurs in Lagos and Ogun state, Nigeria

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### Abstract

Recently, the adoption of digital technology (DT) among entrepreneurs especially in developing countries is gaining economic recognition gradually especially with the advent of the covid-19 pandemic that had put most businesses to halt. In view of this, this study examines the factors that determine the adoption of DT among some selected entrepreneurs in Lagos and Ogun State, Nigeria; two lists were generated from the study areas. The first list consists of the list of entrepreneurs that have adopted DT in the study areas, from this list, systematic sampling method was used to select 156 entrepreneurs that have adopted DT in their businesses (96 from Lagos and 60 from Ogun State). The second list consists of those that have not adopted DT in their businesses and from this list, 92 entrepreneurs (54 from Lagos State, and 38 from Ogun State) were systematically selected from the list. This gives a total sample of 248 entrepreneurs. The Probit regression model was used to analyse the data through Stata version 9. The results of the probit regression indicated that among the variables that were used to measure the factors that determine the adoption of DT among entrepreneurs in the study area (number of years in business, nature of the business, gender of business owner, pressure from customers, access to smart device, availability of constant electricity, IT skills of the entrepreneur, security and privacy), only number of years in business and gender of business owner have been found to be insignificant determinants of DT adoption in the study areas. Thus, it is recommended that emphasis should be placed on those significant determinants by stakeholders and those in authorities so that more adoption of DT can be embraced by business holders in the study areas. Halt

**Keywords:** Digital technology, entrepreneurs, the COVID-19 pandemic.

### Introduction

Digital Economy emanated since the industrial revolution which featured alteration in economies, employments, and the society at large and led to the beginning of digital entrepreneurship. (Akpan & Ibidunni 2021; Manea et al. 2021). The COVID-19 pandemic

has hastened the transformation of the global economy and business practices as brought about by new digital technologies during the past few decades (UNCTAD 2021). In recent time digital technology have changed the terrain of economy and the

environment we live through new opportunities given to entrepreneurs: thereby impacting on the economy, environment, and the society as a whole.

Entrepreneurship is necessary in enhancing economic condition via its ability to generate new employment and income opportunities (Chitsaz et al., 2019), and for this to be achieved in the midst of economic transformation from conventional to digital entrepreneurship, entrepreneurial activities need to be changed so that new jobs and income opportunities can be created. The development of technology has brought new face in entrepreneurial activities, as studies have observed that the nature and structure of companies, as well as the overall economic environment, have changed due to the application of digital technologies and their uses (Burtch et al. 2018; Nambisan et al. 2017; Nambisan, Wright, et al. 2019; Nambisan, Zahra, et al. 2019; Yoo et al. 2012).

It should however be noted that the personal attribute of the entrepreneurs is important in the development of DT as entrepreneur is driven to success by his or her own internal motivation (Tiwari et al., 2020). These internal motivations are encroached in the ability to bring about innovation and part of the ways to enhance innovation is through digital technology.

According to Khalil et al. (2021) digital entrepreneurship is defined as the development and application of new technology in the transformation of already-existing businesses that enhance the improvement of business operations as well as the development of new and competitive business model. The application of digital technology by entrepreneurs in their business activities is called digital entrepreneurship. Some scholars believe that digital technology is the adoption in entrepreneurial activities while others view digital technology as the adaption of DT in entrepreneurial activities. For instance, digital entrepreneurship entails the changing in entrepreneurial activities through innovation and rising competitiveness at the local and international market (Valigursky, et al., 2021). While Sahut et al. (2019) opined that digital entrepreneurship entails the expansion and joining of the conventional business with the newest technology to create a digital business.

One of the goals of SDGs also emphasized the importance of technology in business development. According to Hull et al. (2007) Digital entrepreneur is the aspect of entrepreneurship that involves the use of technology in business activities in place of physical as used by the conventional businesses. However, Le Dinn et al. (2018) gave a broader concept of DE as the alignment of the conventional entrepreneurship with the new ways of creating and operating business in the digital period. Digital technology has given entrepreneurs new challenges as well as exciting opportunities for invention (Fernandes et al. 2022; Kraus et al. 2019; Sahut et al. 2021; Zhai et al. 2022). It is also observed that the application of digital in business activities could create many prospects and facilitates increase in sustainability (Lichtenthaler, 2021).

Studies have identified that the application of digitalization in business can enhances connectivity and accessibility, reduces cost, pollution, and encourages the inclusion & participation of users (Baran & Berkowicz 2021; Gregori & Holzmann 2020; Lichtenthaler 2021). Therefore, DE has a significant impact on sustainability since it not only generates financial value but also improves resource optimization, encourages social inclusion, and

uses digital technology to fight poverty (Manea et al. 2021; Srivastava & Shainesh, 2015).

Digital marketing an aspect of digital technology improves revenues, market share, and profitability, it one of the most successful strategies for small businesses (Onyango, 2016), it generates prospects for companies, connects and engages with customers effectively, and has a positive impact on all aspects of business performance. The study showed that businesses that embraced digital marketing performed better than those that only employed traditional marketing tactics, boasting better returns, more clients, and more revenues.

Similarly, Fan (2016), cautioned and advised that company, regardless of size, should be encouraged to adopt digital business as the understanding of the potential and effects of advanced digital business is critical for small firms as organizations that embrace digital engagement are more likely to expand and maintain their competitiveness in the future.

Currently with the rapid change in technology and the environmental complexity (Salamzadeh, Tajpour & Hosseini, 2019), the need to blend with these changes, and save the environment for future generation often warrant the focus on technology in business activities. Also, the raise in the growth and substitution of conventional sectors by technological based activities necessitate the focus on technological entrepreneurship.

In the literature, studies have examined the role of digitalization (Khalil et al. 2021; Chitsaz et al.2019), concepts of digitalization (Machnik-Somka & Kordel, 2016) digital entrepreneurship and ecosystem (Jha et al. 2022; Tim et al. 2021), few studies have examined the factors that determine the adoption of digital entrepreneurs among entrepreneurs. This study examines the determinants of digital technology adoption among entrepreneurs with specific focus on entrepreneurs in Nigeria. This study is paramount as the number of entrepreneurs keep soaring every passing day especially in developing countries, for this trend to continue and for entrepreneurs in developing countries like Nigeria to blend and fit in with their counterpart in other developed countries, digitalization of businesses is important among entrepreneurs, for professionalism, sustainability, and global competitiveness to be assured.

The slow pace of adoption of technology in the majority of African nations, particularly in Nigeria, has slowed down economic growth (Jones et al., 2014; Tob-Ogu et al., 2018; Okundaye et al., 2019; Rahayu and Day, 2017). In line with this, Okundaye et al. (2019) observed that the rate of digital technology adoption between the developing world and the western world is huge. Western countries have a high internet penetration rate of 78.3% compared to developing countries' rate of 32.4%, while the percentage of households with a computer in developing countries is 27.6% compared to western countries' rate of 75.5 %. Since small businesses have little knowledge of these new devices, any effort to understand how they can be used to their full potential would not only improve their understanding but also enable them to be proactive and strategic in their decision making (Gutierrez et al., 2015; Samad et al., 2018; Agostini & Nosella, 2020; Hong et al., 2018).

Given the roles played by digital technology in entrepreneurial development, and many challenges facing developing countries ranging from inadequate infrastructure, institutions inefficiency, low level of development, high number of illiteracy among others.

The identification of factors that determine the adoption of technology among entrepreneurs is apt and will assist stakeholders, entrepreneurs, and institutions on the steps that need to be taken to enhance the adoption of DT among entrepreneurs as most MSMEs are entrepreneurs and have the potential to enhance GDP, create wealth, create employment, and enhance development. Therefore, this study seeks to identify factors that determine the adoption of technology among entrepreneurs in Lagos and Ogun State.

After the introductory aspect of the paper, the next section covers the literature review, this is followed by the methodology adopted in the study in section three while section four presents the results and discussion. Section five concludes the study and gives some recommendations.

## Literature

### *The Concept of Technology*

The concept of digital economy has to do with the adoption of technology (internet of things, artificial intelligence) in the affairs of the economy to ensure growth, development and sustainability in business and economy. Etkowitz and Zhou, (2017) explained that Technological entrepreneurship involves the running of a firm with the custodian of the financial risks in order for the objectives and future prospects to be achieved through the application of scientific and technological knowledge. Similarly, Machnik-Somka and Kordel, (2016) explained technological entrepreneurship as recognition, utilization and expansion of new technological opportunities in the market place.

Technological entrepreneurship entails the possibilities of creating new products, creating awareness of the products, and selling the product above the cost of production in order to make profit (Petti & Zhang, 2011). This indicates that the adoption of technology in business increases product awareness and also plays prominent role in profitability. According to Bailetti (2012), technological entrepreneurship is holistic in nature as it contributes to the success and prosperity of individual, company, community, state, and country; with this sustainability can be ensured.

Technological entrepreneurship is distinct from other types of entrepreneurship through the development of new products, shared knowledge, possession of assets which includes complex features that helps to increase scientific and technical knowledge, and property rights (Evers, et al., 2014).

### *Importance of Digital Technology*

Application of technology in business can reduce foreign talents, develop the economy, and provide opportunities for technical occupation and important role in the local innovation system (Kanani & Goodarzi, 2017). Also, the adoption of digital technology by entrepreneurs can enhance job creation and income creation, this is supported in Chitsaz et al. (2019) study that emphasized that entrepreneurship is necessary in enhancing economic condition via its ability to generate new employment and income opportunities. According to Khalil et al. (2021) digital entrepreneurship is defined as the development and application of new technology in the transformation of already-existing businesses that enhance the improvement of business operations as well as the development of new and competitive business model. This means that the application of digital technology does not lead to the extinction of existing business as it can be applied to existing business. Similarly, Sahut et al. (2019) opined that digital entrepreneurship entails the expansion and joining of the

conventional business with the newest technology to create a digital business

Digital Entrepreneurship entails the changing in entrepreneurial activities through innovation and rising competitiveness at the local and international market Valigursky et al (2021)

Digital marketing, which improves revenues, market share, and profitability, is one of the most successful strategies for small businesses, according to Onyango (2016). It generates prospects for the companies, connects and engages with customers effectively, and has a positive impact on all aspects of business performance. The results showed that businesses that embraced digital marketing performed better than those that only employed traditional marketing tactics, boasting better returns, more clients, and more revenues.

As identified, digital business enables customers to play their roles in the business. Chaffey (2015) explained that the use of digital technologies can enables significant business advances, through improvement in customer experience, optimizing operations, or developing new business models. Expansion in business through digital technology has also been identifies as Fan (2016) caution and advised that companies, no matter the size, should be encouraged to applied digital technology in their businesses as the understanding of the potential and effects of advanced digital business is critical for small firms as organizations that embrace digital engagement are more likely to expand and maintain their competitiveness in the future.

Furthermore, Studies have observed that the nature and structure of companies, as well as the overall economic environment, have changed due to the application of digital technologies and their uses (Burtch et al. 2018; Nambisan et al. 2017; Nambisan, Wright, et al. 2019; Nambisan, Zahra, et al. 2019).

The use of digital technology has encouraged businesses to adopt new ways of operation that noticeably alter entrepreneurship and innovation (Nambisan 2017; Nambisan et al. 2017; Nambisan, Wright, et al. 2019; Yoo et al. 2010). DT also helps to connect people, things, and places, thereby serving as a link that enhances the relationships between ecosystem components (Bouncken and Kraus 2021). Similarly, Davidsson (2015) explained that technologies in addition to other components of the entrepreneurial ecosystem (such as culture, institutions, and demand), serve as enablers for entrepreneurial activity. In recent time digital technology have changed the terrain of economy and the environment we live through new opportunities given to entrepreneurs: thereby impacting on the economic, environment, and the society as a whole.

Digital Entrepreneurship in the presence of digital ecosystem has the possibility to enhance business sustainability (George et al. 2021; Tim et al. 2021; Tohanean et al. 2020).

In addition, a wider range of opportunities for entrepreneurs to profit from are being created by the specific changes that digital technologies are making to how businesses produce, market, and distribute goods and services as well as how they contribute to economic growth and living standards (Nambisan 2017; Zahra and Nambisan 2011). It is also observed, that the production, marketing, and distribution of goods and services are changing as a result of technological advancements, which also improve the economy and standard of living. As a result, business owners have more chances to take advantage of opportunities (Zahra and

Nambisan 2011, Nambisan 2017). Technology breakthroughs are transforming how goods and services are produced, marketed, and distributed while also enhancing the economy and standard of living. Business owners consequently have more avenue to seize opportunities (Zahra and Nambisan 2011, Nambisan, 2017).

## Methodology

### - Study area

The study was conducted in Lagos and Ogun State, Nigeria. The two areas were selected because of the high number of entrepreneurs and high commercial activities in the study areas.

### - Sampling Technique and Procedure

The first list consists of the list of entrepreneurs that have adopted DT in their business activities in the study areas was gathered and from this list, systematic sampling method was used to select 156 entrepreneurs that have adopted DT in their businesses (96 from Lagos and 60 from Ogun State). The second list consists of those that have not adopted DT in their businesses from this list, 92 entrepreneurs (54 from Lagos State, and 38 from Ogun State) were systematically selected from the list. This gives a total sample of 248 entrepreneurs

## Results and Discussion

Data were analysed through descriptive analysis (frequency and percentage) and inferential analysis (Probit model)

### Descriptive Statistic Analysis

Table 1 depicts the demographic information on the selected entrepreneurs, from the table, most of the entrepreneurs are within the age of 24-43 as given by the frequency and percentage of 194 and 78.23% respectively in Table 1 while the age range of 54-63 has the least number of SMEs as indicated by the frequency and percentage of 22 and 8.87% respectively. More of the entrepreneurs selected are male as given by 133 and 53.63% as frequency and percentage respectively. While the frequency and percentage for female stood at 115 and 46.37% respectively.

Majority of the respondent entrepreneurs are married as represented by the frequency of 152 and percentage of 61.29% and a total of 96 and 38.71% that shows the frequency and percentage are singles. More of the respondents have OND/NCE as their educational level and this is shown by the frequency of 102 and percentage of 41.13% respectively and the least level of education for the entrepreneurs is the primary level of education as represented by the frequency and percentage of 26 and 10.48% respectively in Table 1. This indicated that more of the entrepreneurs are educated to a reasonable extent.

### Descriptive Statistic: Determinants of Digital Technology Adoption

Variables	Total Samples: 248 Frequency	Percentage (%)
<b>Age group:</b>		
24- 33	107	43.15
34-43	87	35.08
44--53	32	12.90
54-63	22	8.87
<b>Gender:</b>		
Male	133	53.63
Female	115	46.37
<b>Marital Status:</b>		
Single	96	38.71

married	152	61.29
<b>Level of Education:</b>		
Primary	26	10.48
Secondary	47	18.95
OND/NCE	102	41.13
Degree/HND	73	29.44
<b>Number of Years in Business</b>		
<= 5 years	102	41.12
6-10 years	87	35.08
11-15 years	45	18.15
16-20 years	14	5.65

In terms of business experience which is represented by the number of years in Business, most of the entrepreneurs has over <= 5 years business experience and this is shown by the frequency and percentage of 102 and 41.13% respectively in the Table 1. While those with over 15 years working experience are small as represented by the frequency and percentage of 14 and 5.65% respectively. This indicates that the level of business experience possesses by the entrepreneurs in the study area is low.

### - Probit Regression Analysis

The probit regression analysis is presented in Table 2, since the dependent variable is a dichotomous variable/Binary response variable that takes on two values (zero and one), Digital Technology adoption takes on the value 1 and non-adoption of Digital Technology takes on zero respectively. The probit model was used to analyse the data and the results are reported in Table 2 below:

**Table 2: Probit Analysis for the Determinants of Digital Technology Adoption**

Variable	Coefficient (Standard Error)	P value	Marginal Effect
Number of years in business	0.065547 (0.019343)	0.201	0.652581
Nature of the business	0.362137 (0.051024)	0.000***	0.112159
Gender of business owner	0.121125 (0.031561)	0.110	0.121116
Pressure from customers	0.023167 (0.002665)	0.000***	0.023166
Access to smart device	1.783613 (0.166336)	0.001***	0.163172
Availability of constant electricity	0.118368 (0.051269)	0.003***	0.041851
IT Skills of the entrepreneur	1.1968751 (0.054484)	0.000***	0.066676
Security and Privacy	0.822674 (0.023671)	0.021**	0.742914

Note: Number of observation =320, LR chi-square = 79. 42, and the P value of 0.0000. \*, \*\*, and \*\*\* represent 10%, 5% and 1%

level of significant respectively. The values in parentheses represent Standard error

Table 2 presents the results of the probit model, from the table, the number of years spend in the business by the business owner is not significant even at 10% level of significant and has a marginal effect of 0.652581. This may be possible as DT adoption is gradually gaining ground as the time of business operation may not determine. However, the nature of the business is highly significant at 1% and with a marginal effect of 0.112159. this signifies that a one unit change in the nature of business (digital oriented business) will increase DT adoption by 11.21% by the entrepreneur. The variable gender of the business owner is positive with male gender as the reference category, this signifies that when the gender of the entrepreneur is male the adoption of the DT will increase, however this variable is not significant even at 10% as given by the p value of 0.110 and a marginal effect of 0.121116

The variable pressure from entrepreneur's customer has a positive and highly significant at 1% this indicates that the more the pressure from the customer concerning DT adoption the higher the entrepreneurs is likely to involve in DT. this is depicted by the marginal effect that a 1 unit increase in the pressure from customer will lead to 2.317% in DT adoption by the entrepreneurs. Similarly, access to digital devices by the entrepreneurs has a positive and significant effect on DT adoption, this is represented by the marginal effect and the highly significant p value of 0.163172 and 0.000 respectively. This means that a 1% increase in access to digital devices will increase the adoption of DT by 16.317%. by the entrepreneurs in the study area.

Access to constant electricity has a positive and highly significant effect on DT adoption this is represented in Table 2 by the marginal effect and significant value of 0.041851 and 0.003 < 1% respectively. This shows that a one unit increase in electricity supply will increase the adoption of DT by 4.18% of the entrepreneur. The IT skill variable is also positive and significant as indicated by the value of the marginal effect as 0.066676 and a highly significant value of 0.000. This shows that a one-unit improvement in the IT skills of the respondents will lead to 6.67% increase in DT adoption by the entrepreneur.

An improvement in security and privacy in the use of DT has a positive and significant impact in DT adoption. In Table 2, improvement in security and privacy of the DT is shown by the marginal effect of 0.742914 and significant value of 0.012 < 5%. This indicates that a one unit improvement in the level of security and privacy will bring about 74.29% increase in DT adoption by the entrepreneurs in the study area.

## Conclusion and Recommendation

It can be concluded from the results that among all the variables, namely number of years in business, nature of the business, gender of business owner, pressure from customers, access to smart device, availability of constant electricity, IT skills of the entrepreneur, security and privacy) used to measure the determinants of DT adoption only two of the variables (number of years in business and gender of business owner) were found to be insignificant determinants of DT adoption by entrepreneurs in the study area while the remaining variables, specifically nature of the business, pressure from customers, access to smart device, availability of constant electricity, IT Skills of the entrepreneur and

Security and Privacy were found to be significant determinants of DT adoption by entrepreneurs in the study areas.

Therefore, it is recommended that emphasis should be placed on those significant determinants by the stakeholders and those in authorities so that more adoption of DT can be embraced by entrepreneurs in the study areas.

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