

ANALYSIS OF FACTORS INFLUENCING THE ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) BY MICRO-ENTERPRISES IN SOUTH-WESTERN NIGERIA

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Abstract

This study focused on the analysis of factors affecting the adoption of ICT by Micro-enterprises in Southwestern Nigeria. Three hundred and forty-eight micro-entrepreneurs were selected using multi-stage sampling technique. Data were analysed using frequencies, percentages, Spearman Correlation Matrix and Tobit Regression. The equation specified ICT Adoption as dependent Variable and education, income, gender, entrepreneur's age, business size and age as independent variables. The findings revealed that ICT has not been well embraced by Micro-enterprises in Nigeria as manifested by low adoption levels in the use of computers, internet facilities and websites which tends to affect their performances.

Findings revealed that a positive and strategically significant relationship exists between Education, Income and ICT adoption by micro-entrepreneurs. This indicated that as the level of education and income increases, ICT adoption also increases. This showed that micro-entrepreneurs are limited by their low levels of education and income which served as major hindrances to ICT adoption. Findings also revealed that micro-entrepreneur's age and business age were negatively correlated to ICT adoption which meant that the older the micro-entrepreneur and the business, the lower the level of ICT adoption as both older businesses and older micro-entrepreneurs find it difficult adjusting to ICT adoption. The study therefore recommended that ICT training should be linked with business skills training in order to increase the likelihood of ICT adoption and usage by the micro-entrepreneurs. Furthermore, low cost computers and other ICT accessories should be provided and given to these entrepreneurs on soft loans.

Key words: ICT, ICT adoption, Entrepreneurs, Micro-entrepreneurs, business size

Introduction

The magnitude of micro-entrepreneurial activities plays a decisive role in the economic development of the rural livelihoods, especially in developing countries where it is considered as a proven instrument to fight poverty in an effective manner. Micro-enterprises play a significant role in employment and wealth creation. They also encourage the development of indigenous entrepreneurship, enhance regional economic balance through industrial

dispersal and generally promote effective resource utilization that are considered to be critical in the area of engendering economic development (Tolentino, 1996); Oboh, 2004; Ode, 2005).

However, micro-enterprises operate in an environment characterized by fragmented and incomplete information where awareness of markets, technology, policy, regulations and finance is limited. This affects entrepreneurial activities since the absence of information impinges on the scope of discovery and exploitation of profitable opportunities. In the context of globalization, information is the basic requirement for enterprise creation, growth

and survival; and Information and Communications Technology (ICT) is capable of easing information gaps in the business sector. Many countries including Nigeria have made deliberate efforts in integrating ICT into Micro and small enterprise (MSE) developing agenda as it offers them enormous opportunities thus empowering them to participate in the knowledge economy by facilitating connectivity; helping to create and deliver products and services on a global scale, and providing access to new markets and new sources of competitive advantage to boost income growth.

Despite all the benefits that ICT offers, the adoption and use of ICT by Micro and Small enterprises in Nigeria has been below expectations thus leading to high cost of production and lower profits (Apuki and Lathman, 2009). This is an indication that a variety of internal and external factors are responsible for low ICT adoption by micro-entrepreneurs. Therefore, this study seeks to evaluate the factors (age, gender, income and educational level of the respondents and business age and size) influencing ICT adoption by micro-enterprises and suggest possible measures to be adopted by government at all levels to provide appropriate information and support to micro-entrepreneurs in order to enhance their performances.

1.1 Statement of the Problem

The benefits of ICT adoption by Micro and small enterprises range from opportunity and market access to operational efficiencies thus making them highly productive and successful. Despite the number of identified benefits from the use of ICT to improve MSEs performance, several literatures (Kjjiteyi, 2009; Apuki and Lathman, 2009) reported that the adoption level is relatively low in Africa when compared to developed countries. Ghobakhloo, Hong, Sabouri and Zulkifli (2012) also cited that prior literature has shown that only a small number of studies

focused on the adoption and use of ICT by MSEs in Africa (Grandon and Pearson, 2004).

Moreover, it has been found that in spite of the exponential growth of ICT within MSEs, the rate of ICT adoption by these businesses has remained relatively low (McGregor and Vrazalic, 2005), and large organizations have noticeably profited more than MSEs in both ICT-enabled improved sales and costs savings (Riquelme, 2002). Failure to adopt ICT has hampered business inter-linkages and networking to the extent that entrepreneurs do not know about new products in the supply chain or even consumer demands, resulting in market mismatch between demand and supply. In effect, businesses continued to be operated in markets that are no longer profitable due to competitive pricing and hence business collapse. It is therefore imperative to examine the types of ICT tools employed by micro-entrepreneurs and to investigate the factors influencing ICT Adoption by micro-entrepreneurs in Southwestern Nigeria.

2. Definition of ICT and Micro-enterprises

Information and communications technologies (ICTs) include tools, devices, and resources used to communicate, create, manage, and share information. This includes hardware (computers, modems, and mobile phones), software (computer programs, mobile phone Applications) and networks (wireless communications, Internet). According to Hafkin and Odame (2002), ICTs are individual or set of technologies that include both new and old equipment, for human and digital communication. Presently, there are phones with radio, media centres with computing capabilities and digital television.

Definitions of Micro-enterprises also change overtime, owing to changes in price levels, advances in technology or other considerations. Enterprises can be

defined based on level of turnover; size of employees and investment capital. The UNCTAD (2000) defined a micro enterprise as "a business involving one to five persons (a sole proprietor) whose activities are simple enough to be managed directly by an individual on a person-to-person basis and the lower scale of the operations means it is unlikely to need or be able to afford to devote significant staff time to accounting.

Examples of micro entrepreneurs as identified by Gordon (2006) are owners of bakeries, beauty parlours, childcare facilities, repair shops, arts and crafts shops, painting businesses, contracting businesses, family-owned shops, small-scale restaurants, and small-inventory trading businesses. However, for the purpose of this study, the surveyed micro-enterprises will be those businesses whose total assets in capital, equipment, plant and working capital is less than N500,000.

2.1 Theoretical Framework

This research is hinged on Diffusion of Innovation Theory. Diffusion is the process by which an innovation is adopted by members of a certain community. Diffusion theory provides a framework that helps to understand why ICTs is adopted by some individuals and not by others. This theory can explain, predict, and account for factors that increase or impede the diffusion of innovations. Rogers (1995) pointed out that diffusion is not a single, all-encompassing theory, but rather several theoretical perspectives relative to the overall concept of diffusion. Thus, it is a Meta theory. Four factors influence the adoption of an innovation by members of an organization and these are:

- (1) The innovation itself,
- (2) The communication channels used to spread information about the innovation,
- (3) Time, and
- (4) The nature of the group to which it is introduced

2.1 Empirical studies related to factors influencing ICT adoption by Micro-enterprises

2.1.1 Income level of the entrepreneurs

Schiffman and Kanuk, (2004) observed that early adopters of innovations have higher incomes than late adopters. Indeed, according to Morales-Gomez and Melesse (1998), access to the Internet and other ICT tools is only open to a small fraction of the population, a phenomenon which is a function of their income. They further observed that the situation is even more dramatic in developing countries, where the income gap is wide; literacy rates are remarkably low; and users of telecom technologies belong to the elite.

2.1.2 Age of the Respondents

Some researchers found that age is positively related to ICT adoption and usage (Morris and Venkatesh, (2000); Pijpers et al. (2001) and Czara et al. (1989) buttressed this by reporting that computer skills were more easily learned by younger subjects than by older subjects.

2.1.3 Educational level of the respondents

Education plays an important role in entrepreneurship as it enables individuals to be broad minded and receptive to new ideas (Ntale, 2013) Furthermore, in Global Entrepreneurship Monitor (GEM) report, Minniti (2004) indicated that low level of education in South Africa contributed to lack of mind set and skills of entrepreneurship. Higher levels of education have been empirically associated with enhanced computer abilities and with more favourable attitudes towards computers.

2.1.4 Gender

Evidences from literature found that gender is one of the most studied personal characteristics in ICT studies. For example, Van Slyke et al., (2002) found gender to be a significant predictor of an individual intention to make purchases over the web. Generally, males are more

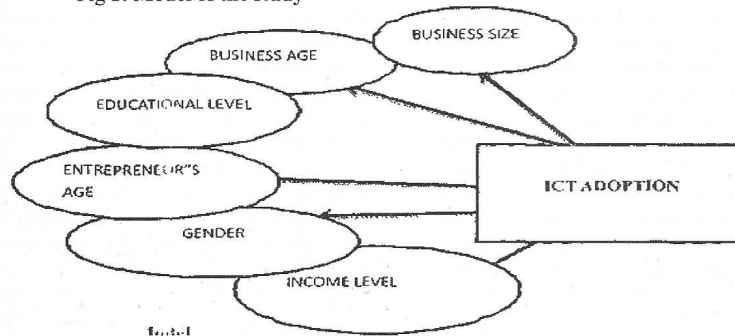
likely to adopt ICT than females. Selwyn (2003) noted that a high proportion of males than females reports access to ICT such as the internet. In the UK, La Vile and Blake (2001) found that women were less likely to have access to computers. Also, a study was conducted in Netherland by Sorenson and Stewart (2004) which revealed that although gender differences in terms of access were small, they still exist.

2.1.5 Business size and Age

Goode and Stevens (2000) found that the age of the organisation is positively related to ICT adoption and

usage. However, Irefin et al., (2012) reported that a negative relationship exists between business size and ICT adoption. Large businesses that possess adequate financial resources, maturity, knowledgeable employees and operation performance are likely to adopt ICT unlike small enterprises that are still under nurturing. However, Dutta et al, (2003) argued that the relationship between Business size and ICT adoption was positive in that the larger the business size, the more the intention for the business to adopt ICT.

Fig 1: Model of the study



The Research Model

Source: Authors Computation

2.2

MODEL SPECIFICATION

Based on the literature discussed above, the research model illustrated in Figure I for this study consists of six sets of variables namely entrepreneur's age, gender, educational level, business size and age. These variables are hypothesized to affect the adoption of ICT by Micro-enterprises.

3. Methodology

The study was conducted in Oyo and Lagos states of Nigeria which were adjudged to be one of the prolific micro and small scale entrepreneurial regions with vast physical and financial

infrastructures as well as economic resources. As one of the commercial hubs of the country, many indigenes were involved in micro entrepreneurial activities. A multi-stage sampling procedure was used to select a total number of 348 respondents involved in these micro-enterprises (Welding, Hairdressing, Fashion Designing and Textile Trading) from the total population of 2700 micro-entrepreneurs which were initially identified through a preliminary survey. The choice of these enterprises was due to their easy accessibility, being found in every nook and crannies of the selected

regions. The study required that the enterprises must have been in existence for five years and only businesses that complied with the following characteristics were sampled: Physical presence (shop, workshop, house where the business is operating from) Business must operate with the aim of generating sustainable income streams; and that such business should be independent (i.e. not be a branch of a larger business) A comprehensive questionnaire was developed to collect data from the enterprises. The dependent variable for the study was ICT adoption while the independent variables were age, income, gender, educational level of the respondents and business age and size. The age of the business referred to the number of years that the business had been in existence and the size of the business was measured by the number of employees.

4. Results and Discussion

This study evaluated the factors influencing ICT adoption by micro-enterprises in Nigeria, with age, gender, income and educational level of the respondents and business age and size as independent variables. The first objective which was to determine the ICTs tools commonly used by micro-enterprises was analysed with descriptive statistical tools of frequencies and percentages. The results as presented in Table I indicated

that Three hundred (86.2 percent) out of 348 sampled respondents make use of mobile phones regularly. This demonstrated that micro-entrepreneurs use mobile phones more than any other ICT tools. Mobile phones seem to be crucial communication for them as they use it daily for communication. This is in agreement with the work of Adewoye et al. (2013) which reported that the fast growing and most popular ICT device in use in Africa is mobile phones, while Facebook (34.48 percent) and internet facilities (22.9 percent) ranked second and third respectively. This was due to the fact some of these mobile phones have computer features like web surfing, Facebook applications and internet facilities. Some of the respondents explained that internet facilities allow them to check out the latest styles in vogue and it is very useful for business development. Personal computers (14.95 percent) were ranked the fourth ICT tools used by respondents. It should however be noted that only two (0.57 percent) of the respondents have websites with which they could benefit from ICT. This is an indication that ICT tools have not been adopted well by the respondents. The reason for low adoption of personal computers may be due to its high costs.

Table I: ICT Tools used by entrepreneurs

	Mostly used		Sometimes used		Rarely used		Not used at all	
	No	%	No	%	No	%	No	%
Mobile Phones	300	86.2	28	8.05	15	4.31	5	1.44
Desktop	5	1.44	15	4.31	40	11.49	288	82.76
PC	52	14.95	60	17.24	25	7.18	211	60.63
Internet	80	22.99	25	7.18	66	18.97	177	50.86
Facebook	120	34.48	80	22.99	50	14.37	98	28.16
Websites	2	0.57	1	0.57	1	0.29	3.43	98.57

Source: Field Survey, 2015

The second objective of the study was to determine the effect of factors like age, income, gender, educational level of the respondent and business age and size on ICT adoption. Tobit Regression and Spearman Rank Correlation using STATA 11 were employed for the analysis. Table II below depicts the correlation matrix of factors influencing - ICT adoption. This is to assess the relationship between the study variables. The correlation coefficient between Education and ICT adoption was positive (0.5186) and significant. This implied direct relationship between the variables and it can be inferred that as the educational level of the micro-entrepreneurs' increases, the level of ICT adoption also increases. Also

the relationship between Gender, income level of the micro-entrepreneurs and ICT adoption were positive (0.5382 and 0.4942 respectively). This showed that ICT adoption increases higher income level. This finding corroborated other researchers (Njiraine, 2000; Omona, 2001), who earlier affirmed gender correlated positively and played significant role in ICT adoption. However, a negative correlation was obtained for age of the micro-entrepreneur, business age and ICT adoption. This indicated that the older the micro-entrepreneur and the business, the lower the level of ICT adoption by the micro-entrepreneurs.

Table 11: Spearman Con-elation Matrix of variables

ICT adopt	Education	Income	Age	Gender	Hi/ size	Biz age
ICT adopt	1,000					
Education	0.5186	1,000				
Income	0.4942	0.2182	1,0000			
Age	-0.3159	-0.2129	-0.3028	1,0000		
Gender	0.5380	0.3675	0.3232	0.0721	1,0000	
Biz size	0.0462	-0.0226	0.689	0.1270	0.0774	1,0000
Big age	-0.1110	0.0603	-0.1488	0.1523	0.0824	0.10331,0000

Source: Field Survey, 2015

Table III below showed the factors influencing ICT adoption using Tobit Regression. The multiple regression line is as written below:

$$ICT\ Adoption = 1.5529 + 0.2816 \times 1 + 0.2081 \times 2 + 0.1209 \times 3 + 0.2700 \times 4 + 0.076 \times 5 + 0.0578 \times 6$$

The likelihood ratio of chi-square of 36.81 with apriori value of 0.0000 indicated that the model fits significantly better than an empty model (i.e. a model with no predictor) and this is an indication that the model is statistically significant. The R2 was 0.5800, implying that 58 percent of the variation on ICT Adoption was explained by the variables considered in the model. In consonance with these

findings, three of the predictors. Education, Income and Gender were found to have positive significant effect on ICT adoption.

Education with coefficient of 0.281 had positive significant effect on ICT adoption meaning that for one unit increase in education, ICT adoption would increase by 2.89 units. This revealed that higher education is associated with

enhanced computer abilities and with more favourable attitudes towards computers. This supports the assertion of Ntale (2013) who reported that education enables individuals to be broad minded and receptive to new ideas.

Furthermore, income also had significant effect on ICT adoption with a positive coefficient of 0.2081 showing that for one unit increase in income, ICT adoption increases by 2.08 units. This meant that as the income of entrepreneur increases, the rate of ICT adoption also increases. This may be due to the fact that, often, the higher the income, the easier it is for individuals to acquire personal ICT facilities and get exposure to ICT through various media (Schiffman and Kanuk 2004). This result may not be unexpected as micro-entrepreneurs would be willing to spend much on ICT adoption as their income increases knowing fully well that the higher their investment in ICT, the better their performances.

Gender was highly significant with P-value of 0.005 and also with a positive coefficient of 0.27000. This implied that males are more likely to adopt ICT more than their female counterparts. This may be attributed to the fact that females spend most of their time raising kids and taking care of their homes thus having little or no time for ICT training unlike males that have the required resources and time for ICT adoption. This result is consistent with the findings of Selwyn (2003) and La Valle and Blake (2001) who noted that a higher proportion of males than females report access to ICT such as the Internet. This can also be linked to some factors such as women having lesser time to spend learning new programmes, undue discrimination against women folk, and

the fact that most women have phobia for ICT as was reported by Olatokun (2007).

Age of the entrepreneurs on the other hand was not statistically significant with negative coefficient of 0.1209. This is an indication that the older the micro-entrepreneur, the lower the level of ICT adoption. This report is in line with the findings of Czara et al (1989) who found that computer skills were more easily learned by younger subjects than by older subjects. Although, Ehikhamenorr (1999) found out that age have no significant influence on ICT adoption, however, this result may not be unexpected because older people may have difficulty in generating syntactically complex commands. This result is further corroborated with the findings of Morris and Venkatesh, (2000); Pijpers et al., (2001) who found that age is positively related to ICT adoption and usage.

In another development, findings also revealed that business size though positive was not statistically significant to ICT adoption. This implied that the larger the business size, the more the tendency to adopt ICT. This is in support of the findings of Duttack et al., (2003) who reported that the relationship between business size and ICT adoption was positive. Business age with a negative coefficient of -0.0578 was not statistically significant. This result was in consonance with the report of Goode and Stevens (2000) who found that the age of the organisation was positively related to ICT adoption and usage. This may be due to the fact that older enterprises may find it difficult adjusting to new innovations and ideas especially ICT adoption unlike new enterprises who are ever ready to adopt new ideas and innovation in order to break into new markets and compete favourably.

TABLE III: Analysis of Factors influencing ICT adoption using Tobit Regression
Log likelihood = 13,325004

	Coeff	Std.Err.	t-value	p-value
LR chi2 =	36.81			
Prob>chi2=	0.0000			
ICT adopt				
Education	0.2815588	0.09878727	2.88	0.006
Income	0.2081354	0.0896792	2.32	0.025
Age	-0.1209795	0.0871647	-1.39	0.172
Gender	0.2700525	0.0921329	2.93	0.005
Biz size	0.0761564	0.0851581	0.89	0.376
Biz age	-0.0578359	0.1069414	-0.54	0.591
Constant	1.552924	0.3667392	4.23	0.000
Sigma	0.274157	0.0310467	0.2115865	0.3367276

Source: Field Survey, 2015
Significant at P<0.05

5. Conclusion and Recommendation

The study attempted to evaluate factors influencing ICT adoption by micro-enterprises in Southwestern Nigeria. The results of the data analysis and hypothesis tested revealed that ICT has not been well embraced by Micro-enterprises in Nigeria as manifested by low adoption levels in the use of computers, internet facilities and websites which tends to affect their performances. Moreover, a positive and strategically significant relationship exists between Education, Income and ICT adoption by micro-entrepreneurs. This indicated that as the level of education and income increases, ICT adoption also increases. This revealed that micro-entrepreneurs are limited by their low levels of education and income and this served as a major hindrance to ICT adoption. However, micro-entrepreneur's age and business age were negatively correlated to ICT adoption which meant that the older the entrepreneur and the business, the lower the level of ICT adoption as both older businesses and older micro-entrepreneurs find it difficult to adjust to ICT adoption.

On the whole, this study indicated that there is need for purposeful measures to be put in place by policy makers to

assist the micro-entrepreneurs in accessing ICT training in Nigeria. By implication, ICT training should be linked with business skills training in order to increase the likelihood of ICT adoption and usage by micro-entrepreneurs. Furthermore, low cost computers and other ICT accessories should be provided and given to the micro-entrepreneurs on soft loans as being operated by major Micro-finance institutions currently available as this will avail the keenly interested but resource-wise limited micro-entrepreneurs the opportunity of incorporating ICT to grow their small businesses. Furthermore, as the mobile phones also play important roles in developing entrepreneurship, mobile telecoms providers should be encouraged to create cheaply accessible services that will give micro-entrepreneurs the platform to collaborate and reach out to their customers and the public in general about their services.

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