Research Article   **Open Access**

Impact of Information and Communication Technology (ICT) on Poverty Reduction in Rural Areas in Kogi State

Arema Bunmi Israel*

Department of Economics, Joseph Ayo Babalola University, Osun State, Nigeria

Abstract

Rural areas in Kogi State Nigeria are facing neglect with attendant rise in the rates of poverty, unemployment and general underdevelopment thereby aggravating rural-urban migration. The underdevelopment of rural areas in the State calls for modern day innovations that Information and Communication Technology (ICT) offers. This study investigated the impact of ICT on rural development in Kogi State from the perspectives of poverty reduction. The study was based on the neoclassical theory of poverty. Multi-stage sampling method was adopted to select 10 households each from 120 rural communities that were earlier randomly selected from the 21 Local Government Areas (LGAs) of the State. This makes a total sample of 1,200 households used in the survey. Three models of regression were estimated in the study using Ordinary Least Square (OLS) technique. The results show that access to, ownership and utilization of ICT by households have had positive and statistically significant impact on poverty reduction in rural areas of Kogi State at 5% significance level. The study concluded that access, ownership and utilization of ICT have positively impacted the people in rural areas of Kogi State. The study recommended that Kogi State government, Non-Governmental Organizations and individual philanthropists should establish more ICT training centers and Community Internet Service Centers (CISC) in rural areas. Also, rural dwellers in Kogi State should make themselves available for ICT training.

Keywords

Information • Communication • Technology • Poverty reduction

Introduction

There exists a discernible disparity between the living conditions of people in the urban and rural areas in Nigeria. In 2011, for example, while rural poverty rate was 63.3 percent, urban poverty rate was 43.3 percent [1]. In the same year, rural unemployment rate was 25.6 percent compared to the urban unemployment rate of 17.1 percent. The necessity for greater and deliberate efforts targeting development of rural areas and their inhabitants has continued to grow especially in Africa generally and Nigeria in particular [2].

The observed poor economic condition of rural areas in Nigeria is not different from what is obtainable in Kogi State. According to the Kogi State Government, the state of infrastructure in the state has declined over the years. Generally, the road networks are in poor condition and rural-urban landscape is chaotic, disorderly and unsanitary. Water supply is perennially inadequate; the state transport company is moribund; housing supply is inadequate and substandard which calls for attention.

The Kogi State Government has over the years embarked on some developmental programmers such as the world bank supported Agricultural Development Project (ADP), the rural water supply scheme, the rural electrification scheme, the low cost housing scheme, the universal primary education scheme and the state transport scheme, but little or no results were achieved given a number of factors such as insufficient funds and corruption.

ICTs are changing the world at an unprecedented rate. The information age has opened up the entire world and has turned it into a global village.

***Address for Correspondence:** Dr. Arema Bunmi Israel, Department of Economics, Joseph Ayo Babalola University, Osun State, Nigeria; E-mail: aremabisrael@gmail.com*

The lives of people, how they live, the type of jobs they do, the way they communicate, and the way they travel are being affected almost day-to-day by the introduction of new technological and scientific inventions. The rapid evolution and accessibility to electronic devices like mobile phones, laptops, tablets and the rapid expansion of the telecommunications industry in Nigeria have greatly influenced and facilitated easy access to ICT and awareness of its potential benefits.

Asserted that despite having the overwhelming proportion of our national population in the rural areas, the rural areas are characterized by pervasive and endemic poverty, manifested by hunger, malnutrition, poor health, inadequate access to formal education, liveable housing and various forms of social and political isolation compared with their urban counterparts. That rural stagnation or underdevelopment, poverty and unemployment constitute the pushing factors that are fuelling rural-urban migration [3].

The main objective of this study is to examine the impact of access to, ownership and utilization of ICT on poverty reduction in rural areas in Kogi State. The study covers 120 rural communities selected across all the Local Government Areas in Kogi State. The survey was carried out during the months of March and May, 2016. Following the introduction; section two is the conceptual review on ICT, theory of poverty and theoretical nexus between ICT and poverty, empirical discourse between ICT and poverty reduction; section three is the methodology; discussion of results is presented in section four while section five contains the conclusion and recommendations.

Conceptual clarifications

Information and Communication Technology (ICT): ICTs are those technologies that can be used to interlink information technology devices such as personal computers with communication technologies such as telephones and their telecommunication networks. ICTs as a range of electronic technologies which when converged in new configurations are flexible, adaptable, enabling and capable of transforming organizations and redefining social relations [4]. The range of technologies is increasing all the time and there is a convergence between the new technologies and conventional media. ICT is a set of activities which facilitate and enhance the processing, transmission and dissemination of information by electronic means [5].

ICT is also defined as a shorthand for the computers, software, networks, satellite links and related systems that allow people to access, analyses, create, exchange and use data, information and knowledge in ways that were almost unimaginable [6]. The prevalence and rapid development of

ICTs has transformed human society from the information technology age to the knowledge age [7].

The information and knowledge represent notions now in vogue in the debate among economists. They noted that the increasingly important role attributed to information depend not only on structural changes that it produces but also from its location in an evolutionary process that is characterized by the transition to an economy based on services (outsourcing) and the extension of markets and production combinations at the global level (globalization) and by the continuous increase in the general level of the stock of information and knowledge [8].

Neoclassical theory of poverty: According to the Classical theory, poverty is mainly seen as a consequence of poor individual choices e.g. the poor lack "self-control" that affect productivity negatively, although it is also acknowledged that pure differences in underlying genetic abilities are also potential causes of poverty [9]. Building on the classical tradition, neoclassical theory stresses the role of the unequal initial endowments of talents, skills and capital which determine productivity of an individual in generating poverty, within a market - based competitive economic system. Market failures such as externalities, moral hazard and adverse selection as well as incomplete information are also viewed as aggravators of poverty [10]. Uncertainty may play a major role in causing poverty because the poor are more vulnerable to shocks to their wellbeing (e.g. recessions, sickness, family breakdown).

Neo-classical economics reinforces individualistic sources of poverty. The core premise of this dominant paradigm for the study of the conditions leading to poverty is that individuals seek to maximize their own well-being by making choices and investments, and that (assuming that they have perfect information) they seek to maximize their well-being. When some people choose short term and low-payoff returns, economic theory holds the individual largely responsible for their individual choices--for example to forgo college education or other training that will lead to better paying jobs in the future. Neoclassical theories of poverty recognize reasons for poverty beyond individual's control. These include; lack of social as well as private assets, market failures that exclude the poor from credit markets and cause certain adverse choices to be rational; barriers to education; immigrant status, poor health and advanced age; and barriers to employment for lone-parent families [9].

Theoretical nexus between ICT and poverty: Asserted that in the context of poverty reduction, 'good' uses of ICT must obviously have a positive impact on one or more aspects of poverty. However, as a target for the investment of scarce development funds, there are several additional criteria – similar to those criteria applied in most cooperative development projects such as affordability, scalability, self-sustainability and sensibility [11]. According to him, the role of ICT is catalytic in the complex task of poverty reduction by leveraging the effects on earnings opportunities, on educational and health services, on good governance and on promoting democracy.

Since information exchange is part of nearly every element of the economy, the impact of improvements in the capacity for information exchange will depend critically on how the rest of the economy functions. This suggests the centrality of a holistic approach in evaluating the impact of ICT. For example, the impact of improved ICT access on farm earnings through increased knowledge of market prices will be muted if there are no roads to carry crops to markets, or there are no markets because of an unreformed agricultural sector [12].

Any approach using ICT in the interest of poverty reduction has to be broad-based and tailored to various sectors with inter-linkages t based on a study carried out in India, Jamaica and South Africa, the effectiveness of ICT in combating poverty depends on [11,13]:

• Complementarities with other local level poverty reduction and development initiatives;

• Responding to the local community needs; and

• Involving stakeholders in applications development.

Care should be taken to make sure that the novelty factor of the technology does not drive decisions regarding the most appropriate technology for poverty reduction. The goal of using ICT with marginalized groups, such as the poor, is not only about overcoming the digital divide, but rather enforcing and furthering the process of social inclusion, which is required for transformation of the environment and social system that reproduces poverty [14]. Technology can assist in this process, but efforts should not be just limited, that it has been proposed that strong linkages need to be established between direct ICT interventions and national-level programmers that deploy ICT as an enabler in development [15].

Empirical discourse of the nexus between ICT and poverty reduction: The activities of ICT entrepreneurs could reduce unemployment and alleviate poverty in Nigeria [16]. The use of ICT such as the GSM, transaction costs of many poor Nigerians have drastically reduced and that technology has led to increased service innovation, efficiency and productivity [17]. The use of information and communication technology in agricultural and rural transformation in Delta State. They concluded that ICT is a veritable tool and requirement for agricultural and rural transformation even though it is not widely accessed by farmers in these communities. These studies used descriptive statistics in their analysis [18].

ICTs are critical components of poverty alleviation strategies, because they offer the promise of easy access to huge amounts of information useful for the poor [19]. ICTs have a high possibility of effecting positive change in the life and activities of the farmers when additional input and effort are provided to the extension method of communication in order to create a multi-dimensional approach that will adequately suit farmers' local situation and conditions [20]. ICT can promote increasing productivity, improve market access and create employment opportunities [21].

The role of mobile telephone in sustainable poverty reduction among the rural poor. The findings revealed that economic and social benefits of mobile telephone are higher in rural areas and consequently have a multidimensional positive impact on sustainable poverty reduction [22]. The impact of mobile telecommunication on the Nigerian economy and the growth implications in terms of income and employment opportunities [23]. The study reported that GSM leads to reduction in poverty level and incidence through increase in income generation and business expansion.

The impact of developments in telecommunications on poverty in Nigeria. They concluded that the developments in telecommunications to a very large extent have a positive impact on poverty reduction in Nigeria [24].

Methodology

This study utilized the survey design, which was conducted through the administration of structured questionnaire to the people in selected rural areas in Kogi State. The survey design was adopted because it made it easy for people to participate and remain anonymous. The study also used quantitative and qualitative data which were obtained through the use of a structured questionnaire.

Instrument for data collection

Copies of a structured questionnaire were used for data collection in this study. The questionnaire sought information about households' characteristics, total daily per capita household consumption expenditure and its impact on access to, ownership and utilization of ICT.

Method of analysis

Three (3) econometrics models were estimated in the study in order to examine the impact access to ICT, Ownership of ICT and Utilization of ICT have had on poverty reduction in rural areas in Kogi State. The models were estimated with the use of Ordinary Least Square (OLS) technique using computer software (E-views version 10). The estimated models were subsequently analyzed on the basis of the sign and significance of the

coefficients of the variables of interest.

Model specification

Poverty model: This model seeks to examine the impact of ICT on poverty in the rural areas in Kogi State. To accomplish this, the study drew from the model was used in examining the determinants of poverty in Malawi with some modifications [25,26]. The model is stated thus:

$$\ln C_j = _j X_j + h_j \quad\quad\text{... (1)}$$

Where: Cj is total daily per capita consumption expenditure of household j; Xj is a vector of exogenous household characteristics, j is co-efficient vector and hj is random error term.

For the purpose of this study the model was modified as follows:

$$\ln C_j = _j X_j + _j T_j + h_j \quad\quad\text{... (2)}$$

Where: C_j = total daily per capita consumption expenditure of household j in rural communities in Kogi State.

X_j = vector of household characteristics such as Household Size (HS), Head of Household's level of Education (HE), Age of Household Head (AH), Marital Status of Household Head (MS), Gender of Household Head (GH), Housing of Household (HH) and Electricity Available in Household (EH).

T_j = vector of ICT variables such as Household Access to Radio (HAR), Household Ownership of Radio (HOR), Household Utilization of Radio (HUR), Household Access to Television (HAT), Household Ownership of Television (HOT), Household Utilization of Television (HUT), Household

Access to GSM phone (HAG), Household Ownership of GSM phone (HOG), Household Utilization of GSM phone (HUG), Household Access to Personal Computer (HAP), Household Ownership of Personal Computer (HOP), Household Utilization of Personal Computer (HUP), Household Access to Internet (HAI), Household Ownership of Internet MODEM (HOI), Household Utilization of Internet (HUI).

β_j = co-efficient vector of household characteristics

λ_j = co-efficient vector of ICT variables

h_j = random error term

The a-priori expectations were that: β_j, λ_j > 0.

Results and Discussion

In Table 1 overleaf, shows the results of the impact of access, ownership and utilization of ICT on poverty reduction (proxied by total daily per capita consumption expenditure) in rural areas of Kogi State respectively. The Access to ICT model has an R-square of 0.5860; this indicates that about 59% variation in the dependent variable (poverty reduction) is explained by the explanatory variables (vector of household characteristics and vector of ICT variables, while the error term takes care of the remaining 41% that are variables that were not included in the model because of certain qualitative features. The F-statistic (71.3354) shows that the model as a whole is statistically significant at 1% significance level.

Table 1. Impact of access, ownership and utilization ICT on poverty reduction in rural areas of Kogi State (Disaggregated model).

Independent variables	Access coefficient	Probability	Ownership coefficient	Probability	Utilization coefficient	Probability
Constant	4.3321***	0.0000	4.2586***	0.0000	4.6069***	0.0000
Household size	-0.1408***	0.0000	-0.1409***	0.0000	-0.1339***	0.0000
Household's head level of education	0.0585***	0.0000	0.0539***	0.0000	0.0630***	0.0000
Age of household head	0.0262***	0.0000	0.0251***	0.0000	0.0194***	0.0000
Marital status of household head	-0.3297***	0.0000	-0.3202***	0.0000	-0.3246***	0.0000
Gender of household head	0.1438***	0.0001	0.1655***	0.0000	0.1359***	0.0001
Housing of household head	0.0217	0.4831	0.0824***	0.0090	0.0794***	0.0058
Electricity available in the household	0.0532	0.2021	-0.0402***	0.3470	0.1346***	0.0005
Household ICT knowledge	0.0471	0.2165	0.0063	0.8669	0.1128***	0.0031
Household access to radio	0.1044***	0.0060	-	-	-	-
Household access to television	0.1822***	0.0000	-	-	-	-
Household access to GSM phone	0.4083***	0.0000	-	-	-	-
Household access to personal computer	0.1044**	0.0284	-	-	-	-
Household access to the internet	0.0369	0.4537	-	-	-	-
Household ownership of radio	-	-	0.0351	0.3277	-	-
Household ownership of television	-	-	0.2121***	0.0000	-	-
Household ownership of GSM phone	-	-	0.1934***	0.0001	-	-
Household ownership of personal computer	-	-	0.0712	0.1679	-	-
Household ownership of the internet MODEM	-	-	0.2427***	0.0000	-	-
Household utilization of radio	-	-	-	-	0.2384***	0.0000
Household utilization of television	-	-	-	-	0.2450***	0.0000
Household utilization of GSM phone	-	-	-	-	0.5063***	0.0000
Household utilization of personal computer	-	-	-	-	0.2762***	0.0000
Household utilization of the internet MODEM	-	-	-	-	0.4707***	0.0000
R-squared	0.5860	-	-	-		
F-statistic	71.3354	0.0000	72.2372	0.0000	93.7313	0.0000

Note: ICT OLS model estimation; **Dependent variable:** Poverty (total Daily Per Capita Consumption-Expenditure in Naira); No. of Observations: 1,120.
(***) Significant at 1%, (**) Significant at 5% and (*) Significant at 1%.

Holding the vector of household characteristics constant, the coefficients and the associated probabilities of the vector of ICT variables used in the study indicate that all the ICT variables (household access to radio, television, GSM phone, Internet and ICT knowledge) have the expected signs. These imply that household access to radio, television, GSM phone, personal computer, the Internet and ICT knowledge contribute to poverty reduction in rural areas of Kogi State. Statistically, the positive impact of household access to radio, television and GSM phone is significant at 1%; while that of household access to personal computer is significant at 5%. The positive impact of access to the Internet and ICT knowledge are however not statistically significant.

On the basis of the magnitude of the coefficients of the ICT variables, households' access to GSM phone appears to have more positive impact on poverty reduction in the rural areas of Kogi State since it has the highest coefficient (0.4083). From the foregoing therefore it is expected that as more people in the rural areas in Kogi State have access to radio, television, GSM phone and personal computer, their level of poverty will decrease ceteris paribus.

Also shown in Table 1 is the Ownership of ICT Model. The model has an R-square of 0.5510; this indicates that about 55% variation in the dependent variable (poverty reduction) is explained by the explanatory variables (vector of household characteristics and vector of ICT variables, while the error term takes care of the remaining 45% that are variables that were not included in the model because of certain qualitative features.

Holding the vector of household characteristics constant, the coefficients and the associated probabilities of the vector of ICT variables used in the study indicate that the ICT variables such as household ownership of radio, television, GSM phone, personal computer, Internet MODEM and ICT knowledge all have the expected signs. These imply that household ownership of radio, television, GSM phone; personal computer, internet MODEM and ICT knowledge have positively contributed to poverty reduction in rural areas of Kogi State. Statistically, the positive impacts of household ownership of television, GSM phone and internet MODEM are significant at 1%; while the positive impact of household ownership of radio and personal computer are not statistically significant. The F-statistic (72.2372) shows that the model as a whole is statistically significant at 1%significance level.

Households' ownership of Internet MODEM appears to have had more positive impact on poverty reduction in the rural areas of Kogi State since it has the highest coefficient (0.2427). From the foregoing therefore it is expected that as more people in the rural areas in Kogi State own television, GSM phone and Internet MODEM, their level of poverty will decease ceteris paribus.

In Table 1 also shows the utilization of ICT Model. The model has an R-square of 0.6250; this indicates that about 63 percent variation in the dependent variable (poverty reduction) is explained by the explanatory variables (vector of household characteristics and vector of ICT variables, while the error term takes care of the remaining 38% that are variables that were not included in the model because of certain qualitative features. The F-statistic (93.7313) shows that the model as a whole is statistically significant at 1% significance level.

Holding the vector of household characteristics constant, the coefficients and the associated probabilities of the vector of ICT variables used in the study indicate that the ICT variables such as household utilization of radio, television, GSM phone, personal computer, the Internet and ICT knowledge, all have the expected signs. These imply that household utilization of radio, television, GSM phone, personal computer, the Internet and ICT knowledge have all contributed to poverty reduction in the rural areas of Kogi State. Statistically, the positive impact of household utilization of the radio, television, GSM phone, personal computer, the Internet and ICT knowledge are all significant at 1%.

Conclusion

Households' utilization of GSM phone appears to have had more positive impact on poverty reduction in the rural areas of Kogi State with the highest coefficient (0.5063). Access to radio, television, GSM phone and personal computer; ownership of television, GSM phone and Internet MODEM; and utilization of radio, television, GSM phone, personal computer and the Internet; have had a positive and significant impact on poverty reduction in Kogi State with p-values (< 0.0284).

The potentials and opportunities offered by ICT have not been fully exploited in rural areas in Kogi State due to ICT illiteracy, epileptic and lack of electricity, lack of access, ownership and utilizations of ICT gadgets. Even though ICT has positively impacted the people in rural areas of Kogi State, the impact has not been substantial and wide spread. Kogi State Government, Non-Governmental organizations and individuals should establish ICT training centers across the State to provide technical training for the unemployed people. Financial institutions in rural areas in Kogi State should be encouraged by governments at different levels to give interest-free loans to rural dwellers to acquire ICT gadgets.

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