

## **Developing Rural Communities in Nigeria Through Information and Communication Technologies and the Potential Barriers**

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**Citation:** Ifeoma Felicia Uzoagu and Abraham Oriji (2022) Developing Rural Communities in Nigeria Through Information and Communication Technologies and the Potential Barriers, *British Journal of Education*, Vol.10., Issue 6, pp. 1-16

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**ABSTRACT:** *The roles of Information and Communication Technologies (ICTs) in all spheres of human activities have been applauded by researchers and/or professionals in the field. Rural community development is a critical driving force in a nation's advancement. The effort is to address and successfully support the specific needs and opportunities of the communities and their inhabitants. As a result, any nation that has weak or undeveloped rural communities finds it extremely difficult to reach the height of its developmental stride. In the same manner, the role of new technologies in modern times cannot be quickly exhausted in a hurry. As a result, this paper attempts to identify and conceptualize "ICTs" and "Community development". It also attempts to understand the technological tools, and how these various tools are used to address community developments, particularly in Nigeria and the wider world at large. The paper further examined the challenges or obstacles hindering the effective use of Information and Communication Technology tools in rural community development in contemporary times. The authors finally made suggestions for combating the effective implementation of ICT tools in rural community developments.*

**KEYWORDS:** community development, ICTs, technology tools, electronic development, and rural development

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### **INTRODUCTION**

Information and communication technology (ICT) has become one of the basic building blocks of modern society (Gokhe, n.d.). It is presently influencing every aspect of human endeavour, and human life (Ratheeswari, 2018). Presently, Singh, Agrawal and Mishra (2015) have observed that societies depend on Information Technology for rapid growth and development. These technological tools are playing salient roles in workplaces, business, education, and entertainment. Moreover, many people recognize ICTs as catalysts for change in work places, handling and exchanging information, teaching methods, learning approaches, scientific research, and accessing information communication technologies (Ratheeswari, 2018).

World over, there has been a remarkable significance in using Information and Communication Technologies in facilitating and accelerating the process of development and as a way of reducing poverty across the globe. ICT,

as noticed by Patel and Patel (2020), offers an opportunity to introduce new activities, new services, and applications into rural areas or to enhance existing services. ICT plays a significant role in both the health and education sectors. Other areas of notice are agriculture, allied services, and livelihood. The authors further assert that ICT gives the preparation to the citizens to advance their items on the web. ICT supports activities involving information, including information gathering, processing, storing, and presenting data. ICT can be utilized for social, financial, and potential advancement with a specific emphasis on helping poor and significant individuals and networks. Increasingly, these activities also involve collaboration and communication (Patel & Patel, 2020).

Empirical evidence confirms that ICT has huge potential for rural development in many sectors. It enables improving digital literacy, community economy, and online community activities (Ko, Routray & Ahmad, 2019). ICT opens up new opportunities for rural people to access a wide range of services, such as healthcare, government services, market, and security, as well as accelerating the exchange of information, especially knowledge (Migiro & Kwake, 2007).

The import of ICTs in community development in modern society cannot be overemphasized. Therefore, this study attempts to conceptualize the terms, “ICTs” and “Community development” and identify the various technological tools used for community development, particularly as it affects Nigeria and the world at large. The paper hopes to tackle the obstacles hampering the effective use of ICT tools in community development in contemporary society and make appropriate recommendations to combat the obstacles hindering the efficient implementation of ICT tools in community development.

### **Purpose of the Study**

The rhythm of a drumbeat dictates the dancing style. This is a technology-driven society that also requires adequate knowledge of technological skills. There is no doubt that there is a lack of technological knowledge in this part of the world, which has not been given the required attention. As a result, there is a need to address the technological issues confronting Nigeria, just like other underdeveloped or developing worlds, especially concerning the development of the rural communities in Nigeria. The purpose of this study, therefore, is to create technological awareness among the Nigerian populace, by highlighting the influence of Information and Communication Technologies (ICTs) in developing rural communities in Nigeria, and at the same time stressing the potential barriers or limitations of adopting Information and Communication Technologies in developing rural communities in Nigeria. The adequate knowledge and the use of ICTs skills in developing rural communities will enable the community to play a quicker and a special role in overcoming abject poverty and poor living standards among the populace. The acquisition of the needed technical knowledge or skills will also help to unite the community at a grassroots level, enhance strong democracy and proffer immediate solutions confronting the development of rural communities at large (Ibanga, 2017).

### **Previous Studies**

This section of the paper places emphasis on numerous kinds of literature related to Information and Communication Technology and rural community development, and how these ICT tools have helped in rural or community development objectives. The authors believe that the knowledge of the previous research could be a good guiding principle to accomplishing the task of ICTs' role in community development. Nonetheless, the major terms observed in this topic will be explained for a better understanding of the subject matter.

### Conceptual Clarity

ICT: This acronym or abbreviation stands for “Information and Communication Technology (Khan, Khan, Din, Ismail, & Rafid, 2015); it further refers to technologies that provide access to information through telecommunication, which includes the internet, wireless networks, cell phones, and other communication mediums (Ratheeswari, 2018). It is an umbrella term that features any communication device or application that enables individuals to access, disseminate and process information. It, therefore, encompasses any medium used to record information (whether paper, pen, magnetic disk/tape, optical disks - CD/DVD, flash memory, etc.); and also technology for broadcasting information - radio, television; any technology for communicating through voice and sound or images - microphone, camera, loudspeaker, telephone to cellular phones (Ratheeswari, 2018) and (<https://www.igi-global.com/dictionary/information-and-communication-technology-ict/14316>).

The term has also been operationally defined as the use of the computer and internet connections to handle and communicate information for learning purposes (Ratheeswari, 2018).

IT: This refers to Information Technology (IT). It is the use of computers to create, process, store, retrieve, and exchange all kinds of electronic data and information (Daintith, 2009). Similarly, Singh, Agrawal and Mishra (2015) conceptualizes Information Technology as the technology, which uses the computer to gather, process, store, and output information. Generally, Information technology covers any form of technology, which includes any equipment or technique used by a company, institution, or any other organization which handles information. It incorporates computing, and telecommunication technologies, and includes consumer electronics and broadcasting as it is getting more and more digitized (Singh, Agrawal, and Mishra (2015). Invariably, IT entails the use of computers in the dissemination of digitized or electronic information.

Community: The most commonly held meaning of “Community” at the earlier times was referred to as “people living in a place, who have face-to-face contact with each other” (Goel, 2014). This definition, as the author further stated suits the traditional society where the social formation was much emphasized, that is, where face-to-face contact was possible in rural and tribal society). However, this definition has recently changed; such tight compartmentalization as noted by Goel (2014) has changed over time as the community crossed physical boundaries of place and people could connect by using technologies and still fulfill most of the functions of the community. For instance, web communities, Facebook or other social media community, and online groups that traverse physical boundaries and relate with unknown people in diverse locations.

In concord with Goel (2014), Gradinaru (n.d.) opine that there is yet no established unique and global definition of a community; one of the reasons being that one can distinguish among others - local community, professional community, a community of interests, religious community, electronic community, a community of practice, epistemic community, community studies, etc. In this regard, an online community could be defined as “a group of people coming together for a common purpose, interest, or vision, and doing so through the internet, especially via the use of chat rooms, mailing lists, and forums as their primary mode of interaction (DiRose, 2021).

Nonetheless, ordinarily, a community could be defined as “A group of people forming a smaller social unit within a larger one, and sharing common interests, work, identity, location, etc.” (<https://www.yourdictionary.com/Community>). Generally, the traditional community is characterized by a “natural will”, natural ties of kinship and friendship, familiarity, and the age-old habit and customary ways of doing things together, living together in

a common locality, and social position is defined by birth, personal achievements, education, property, etc. Additionally, a community is homogeneous, socially and geographically immobile, and characterized by values, such as the centrality of kinship ties, solidarity as a community, and attachment to the locality (Diaz, 2000).

Conclusively, “community”, be it natural or technological society as we see it today is said to exist when there is a sense of identity, commonality, or spirit among a group of people interaction between individuals, and has the purpose of meeting individual needs and obtaining group goals (Diaz, 2000). In conclusion, Onyeozu (2007) informs that a community may have more than one ethnic groups which have different ways of life, still, the social and economic problems which they face and which they fight together to eliminate remains the common bond that tie them together.

**Development:** The word, “Development” is defined differently by professionals in different disciplines as it connotes to them (Kingsley, 2017). This phrase “Development” as opines by Kingsley (2017) is commonly linked with the third world or least develops countries (LDC). Hence, development generically, according to Akarowhe (2017) refers to an institutional change, which is accompanied by an increase in welfare, and a fall in the cost of living. Additionally, Kingsley (2019) further describes “community” in a community development sense as referring to the citizens of the area and does not usually refer to service providers or organizations.

**Community Development:** Community development is a broad term for a variety of initiatives in many areas of community life, such as civil society, education, social services, housing, business development, health and safety, welfare, and so on (Forgeard, 2022). (Kenny, 2007) sees it as a holistic approach grounded in principles of empowerment, human rights, inclusion, social justice, self-determination, and collective action.

Smart (2019) conceptualized community development as a process where community members are supported by agencies to identify and take collective action on issues that are important to them. Community development empowers community members and creates stronger and more connected communities.

Similarly, community development teaches people to think about the places they live, what surrounds them, and how to protect their neighborhoods, and the communities contribute to the social, political, cultural, and economic development of their countries (Forgeard, 2022). Community development as Forgeard (2022) further puts it as a group of activities and programmes that empower communities to bring about social change in their own lives.

Smart (2019) also describes community development as a process where community members are supported by agencies to identify and take collective action on issues that are important to them, empower community members, and create stronger and more connected communities. The scholar Kenny (2007) additionally conceptualizes it as a holistic approach grounded in principles of empowerment, human rights, inclusion, social justice, self-determination, and collective action, and further considers community members to be experts in their lives and communities, and values community knowledge and wisdom.

**Rural Development:** This denote the actions and initiatives taken to improve the standard of living in non-Urban neighbourhoods, the countryside, and remote villages. Such communities are characterized by predominant agricultural activities and where economic activities relate to the primary sector, production of foodstuffs and raw materials (Chamber, 1983).

Nampijja (2010) reports that the South African Rural Development Framework defines rural development as helping rural people set the priorities in their communities through effective and democratic bodies, by providing the local capacity; investment in basic infrastructure and social services. The main beliefs of rural or community development are to involve the rural populace in decisions, which influence the lives of the community via their involvement in rural development, provide reasonable infrastructure, ensure communal sustainability in rural areas and increase employment and economic growth.

Community Development: The United Nations, as cited by Shani (2020) defines the term “Community Development” as the process by which the efforts of people themselves are united with those of governmental authorities to improve the economic, social, and cultural conditions of the communities, to integrate these communities into the life of the nation and to enable them to contribute fully to national progress. This definition connotes the members of a community taking the initiative to engender development in their environment, with or without governmental agencies.

What are ICT TOOLS?

A close look at the definitions of Information and Communication Technology by Khan, Khan, Din, Ismail & Rafid,( 2015); Ratheeswari,( 2018), Chapman and Slaymaker (2002) and (<https://www.igi-global.com/dictionary/information-and-communication-technology-ict/14316> website, will easily deduce that the under-listed are technological tools, which aid community development. They are:

(1) Paper (2) Pen (3) Magnetic disk/tape (4) Optical disks (6) Radio (digital, satellite), (7) CDs/DVDs (8) Flash drives (9) digital camera (10) digital video cameras (11) Memory cards (12) Television (cable, digital, satellite) (13) Microphone (14). Loudspeaker (15) Telephone or cellular phones (16) Players.

Uses of ICT Tools in Community Development

There is no ambiguity that globalization is gaining momentum, the geographical boundaries are becoming increasingly irrelevant, and each of the communities is struggling to maintain its identity. In course of maintaining their identities and improving the condition of their members, they (communities) are usually confronted with lots of obstacles (Mulira, 2006). Recently, no one can underestimate the power of Information and Communication Technologies in community development worldwide. There is a common adage today which says that without the usage of ICTs, society will fall behind in the path of development (Mulira, 2006).

In modern times, the presence of ICTs could be felt in every rural community. Many scholars are optimistic that ICT has a role to play in national development and that there is no way a country can survive the global era without this digital platform. Some scholars viewed information technology as a tool for delivering economic growth (Heeks, 2008). The emergence of the Information and Knowledge Society and its power in gathering, processing, storing, retrieving, and transmitting knowledge and information at a distance, seems to create new promising perspectives towards the future development of rural regions (Stratigea, 2011). It could be used to fully exploit and promote rural or local developments. Ohaka and Akpom (2018) believe that ICT in contemporary times has improved the living standard and well-being of the societies and its usage has increasingly made the world a better place, considering its huge benefits.

For instance, in several remote communities today, ICTs have become a vital means for communicating within and as well as with the outside world. ICTs tools are used daily in getting in touch with news globally; ICTs also provide a platform for information dissemination, whereby rural/local communities do let the world know about them and their people ([https://www.itu.int/osg/spuold/wsis-themes/ict\\_stories/themes/community.html](https://www.itu.int/osg/spuold/wsis-themes/ict_stories/themes/community.html)). For example, the telephone, email, and other social media platforms, such as Facebook, WhatsApp, YouTube, Twitter, etc., are used daily for numerous remote communities today.

ICTs could be applied to both the individual and the societal levels (Stratigea, 2011). Community development therefore necessitate the development of the rural communities in all spheres or ramifications. Stratigea (2011) further affirms that the emergence of the Information and Knowledge Society and its power in gathering, processing, storing, retrieving, and transmitting knowledge and information at a distance, seems to create new promising perspectives towards the future development of rural regions. Hence, Community development through the use of ICTs embrace Information Gathering, Security, Health, Education, Social Cultural, Religious and Political developments.

Information Gathering: Presently, ICT has the potential to bridge the information gap (Singh, Agrawal and Mishra, 2015). ICTs are essential tools for information gathering in modern societies. Community development depends largely on information gathering, especially when the communities are dispersed and/or experiencing the process of urbanization. As Singh, Agrawal and Mishra (2015) put it, the social networking sites are very wide in today's scenario, as they are very good for current news, and bring all friends close to each other. ICTs, especially Social Media profiles can be connected with family, friends, and colleagues, where information can be shared among one another (Boyd and Ellison 2007) and (Shani, 2020). ICT also creates an open platform for effective and efficient interaction and intelligence gathering, which serves both the individuals and firms and the rural regions towards the enhancement of their competitive position in the new economy context (Stratigea, 2011). In the same manner, Stratigea, (2011) advances that:

“The development of ICTs has largely contributed to the increase of social interaction taking place between individual to individual, individual to group, group to individual and group to group communication. ICTs and the Internet can be characterized as highly e-inclusive technologies, allowing people to establish links with the rest of the community or other communities as well. E-Inclusion is of paramount importance for rural regions, especially for those which are geographically isolated, leading to the creation of social networks. Such networks are vital for the strengthening of social relationships among citizens of rural communities, but also can be considered as important platforms for information dissemination and increase of awareness on various issues of concern at the local level. (P. 188).

Health: The role of ICTs in rural development on health services cannot be overemphasized. There are lots of ICTs tools that allow citizens of rural areas to enjoy unlimited access to some basic health services that are necessary for the improvement of individuals and the society at large, thereby necessitating a decrease in inequality in access to some basic services between rural and urban population.

ICTs can help individuals in rural communities to have access to health services through electronic (e-health services) means to improve the quality of their lives in the area. As observed by (Stratigea, 2011), distant, non-

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stop medical support for the rural population is of importance, especially for the elderly or disabled groups, mainly due to the limited access of rural regions to sufficient health services. As a result, ICTs are offering great potential in this respect and great progress can be marked in the field of e-health applications (Stratigea, 2011). The author further observes that in-house video-phone equipment allows direct communication of rural citizens with properly equipped health centers, where they can send video information and receive care support from specialized staff.

Stratigea (2011) further asserts that this staff can monitor citizens' health via ICTs equipment (e.g. a GIS and a CRM system keeping historical clinic information) and properly intervene in case of critical incidents. Portable devices, especially cell phones) have become important ICT tool that enables the rural population to be in real-time with specialized health centres. Medical specialists can as well monitor patients through cell phones. E-health applications can also be used for both disease management and prevention. The following services could be performed with the use of Information and Communication Technologies in the rural communities in Nigeria and elsewhere at different levels, such as the individual, societal, business, and administrative levels.

Access to rural populations could be bridged through the use of modern ICTs tools. These tools will reduce the barriers, which have long existed before the advent of modern technological tools. For example, individuals can reach their friends, relatives, well-wishers, etc, through social media platforms, and electronic mail (email). In addition, ICTs make it possible for inhabitants of a rural community to buy goods and services electronically (e-commerce, e-marketing, e-banking, etc.). Stratigea (2011) advances that improving access to financial services is vital for rural regions (communities), especially the more remote ones. He states that e-banking and m-banking applications can revolutionize the provision of formal services in the banking sector, offering new cost-effective ways of delivering traditional services, with huge benefits for users. ICTs provide the citizens of a rural community the opportunity to have access to marketplaces or businesses, and public services in government establishments.

Education: Singh, Agrawal and Mishra (2015) acknowledge that ICTs have the potential to bridge the educational gap" in terms of civilizing excellence of education, increasing the magnitude of quality educational opportunities, making knowledge building probable through borderless and unlimited access to resources and people, getting populations in inaccessible areas to satisfy their basic right to education. E-learning is aimed at reducing education and training services to the rural populace. Rural communities can utilize cell phones and SMS tools to improve access to education, and also offer unlimited access to incapacitated individuals, an amazing asset in their fight to pick up business and other opportunities.

Also, computers and the internet are already enhancing the quality of education by making learning more relevant to the life of the rural communities, and this has been seen as an ideal situation by educational institutions (Patel & Patel, 2020). The authors further assert that ICT is not limited to computers or the internet, but also ranges from the use of radio and satellites for communication. With these facilities, teaching becomes more effective and learning more experimental. With the help of ICTs, the students get online study materials and lecture notes from all over the world within no time. Generally, ICTs have been considered effective tools for teaching, learning, and making the educational process more meaningful.

ICTs have made it possible for rural people to receive an education. E-learning services are aimed at reducing barriers to the access of the rural population to education and training services (e-courses) offered by various providers (companies, universities, private and public institutions, etc.), developing new skills and competencies that lead to personal empowerment and increase of skills and knowledge of employees in rural regions, adding value to labour productivity and competitiveness (Stratigea, 2011). ICTs tools provide an e-learning platform that supports rural communities. E-learning or e-training offers life-long education to rural individuals, businessmen, and women by giving them access to distant training opportunities, which enables them to upgrade their knowledge and skills at an affordable cost.

ICTs can bring online libraries to the footsteps of the rural communities, which, before now would not have been possible. E-libraries offer local or rural dwellers/communities more access to knowledge and information. Stratigea (2011) concisely states that joining networks of libraries enables the local population (students, professionals, etc.) to share a larger amount of knowledge resources. The national network of public libraries, private individuals, government and non-governmental organizations worldwide can be accessed by rural communities via these modern ICTs tools, which will help rural farmers to acquire specialized knowledge on issues of interest, which will help enhance their local knowledge in solving numerous agricultural problems, such as sustainable agricultural practices, organic farming, new production techniques, marketing approaches, and agricultural policy framework.

Millions of journals or journal articles and books in all formats can be viewed online; these literary materials can also be ordered for purchase through a digital format. Therefore, access to e-libraries helps farmers to acquire specialized knowledge for issues of interest, which enhance local knowledge of agricultural issues, such as sustainable agricultural practices, organic farming, new production techniques, marketing approaches, and agricultural policy framework (FAO 2005).

**Culture:** Culturally, the potential role of ICTs is not in doubt. Today, we talk of electronic culture (e-culture), whereby rural citizens can access all forms of cultural artifacts online. These ICTs tools are offering rural communities access to museums, cultural events, etc. These are interesting applications, especially for young people in remote rural regions, keeping them online with exceptional cultural assets and events all over the world (Stratigea, 2011).

**Security:** Community development will be a nightmare or horrendous in the absence of the security of lives and properties of the citizens living within the geographical delineation.

**Social:** Social learning is a knowledge-sharing platform that enables unlimited interaction among various partners based on ICTs marking the growing capacity of multiple-actor networks to develop and perform collective actions (Harmoni COP Project, 2003). A growing body of literature now describes the use of social media as a tool in areas, such as political action, democracy promotion, business marketing, and public relations management (Brown, et.al. 2009).

The application of ICTs make possible for teleworking. ICTs are key drivers, among others, for the greater flexibility of jobs in time and space (Vescoukis et al, 2003). New location and time-independent working structures are now offering the potential for decentralization of work through various teleworking schemes.



Teleworking is a powerful tool for “breaking down barriers between people, places, roles, and activities”. (EC, 1999) can benefit rural dwellers by rendering them attractive locations for the development of teleworking schemes.

Agriculture: The advent of new information and communication technology is playing vital roles in the agricultural sector. Stratigea (2011) claims that the rise of ICTs, with their wide variety of applications, holds a great promise for agricultural development in rural regions. In the same manner, Engelhard (2000) alleges that agriculture nowadays is an information-intensive sector, drawing upon an infinite number of sources of widely dispersed “locally contextualized knowledge” and a considerable body of research material. He further argues that it relies upon the continuous flow of information from local, regional, and world markets.

FAO (2005) informs that remote rural farmers can get access to special agricultural support services by use of mobile and wireless networking technologies, integrated into the satellite broadband channel. Hence, through ICTs, farmers can get quick information about on-farm support (i.e., consulting services) by directly linking to agriculturalists; and also get immediate information on specific problems at the farm level. The availability of various ICTs farmers can be easily located on their farms in any of the remote communities. SCAR Foresight (2007) affirms that with the application of various ICTs, agricultural scientists can provide farmers with valuable information on the variations in soil quality, the water table, and crops on a day-to-day basis; farmers will be able to raise questions on some problem areas and immediate information will be given the agriculturalists; agricultural scientists can transmit digital information to farmers in real-time, and also get immediate diagnostic feedback (Stratigea, 2011)

The methods in which the farmers and the agricultural scientists interact can be either synchronous by transmitting digital photos of infected plants in real-time or wait for immediate diagnostic feedback. It could also be through asynchronous communication in which the farmers ask questions to agriculturalists on problem areas. With appropriate ICTs facilities, farmers can decide to upload high-resolution pictures that are relevant to the issue or issues raised and also gather information on the same subject matter at hand Stratigea (, 2011).

Digital technologies make it easy for the farmer to get quick access to information and knowledge systems. ICTs support the acquisition of various kinds of farm-specific information, such as weather information for irrigation, seed options, information for fieldwork purposes (Thysen and Detlefsen, 2006), also information on commodity prices, developments in farm machinery, pesticides and chemicals, etc. that aim at supporting decisions at the farm level and improve farm management.

Applications of ICTs are continually offering platforms that support businesses in rural regions, both in the agricultural and other sectors. ICTs have made it possible for modern farmers to migrate quickly to Web-based transactions (FAO, 2005). Due to on-site support services delivering knowledge and information to farmers, which includes: On-site training services by agriculturalists through e-seminars - available either in real-time or in recorded video. Through these media, farmers are provided with useful information on various themes of agricultural interest. Through these methods, they gain new and improved ways of cultivation, sustainable production, management issues, and advisory services on new technologies in farming, cost-effective techniques, new and upcoming agricultural methods, and agricultural events (Stratigea, 2011).

ICTs offer farmers access to e-marketing or e-commerce. This online method allows farmers to directly access either traders or customers to market and sell their produce, identify targeted audiences, collect and track client/customer information on preferences, provide online information on product updates at a minimum effort and cost; etc. (FAO, 2005). ICTs applications support direct online access and interaction with customers for new market opportunities to enhance their competitive potential in the new economy. ICTs offer direct interactions and also establish an online transaction space across geographical boundaries and exchange information with other members of the community that contributes to the increase of their knowledge and experience or the pursuance of mutual interests (networking) and objectives within the e-community (Stratigea, 2011). The author further states that ICTs make it possible for e-marketing, whereby rural businessmen and women market their products by establishing a two-way communication direct links with their customers (firms or individuals), thereby identifying and adjusting to customers' needs and permeating to new market segments.

Conclusively, Stratigea (2011) declared that ICTs provide access to e-communities through which farmers and other professionals in rural communities get access to professional networks, crossing geographical boundaries and exchanging information with other members of the community that contributes to the increase of their knowledge and experience or the pursuance of mutual interests (networking) and objectives within the e-community. ICT helps farmers by advising them about the utilization of rising water for crop creation through straightforward instant messages. The instant messages additionally caution the farmers about the flood occasions which would assist them with setting up their fields and encourage on the best way to alleviate flood harm.

### **Challenges/Obstacles on the Successful Use of ICTs Tools in Rural Community Development**

- Globally, ICTs' excellent role in fostering sustainable development in rural communities cannot be overstressed. However, these ICTs' outstanding roles have been hit by some identifiable barriers, which hinder all efforts of rural/remote communities to log on to the information and knowledge society. As a result, most of the major pitfalls will be enumerated hereunder as identified by Hammond & Paul (2006); FAO (2005); SCAR Foresight (2007); Gouscos, Mentzas & Georgiadis (2001); IIED (2009); Kastells (2010); Lind, Albinsson, Forsgren, & Hedman (2008); David (2009), and Ashton, &Thorns (2004), among others.
- As stated above, the following barriers have been identified thus: Lack of trust in technology in the local society, the cost of getting personal computers, mobiles phones, and other technological equipment, and the use of ICTs for businesses and other activities.
- Resistance to change is yet another problem associated with the use of technology in rural communities. This may be barriers due to the culture and traditions of rural social systems, resulting in a reluctance to shift to a new, less controllable which impedes social anchoring of ICTs in local rural communities.
- Lack of region-specific knowledge and respective needs of the various rural communities from those engaged in developing applications and content may result in a mismatch of applications and content developed for the real needs of rural areas.
- Barriers associated with the adoption and use of technology by the end-users in rural areas.
- There are connectivity challenges in rural communities; most rural communities, especially in Nigeria cannot receive mobile phone signals.
- Most people can't afford compactable ICT tools, such as a mobile phone for internet connectivity while some cannot afford the high internet charges of watching videos on their devices for like one to two hours daily (Anoemuah, 2019).

- The other challenge is how communication infrastructure can be exploited in rural communities without electricity. It is a fact that irregular or constant power supply is a big challenge in most of the rural areas in Nigeria. Consequently, individual power might be a big problem for the use of ICT tools, for those that have (Anoemuah, 2019).
- Lack of awareness and adequate knowledge of the use of ICTs tools. Anoemuah (2019) opines that even if there is electricity supply and available Internet services in the rural communities, there will still be a problem if the people involved have the knowledge to access and use the technologies effectively.
- Lack of institutional capacity and capacity of people involved in the information provided in rural areas to ensure the right information in the right formats.
- Lack of continuous and high-speed network connections. In Nigeria, even in the urbanized areas, it is often very difficult to get high-speed connected networks talk-less of sparsely populated rural communities. In addition, in Nigeria, most users access the Internet through Internet Cafes and since the majority of Nigeria's population (52%) lives in rural areas, the lack of Internet access would have huge implications for the economic development of the nation
- Lack of training opportunities/structures that offer the chance to rural population to develop skills and competencies on ICTs and their applications, focused on their specific needs.
- Costs involved in using the network infrastructure.
- Lack of knowledge of the potential offered by ICTs applications
- Costs involved in getting access to the necessary equipment to join the network.
- The lack of new technology culture, concerning older age groups in rural communities influences the propensity to adopt and use ICTs and their applications
- Lack of knowledge of the range of applications that could be of relevance for each the rural area due to the lack of a regionally focused and demand-driven approach to identify specific needs;
- Lack of skilled human resources, that is, limited capacity of human resources as users of ICTs.
- Lack of skilled personnel to build and run such applications and content.
- Costs involved in content development, where different needs and preferences of different groups call for region-specific user-oriented content development, with content developed for or adapted to the specific rural context.
- Lack of language skills that bound interaction potential of rural population/businesses and limit the benefits reaped out of this.
- Lack of access in rural regions to proper equipment, both hardware, and software, for the development of specific applications as well as costs involved in this respect.

### **Solutions to Effective Implementation of ICTs in Rural Community Development in Nigeria**

The successful use of ICTs tools in rural community development is not questionable. But, there is no gainsaying that there are lots of obstacles to its successful implementation in rural community development in Nigeria as discussed below.

1. Just as David (2009) points out that most of the rural communities in Nigeria are not electrified, knowing that electricity is synonymous with ICTs; if these rural communities have no power supply, how can the citizens of these areas effectively use the ICTs tools to their advantage. Hence, electricity should be provided for the rural communities for better use of the ICTs tools for developmental purposes.
2. Attempts should be made to provide rural telecommunication services to provide basic telephone services.

3. There should be provision for services, such as data and internet connections; these services require substantial transmission capacity, which is lacking in most rural areas of Nigeria (Bello, 2003). This is necessary for an effort to bridge the digital divide between the urban and rural communities in Nigeria; therefore, there is a high need to turn to the use of wireless technology for rural connectivity.

iv. Awareness of the current trends in the application of ICTs in rural development should be created so that the citizens will be abreast of the potential relevance of the technologies.

1. Fund should be provided to buy ICTs equipment (Computers) and other services in the rural communities. The rural population in Nigeria is very, very poor; the citizens find it difficult to meet their daily living. For rural people, accessing the Internet is a costly exercise for necessary communications, especially in the form of installing the required telephone lines needed for internet or email access is similarly too exclusive in developing countries like Nigeria (Gupta & Gautam, 2017).

2. Seminars, conferences, and workshops should be made available for rural dwellers to enlighten the citizens on the impact of ICTs on rural community development.

vii. Illiteracy is one of the problems confronting most rural community development in Nigeria. The literacy rate of the rural population is much less than that of the urban areas. As Gupta and Gautam (2017) also observed that there is a link between literacy and technical literacy as well; there is a connection between education level and the use of electronic means or the Internet. As a result, this is a major drawback in which the users are not technically literate to use the new technologies. Hence, the Nigerian government at all levels should create room to improve or increase the rural literacy rate of the rural populace to effectively use the ICTs devices or tools (Gupta & Gautam, 2017).

1. There is a common lack of awareness concerning the advantages\importance of ICTs in the rural community's development; for this reason, attempts should be made to sensitize the rural populace to effectively embrace the role of ICTs in rural community development (Gupta & Gautam, 2017).

### **Summary**

This paper titled: "Developing Rural Communities in Nigeria Through Information and Communication Technologies and the Potential Barriers" looked into how ICTs could play a significant impact in developing rural communities in Nigeria, and the problems associated with the application of ICTs tools, especially in rural areas where culture and tradition are resistance to change to ICTs adoption, and lack of trained personnel to adequately handle ICTs related matters. Nevertheless, in an attempt to find the impact of ICTs in rural developments, the paper briefly examined the concepts of "IT", "ICTs" "Community", and "Community Development". Also, the new technological tools used in community development were concisely discussed. Also talked about are the factors hampering the effective utilization of ICTs tools in rural community development in Nigeria and the wider world were examined. The authors finally made suggestions to strengthen the use of ICTs tools in rural community development.

### **Justification for the Study**

Nigerians cannot claim to be unaware of the serious and numerous challenges and difficulties facing the country on technological issues, especially when it comes to its application in developing rural communities. The dissatisfactory nature of the citizens' technological backwardness calls for urgent attention (Orij & Nwaizubu, 2022). Consequently, there is a need for the authors to create technological awareness and its potential by advocating that the Nigerian government at all levels should invest heavily in the technological education of the

citizenry as only an insignificant few of this population have access to technological skills. The knowledge of these technical skills will enable the citizens to embrace the adoption and application of ICTs in developing rural communities and at the same time weighs the possible barriers before implementation.

### **Contribution to Knowledge**

The twenty 21st century is not like the previous centuries because the demand of the present is quite different from the former ones. There is a lot of difference between the “analog” and “digital” ages. This write-up will quickly awaken the Nigerian government at all levels of governance to do the needful by introducing technological education and massively training her citizens’ on technological skills to be relevant in the present relativities. This work will create technological awareness among Nigerian citizens, and also enable them to acquire the skills and equally utilize the potential of Information and Communication Technologies to solve rural community developments among others. Also, it will be a benchmark for policy and decision-makers, private individuals, institutions, organized bodies, and the upcoming researchers alike to have a concise knowledge of the role or the need for ICTs in rural community development.

### **CONCLUSION**

There is no doubt that the traditional method of passing information has been largely ineffective in addressing the needs of developing the rural community’s population in recent times. Presently, the methods of passing information to and from rural communities have gone scientific, more open, more participatory, and more demand-driven. Also, there is a new emphasis on the acquisition of information and communication technologies to enable rural poor communities to meet the present realities. As a result, the Information and Communication Technology specialists have seriously recognized the mammoth importance of ICTs to support and enhance the rural community development challenges. On this note, the role of ICTs in community development has been applauded by researchers in the field of Information and Communication Technology. David (2009) opines that ICTs can change how development activities are performed, and also accelerate the realization of rural community development goals. Elijah and Ogunlade (2006) in a study conducted in Nigeria revealed that there is a great potential for ICTs as tools to enhance people’s daily lives whether by increasing access to information relevant to their economic livelihood, better access to other information sources, such as healthcare, transport, distance-learning or in the strengthening of kinship”. Nampijja (2010) observes that in many remote communities that ICTs are potential means for communicating with the outside world and getting in touch with news from outside, but also for letting the world know about the needs of these rural communities and their people. It will be very difficult in modern times for a population that is technologically naïve to think of community sustainable development. Consequently, the adequate knowledge and use of ICTs in sustaining rural community development are very paramount, and the awareness of ICTs’ developmental strides must be created for the rural population to embrace and enhance their daily needs and services. Finally, the ICTs have the driving force to address the rural community development barriers if the citizens acquire the required technical skills, which will facilitate improved knowledge sharing and information exchange among the rural populace.

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