

Information Communication Technology as an Effective Communication Tool in Rural Communities for the Post Covid 19 Era

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Abstract

This paper exposes the numerous sectors where benefits are imbued through the deployment of information and communication technology in conducting individual or communal task in rural communities despite the limitations presented due to the covid 19 pandemic. Using an expository style, the components of information and communication technology (ICT) are x-rayed as an independent concept, while its impact in ensuring effective communication in challenging conditions, in this case, rural community and the covid 19 pandemic. Furthermore, the numerous formats and constituent combinations of information and communication technology paraphernalia are highlighted. Particularly, areas of importance and relevance of information and communication technology in the post pandemic era are vigorously treated with insight into areas such as education, research, business, healthcare, governance and lifestyle. Finally, useful recommendations for all stakeholders are made for optimum productivity to be achieved.

Keywords: Information communication technology; Rural community; Communication.

1. Introduction

Information and communication technology is arguably in pole position amongst a plethora of useful human innovations such that activities considered impossible or hitherto carried out manually are now possible digitally with greater efficiency. Information and communication technology perform such unquantifiable task for the positive transformation of human and organizational activities globally. Information and communication technologies perform an important task in every sector of new society. It systematically transforms the manner with we exchange information among ourselves, the way we seek knowledge and skills, perform a task, transact businesses, interact with private and public institutions, and all other actions employed to generally stabilise our socio-economic wellbeing.

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Information and communication technologies has immense impacted on man's daily routine , they also have effect on the macroeconomic growth of a community, which further affects entire society by enabling infrastructural growth and improved living standards.

Information and communication technology is a broad terminology which encompasses information exchange devices or applications (cellular phone, satellite system, networking, radio, television, , computer hard and software) and associated peripherals. ICT also refers to a large range of technologies, applications and services utilising varying types of gadgets and programs actively on system networks. ICT is also be described as computer system based tools with instructions to capture and make use of data. The technology entails numerous components such as hardware, software, networks and several other peripheral devices (video, audio, photographic devices, etc) which are able to transform data, images and sound into their digital format. Moreso, ICT pertains to digital information processing technologies such as computers and internet and telecommunication networks. The authors in [6] stressed that information and communication technology has drastically changed every facet among man's endeavour.

Nowadays, individual tasks and collective human interactions can take place virtually with ease and economy of cost using basic ICT tools such as mobile phones, tablets, smart watches, etc. ICT refers to all kinds of electronics that are used for broadcasting, telecommunication and all forms of computer-mediated communication [1]. In the information age that we live now, ICT mainly depict the ability to electronically send and receive data on computer systems that can input, process, store, output and transmit information. The premium benefit with ICT is largely viewed as strategic to improving efficiency and influencing innovation in the globe. The commissioning of Information and Communication Technologies has huge capacity to improve economies and societies in numerous contexts such like decreasing information and consultancy costs, enabling new partnership models to improve the efficiency of employees, engendering innovation and improving education and access to basic social welfare services. Innovation is ubiquitous in the lives of consumers, in industry and service production processes, as well as in public sector tasks. ICT has affected man in all spheres of life. ICT has affected the way people live, work and play. People from all walks of life use ICT to accomplish various tasks. The influence of ICT an all human activities especially in the workplace is imperative and necessary. ICT performs a major role in fostering entrepreneurship and socio-economic advancement in rural communities, maximizing the productivity of agriculture and forestry, improving living standards and the rural economy diversification.

The unexpected arrival of the novel, deadly COVID-19 virus shook the whole nations of the world that the World Health Organization(WHO) announced it as a universal health emergency of global effect [2]. The economic, social and academic sectors were hugely impacted as the enforcement of sit at home order turned strategic in preventing the spread of the virus. The acquisition of ICT skills is a prime part of building immunity to socio-economic shocks such as those associated with the COVID-19 outbreak. It is now recognized in developing nations, wherein learning of ICT skills can act as a shield over job loss issues. Post-COVID-19 era has experienced changes in global operations, exposing the shortfall of extant systems and indicating the importance to reassert the seniority of information technology as an enabler for socio-economic growth and productivity. It has become imperative and mandatory that institutions automate its activities and streamline

such activities to engender business longevity and build shock absorbers to future crises. This supports the opinion of J.F. Kennedy that “in as much as an emergency situation comes with challenges, that an inward look will present the opportunity therein” [20].

Access to information and communication technology (ICT) like the world wide web and internet will improve the living standards of rural populace, disseminate information on agricultural and off-farm sustenance, render public works, and provide educational and health information. Information Communication Technology has been accepted globally as a conveyor of economic growth. Lastly, it has appeared to facilitate the survival and sustainability of multiple industries. Simply put, ICT is a catalyst for rural development [24]. ICT can uplift the developing nations where rural people reside to fill the development void that exists with the developed nations.

2. Literature Review

Several scholarly attempts have been made to explain “information and communication technology”. ICT is now the new global paradigm for description and of the program designs that are used to save, collect, manipulate and relay information/data along any electronic media. The author in [17] defined information and communication technology as a device that permits the collection, storage, processing and/or the communication of information. The author in [7] was of the view that information and communication technology is any equipment which can be used for capturing, processing, storing and accessing information.

The authors in [19] defined information technology as a technology which supports activities such as the creation, storage, processing and communication of information, together with their associated processes, management and application. Information Technology can be explained as the use of computer systems and associated peripherals to save, query, transmit and manipulate data with commands to produce output in form of information to an end. According to the author in [3], information technology depicts the use of man made tools for the collection, generation, communication, recording, re-management and exploitation of information. It includes those applications and commodities, by which information is transferred, recorded, edited, stored, manipulated or disseminated”. The author in [11] explains information technology to be a disruption that has permeated the entire fabric of man’s activities, thereby improving socio-economic living status. Recently, there has been a meeting of information technology, telecommunication and audio-visual technology. The convergence now birth the globally accepted term of Information Communications Technology that reflect this phenomenon. The situation implies that IT is now a subclass of ICT alongside telecommunications and audio-visual technologies.

ICTs have come a long way to better the way man lives in his society and it encouraged him to constantly find means to process information better and sharing the information instantly with others unhindered by location barrier. [16]. The authors in [4] designed a model to describe the impact of ICT to development in the community. Pointedly, their work viewed three community hubs in Bangladesh, that render socio-economic empowerment intervention to communities where poverty is rife. The model also has social challenges posed as hindrance to growth. Therefore due to its nature, ICT might allow an avenue for economic development, social such as perceptions and restrictions on women and youths should be eliminated to reach the anticipated progress

to information availability, job opportunities, social standing, education, and social consciousness.

The model is directly concerned with ICT situated by communal centres in local areas within a developing nation. Instructively, it enumerates some rules concerning the conduct of ICT related research to pursue socioeconomic development at local level. Relevance in the information world nowadays is directly proportional to national and global information access and networks. ICTs serve as foundation for the sustenance and advancement of any nation in a speedily revolving world, and it incumbent for all to create alternative solutions a lot of challenges such as transparent governance, adequate infrastructure, skilled workforce and constant capacity development [9]. Data processing or manipulation can then be said to be a term which refers to the process of producing meaningful information out from a collection of all items of data and performing operations (mathematical, statistical, experimental, etc.) on them in order to extract the desired information from them. The authors in [19] further defined data transmission as the movement of data via telecommunications systems. This makes it possible to link a central computer to a number of remote terminals, workstations and interfaces. Some technologies that constitute ICT include computing gadgets for data recording, storage technologies and communication technologies such as voice recorder, cameras, external HDs, flash disks, optical disks like Blu-Ray/CD/DVD, FM radio, terrestrial TV, Digital Satellite, telephones, satellite phones, cell phones, electronic loudspeakers, computer networks, PCs, software applications and mainframes. The aforementioned examples is not total as new designs and variants are commissioned from time to time.

Computer system (hardware and software) which is the building block and backbone of every information and communication technology comprises of basic constituent elements such as the input, storage, control, processing and output devices. Aside the computer systems, electronics and telecommunications constitute the other critical areas of development of information and communication technology (ICT). Information technologies perform processing operations on different kinds of data such as text, images, audio, etc. A typical information technology gadget such as a smart phone incorporates and executes several processing functions i.e data capture, data transfer, data coding, etc within a single information technology suite.

Communication tools or devices are a prerequisite for the transportation of data/information via information channels and carriers. The author in [21] further explained that a communication device is needed at the sending end to translate digital signals from the computer system into analog signals i.e modulation which can then be transmitted over a carrier, such as a telephone line. Moreso, another communication device is needed at the receiving end to translate analog signals to digital signals i.e demodulation. Thus, the communication architecture is incomplete without the modulation/demodulation devices (Modems).

The Encyclopedia Britannica describes a rural community as a community that has a low ratio of inhabitants compared to open land and where the most important economic activities are the production of foods and raw materials.

The Longman dictionary of contemporary English defines 'effective' as 'successful, and working in the way that was intended'; while it defines 'tool' as 'something held in the hand to carry out a particular job' and 'a skill used to do a job. It is therefore instructive to deduce that an effective communication tool is any component

used (hardware or software) to transfer, receive and or share data/information between two or more entities and capable of producing a desired i.e satisfaction of an information need. This paper consider and refer to the 'Post Covid 19 era' as the aftermath of the discovery of the novel Coronavirus in China which has negatively affected human, communal and socio-economic activities. With the introduction and use of World Health Organization (WHO) approved vaccines in the year 2020, this paper shall consequently consider the year 2020 as the beginning of the post Covid 19 era.

3. Objectives of the study

The broad objective is to emphasize the usefulness of information communication technology for the post Covid 19 era while the specific objectives are to :-

1. define information communication technology(ICT),
2. highlight the usefulness of effective communication and
3. identify sectors where ICT is relevant for the Covid 19 era, especially to rural communities.

4. Importance and Relevance of Information Communication Technology in Rural Communities for the Post Covid 19 Era

Mankind derives immense benefits from the deployment of information and communication technologies, which can neither be over emphasized nor accurately quantified. The impact is as ubiquitous as air in daily human, communal and organizational life. Every sphere of human existence, relationships and adventure within and outside planet Earth has been positively impacted by the use of information and communication technology.

Rural development is a combined design of all inclusive progress and poverty eradication which is of highest necessity in the short, medium and long term plans of all development approaches. Rural Development is primarily focussed on economic progress and social rights, betterment in the living of the rural households by the provision of needed and quality social amenities. The current tactic of rural development put more attention on poverty reduction, better work conditions, provision of basic services and infrastructure by implementing creative initiatives of pay and self-reliance. ICT is now the new fix for rural development. Information and Communication Technology, if rightly harnessed can be of great good for grassroots development.

Rural Development programs consists of providing basic amenities and social infrastructure in the rural places i.e. schools, health facilities, roads, drinking water, electrification etc., increasing agricultural production in the rural communities, social services such as health education, schemes for the growth of rural businesses, providing rural jobs etc. and help to families and Self Help Groups living poorly by providing resources through loans and subsidy.

Primarily the responsibility of rural development is vested with the government. During the pre-economic liberalization period, broadcast media was used to communicate with the large rural audience for the rural development works. Nowadays, during the post-economic liberalization period, rural development works added information and communication technology to produce need based information in broad development sectors

via the net. Combining ICT in rural development shall not only hasten the development process but it can also fill the void between the backward and forward sections of the society.

Been that the areas of relevance of ICT is endless, this paper shall seek to identify some crucial sectors of ICT relevance especially to the rural communities in the post Covid 19 era.

5. Education

Information and communication technology has greatly reformed the traditional methods of teaching and learning. The author in [15] opined that “ICT is a global network in which ideas are exchanged, or information and knowledge is shared, through using communication like cell phones and technology like computers to connect people”. This definition is among numerous definitions describing the relationship of ICT with education. Nowadays, students can independently attend lecture, tutorial or training module in the absence of the instructor, whom in the past is mandatory to be present before such class can hold. The twin barriers of distance and physical attendance has been eliminated with the use of virtual classroom applications/ platforms such as **Zoom, GoogleMeet, Skype**, etc.

ICT helps to expand educational access. Learning can happen through ICT instantly anywhere. Online courses are accessible all through the day for the whole week. Teleconferencing rooms permits two-way interaction simultaneously in real time. With ICT, teaching activities are now independent on printed materials and physical appearance. Several resources are ubiquitous on the internet, and knowledge is impacted through media, video clips, audio sounds, visual presentation, etc. New research has shown that ICT helps in changing the classroom environment into a learner-centred class [5]. Since learners are actively involved in the learning processes in ICT classrooms, they are permitted by the teacher to take decisions, make plans, and so on [13]. ICT thereby provides teachers, instructors and learners with a myriad of educational opportunities and possibilities.

Based on UNESCO Policy Brief of 2012, which pointed six relevant motives when viewing ICT with education. However, the author in [24] is of the opinion that there are three most relevant motives. These are; “Social Rationale”, “Pedagogical Rationale” and “Vocational rationale”:

- Social motive – relate to the necessity to support students to acquire ICT knowledge for future use.
- Pedagogical motive – relate to improving the education and learning process with ICT.
- Vocational motive – relate to the significance of ICT skills possessed by students to benefit them in their future endeavours.

ICT have also facilitated the instructor’s use of better teaching techniques made possible through the use of tools such as the interactive white board, projectors, tablets, etc. Thus, it is instructive to say that ICT has facilitated a more robust, efficient and collaborative learning and teaching experience in various communities during the post Covid 19 era. In the education sector, over a billion pupils and students globally are domiciled at home as schools are shut, as three in four students have witnessed interruptions in their education due to the lockdown. Schools and public administrations have deployed e-learning for students at home. For example in

Kenya, Egypt and Nigeria, educational systems now [provide access to information materials](#) and academic programs on cloud services, [radio, television](#), and social media channels.

6. Healthcare

Nowadays, e-health is the use of information and communication technology to make available efficient management and better access to health care services by patients and health care professionals. The Presidential National Commission on Information Society and Development defines e-Health as a mix of IT and electronic communication and to produce, transmit, save and retrieve digital health data for clinical, educational and administrative uses.

Moreso, Mobile health (Mhealth) is another unique health service provision platform made up of technologies that have great potential of premium health service delivery and quality assurance, though they rely on goodwill by both the health professionals providing the services and the receiver i.e the rural community. The rural dwellers need to be aware of these solutions and its attendant benefits. It is a framework built with ICT to provide a reliable means of gathering, storing, processing and communication of health records, diagnosis and treatment based on latest medical research information, hospital prescription trends, electronic laboratory technology, etc.

Lastly, database management systems such as the **Healthcare Management Systems (HMS)** is another example of information communication technology (ICT) which have greatly improved access to scientific and health information, medical research and pharmacovigilance by health care providers so as to deploy the most efficient tool and information in the diagnosis and treatment of a patient's ailment especially in rural communities.

7. Research

The procedural, organized and systematic nature of research has been greatly improved due to the introduction of information and communication technology. Every stage of research can be efficiently conducted in less time nowadays. There is a plethora of ICT tools, software and applications that assist researchers with data gathering, investigation, experimentation, analysis and dissemination of research findings such as **Google forms, MS Powerpoint, MS Excel, SPSS**, etc. In rural agrarian communities, agricultural extension agents have deployed numerous information and communication technology platforms to eliminate age long challenges e.g elimination of middle men/fertilizer racketeering with the **mobile phone scheme** during Dr.Akinwumi Adesina's tenure as Nigeria's honourable minister of agriculture.

8. Business/Trading

Information and communication technology have consistently improved the way we conduct our businesses by promoting transparency, efficiency, productivity, competitiveness, profitability and addition of more value to the numerous actors in the business chain/ community. E- commerce is an instant platform and virtual community for trade involving buyers, sellers and agents that utilize the ICT platform for advertisement,

purchase, payment, delivery, etc such as **Jumia, PayPal**, etc. Information and communication technology have become a notable pillar upholding the virtual architecture of financial institutions and customers vis a vis the myriad of operating/transaction channels available such as the **USSD code, mobile bank applications**, etc. The elimination of the distance barrier for members of the rural community who hitherto had to migrate to rural areas for such financial transactions is an undeniable example of the benefits of ICT.

ICT permit entrepreneurs to constantly link up with clients they desire to productively enrich in a straight and interactive way. Virtual channels are also a highly potent way to announce business news. Though the availability of a social business is highly established within the locality, its message can disseminated online via social media, reaching a worldwide market. The numerous impacts of ICT tools on businesses nowadays, cannot be overemphasized. Social impact is now affordable and scalable, and allows new ways to connect and engage with communities. ICT is empowering businesses to provide a real difference in communities all over the world, guaranteeing a better future for the generations to come.

9. Governance

In nationhood, the active participation of the citizens in its affairs is non-negotiable. The method of engagement between the elected and the electorate is critical to the achievement of an egalitarian society. Information and communication technology has greatly influenced the interaction and engagement in the government of any society. From the conduct of national census and elections, budgeting and monitoring, security provision and policing to personnel recruitment; ICT has become a dependable ally in the realization of the aforementioned. In the post Covid 19 era, more citizens have become endeared to electronic voting and governance (**e-voting, e-governance**) unlike in the immediate past.

It has become important that business sector and government to automate their activities and control their work schedule to foster business continuation and garner resilience to unexpected crises.

Telecoms and media industry have been less impacted by this pandemic compared to the aviation and tourism industry which have been bruised by anti-pandemic guidelines. Organizations in less impacted industry sectors are better placed to progress with business as usual particularly if they make use of the added digital channels and tech solutions for business operations. In fact, many would claim greater market share and profit once the business environment bounces back.

Information and Communication Technologies are being increasingly used by the government agencies to render its services at the places convenient to the people. The rural ICT applications try to deliver the services of central agencies (e.g. district authority, cooperative society, and state and federal government departments) to the citizens at their door steps.

These applications make use of ICT in offering better and affordable connectivity and processing solutions. Computerization of records have been a great result in application of ICT in rural development. Records are of great importance to contemporary socio economic activities and their revision and update are necessary for capturing the changes in rural societal dynamics.

10. Lifestyle

The quality of life nowadays in our communities has been positively impacted by the overwhelming presence of information and communication technology in virtually every aspects of our daily lives. Information communications technology has the capacity to develop society. It perform a pivotal job in each of the Sustainable Development Goals (SDGs), creating the factors and environment needed to achieve them.. ICT has provided avenues for people to keep abreast of needed information/news, served as a route to an avalanche of entertainment sources and a veritable means to reduction of stress arising from daily economic activities. ICT has also positively influenced the way we interact with one another i.e virtually e.g **WhatsApp, Skype**, etc. Presently, the influence of ICT in human lifestyle is unlimited and it is evident in our relationships, music, culture, etc producing a more interesting and satisfying life.

11. Conclusion

Information and communication technology is key to a productive existence in rural communities in the post Covid 19 era. There is an avalanche of evidence that confirms the effectiveness and efficiency of digitally accomplished processes and activities compared to the rustic manual method. Premium and hitch free communication in the post Covid 19 era is achievable with the deployment of an appropriate choice among a plethora of information and communication technologies. Despite the challenges imposed on daily rural existence due to the Covid 19 pandemic, the significance of the resultant effective communication cannot be over emphasized in critical sectors such as education, research, governance, healthcare, business and other lifestyle activities.

12. Recommendations

The crux of this paper is to propagate the appropriate use of information and communication technology in rural communities during this post Covid 19 era for effective communication and efficient execution of personal and organizational tasks and mandates. It is therefore necessary for all concerned stakeholders, providers and users of information and communication technologies to take decisive actions on the following recommendations:

- 1) All hands must be on deck to achieve universal vaccination against Covid 19 within the shortest possible time.
- 2) Government and organized private sector should improve the infrastructural capacity of rural communities to host the nascent 5G network for total inclusion into the information society status.
- 3) Relevant stakeholders such as government agencies, donor agencies, telecom manufacturers, educational institutions, civil society, etc should embark on an aggressive campaign to raise awareness and improve the capacity of the rural populace on the judicious deployment and use of information and communication technology.
- 4) Rural dwellers should embrace the new methods occasioned by the use of information and communication technologies.
- 5) The socio-economic power of the rural dwellers should be magnified by concerned parties such as the

government, private sector, donors/intervention programs, extension agents, etc in order to increase their capacity to procure needed technology.

- 6) The entire community should be encouraged to demand and be provide with qualitative ICT infrastructure such as renewable power, broadband penetration, premium connectivity, etc
- 7) Regulatory agencies such as Nigeria Communications Commission (NCC), Nigeria Information Technology Development Agency (NITDA), etc should ensure strict compliance to extant laws by industry players to achieve premium quality assurance in the information technology and telecommunication sectors.
- 8) Parents, guardians, relatives, tutors, friends, etc should endeavour to ensure children and kids are aware and become familiarized with information and communication technology (ICT) from a tender age.
- 9) Acquisition of digital skills should be encouraged by all and sundry in order continually generating applicable innovations in the information and communication technology (ICT) sector.
- 10) Residents of rural communities should adhere to all Covid 19 prevention protocols and conduct virtual interactions as most possible.

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