

Systems Study of the Impacts of ICTs on Rising Extreme Poverty in Nigeria

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Abstract- The rising tide of globalization over the last couple of decades has seen a corresponding increase in income gaps between the rich and poor of the world – with the rich getting richer while the poor get poorer. This has been the global pattern according to World Bank statistics [1]. However, this anomaly is even more visible within the countries of Sub-Sahara Africa where World Bank figures [2] show an alarming overall drop in house-hold incomes over the last 10 years – in fact, since the transition from colonial rule to independence, for most of these countries. World Bank statistics also reveal the emergence of a handful of extremely wealthy individuals in some of the poorest countries of this region. Many of these individuals command wealth on a global-scale; usually stashed in the foreign banks of more developed countries. Nigeria presents an interesting case study of this problem. The sizeable number of its super-rich is well known to command more wealth together than the national Government, yet in numbers, this population is dwarfed, manifold, by the large pool of those living in extreme poverty. The rate at which that pool has been rising is alarming. This paper seeks to shed a perceptive light on this dynamics of the widening divide between the rich and poor in Nigeria. In particular, we will examine the critical role that ICTs can play in helping reverse that trend.

Index Terms— Nigeria, ICT, Poverty, Sustainable, Development.

I. INTRODUCTION

Knowledge about income disparities among the world's countries, as well as the widening gap between the rich and the poor in individual countries has led to the recognition of one of the most significant challenges of the 21st century: *reduction of extreme poverty*. These disparities are measured in terms of economic growth and development. Efforts on this have led to a division of the world's population into the poor, undernourished, and the wealthy and healthy [3]. The poor and undernourished outnumber the wealthy and healthy by the billions. This disproportion has created a *vicious cycle* with the poor entering extreme poverty as they compete for increasingly scarce resources in their realm. Isolation from the rest of the population has been recognized as one of the main causes of poverty. The isolated are usually cut off from critical information about resources and opportunities available to them. ICTs are a key enabler for connectedness and have, therefore, been identified as a significant competence in the fight against extreme poverty. This paper investigates the role of ICTs as a key influence factor in the dynamics of increasing *extreme poverty*. The key research question for us is how ICTs become an enabler and catalyst for the reduction of extreme poverty in the general drive for sustainable development which is becoming imperative for most developing countries especially those within Sub-Sahara Africa such as Nigeria.

II. STAKEHOLDERS & DRIVERS FOR ICT – SUSTAINABLE REDEVELOPMENT

People will embrace a new practice for one of two main reasons: (1) in order to catch up with others seen to be ahead of them in the game, or (2) To differentiate themselves from the rest and obtain a competitive advantage. In both cases, there is an expected return on their investment. This is also true for introducing ICTs. However, ICTs have many other advantages that support leveraging them for this problem situation. For example, ICTs help expand geographical reach and promote greater efficiency and effectiveness in operations. So there is a need to identify key ICT stakeholders and drivers in the area of interest before beginning the actual work [4].

In order to ensure that the re-development of sustainable ICT is possible, all the stakeholders, including the inventors and innovators of the ICT systems and implementers, manufacturers, distributors, retailers, IT specialists and the governments work together. Some governments, like China, for example, have strict control on the information that their citizens can access. Such practices impede the effectiveness of the ICT infrastructure as a basis for information dissemination and education of the masses [4].

III. CAPACITY BUILDING & KNOWLEDGE EXCHANGE

The target beneficiary of the ICT can be provided with the training and skillsets needed to be adept at ICT use. Experience is gained through increased use and practice with ICTs. This gives the beneficiaries a chance to develop their skills and identify their unique competencies in particular areas. This is necessary because of the nature of the digital divide which exists on two platforms: *physical connectivity* and *ability to use the physical connections* [5].

After the beneficiaries are able to utilize the ICT infrastructure, they can access voluminous amounts of information that can help them bridge the digital divide. This is, in addition to using the emerging, *people generated information source: the social networks*. The networking platforms have provided people with places where they can openly discuss issues they are reticently discussing with the people closest to them [5].

IV. SUSTAINABLE AGRICULTURE & FOOD SECURITY

Sustainability means the processes and practices that enable the satisfaction of the needs present in the current environment without adversely compromising the future generations. In the agricultural sector, people have always sought advice and information on the best practices on a given topic. People that become successful in a given field become points of reference, and sources of information with regard to that area. Practices which are internal or external to the agricultural practice, but which affect the effectiveness of agriculture have become essential in improving the quality and quantity of the yield [5]. With the continued changes in soil conditions, weather patterns, pest and diseases; market situation for both the produce and farm implements; also, having updated information will help the farmers exploit and benefit from these changes, or if necessary cope with the resulting situations. With the adoption of ICTs and greater diffusion of ICT competencies, information aimed at the local agricultural communities can be easily provided [5].

According to World Bank's Agriculture and Rural Development division, the rising food prices have since 2010 pushed into poverty more than 40 million people. With the world's population being projected to reach 9 billion by 2050, the need for food sufficiency has heightened. In order to be able to feed the 9 billion people, the world will have to increase its food production by 70%, hence putting unbearable strain on the already strained resources. ICT will allow the use of best practices which will ensure increased food production, while at the same time ensuring sustainability [5].

V. ENERGY FREQUENCY

Energy is one of the factors affecting the sustainability of the ICT infrastructure, a key consideration in Nigeria. Although the ICT infrastructure is dependent on electrical current, adoption of ICT has the capacity to reduce the usage of energy by significant percentages through what has been termed de-materialization by those concerned with the adverse effects of climate change [6]. Compared with the traditional printed mode of communication, ICT will lead to a reduction of energy used in the manufacture of paper, printing, transportation of the bulky paper based communications, and if possible, recycling to start the process all over again [6].

Through the use of ICT, proper monitoring, measuring, and intelligent management and control will help determine which methods are the most energy efficient than the other especially when such outcomes produce a similar outcome. This will enable the decision makers to choose the practices that they feel are best suited [6]. ICT can be used to initiate behavioral change in the usage of energy. This can be achieved through provision of reliable and valid data to the governments, citizens, and industries about carbon emissions and energy consumption, hence supporting energy sustainability [6].

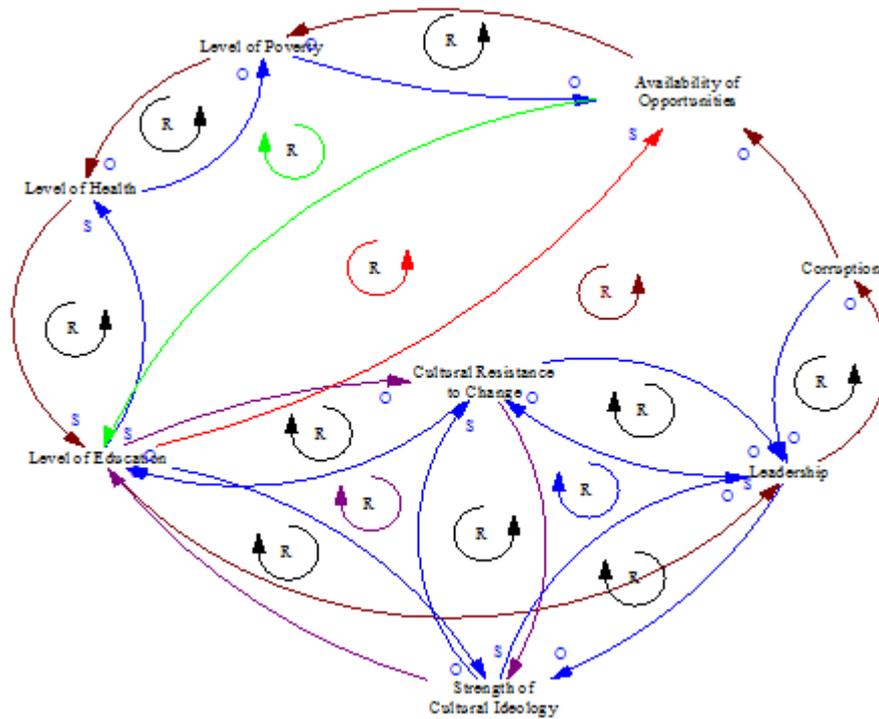
VI. YOUTH EDUCATION

Now approximately one billion people are aged between 15 and 24 years total. This number is projected to increase to 89.5% of the populations in the developing countries by 2025. This statistics brings to light the need to include issues affecting the youth when coming up with ICT policies and ICT development agendas. According to the International Telecommunication Unit and the United Nations Program on Youth [7], ICT users are increasing rapidly with mobile phone subscribers totaling 5 billion, and 2 billion internet users in the world. The frequency with which people access the internet has been determined as at least once a day for over half of the internet users. This makes ICTs an overarching vehicle necessary to prepare the youth for the future through education.

With the population of the world increasing rapidly and the percentages of the youth projected to rise especially in the developing countries. There is a need to adopt the ICT enabled learning approaches in order to ensure that a majority, if not all, of the youth will have access to education. Distance and online learning are fast emerging as the new paradigm to learning in an interconnected world today where people are empowered to take charge of their own education, break the barriers of geography, and gain education from whatever location they may be as long as they have internet connectivity. This has not only reduced costs in terms of accommodation, transportation, and time, but has also increased the potential for each program, and has made the students tailor their training times around other activities such as work. This also affords students the opportunity to work while

they pursue an education and puts in the hands of the student greater responsibility and control for their education; in terms of alignment with career needs and time management, in itself a key life lessons for the student [7].

A CAUSAL LOOP MODEL OF THE DYNAMICS OF POVERTY



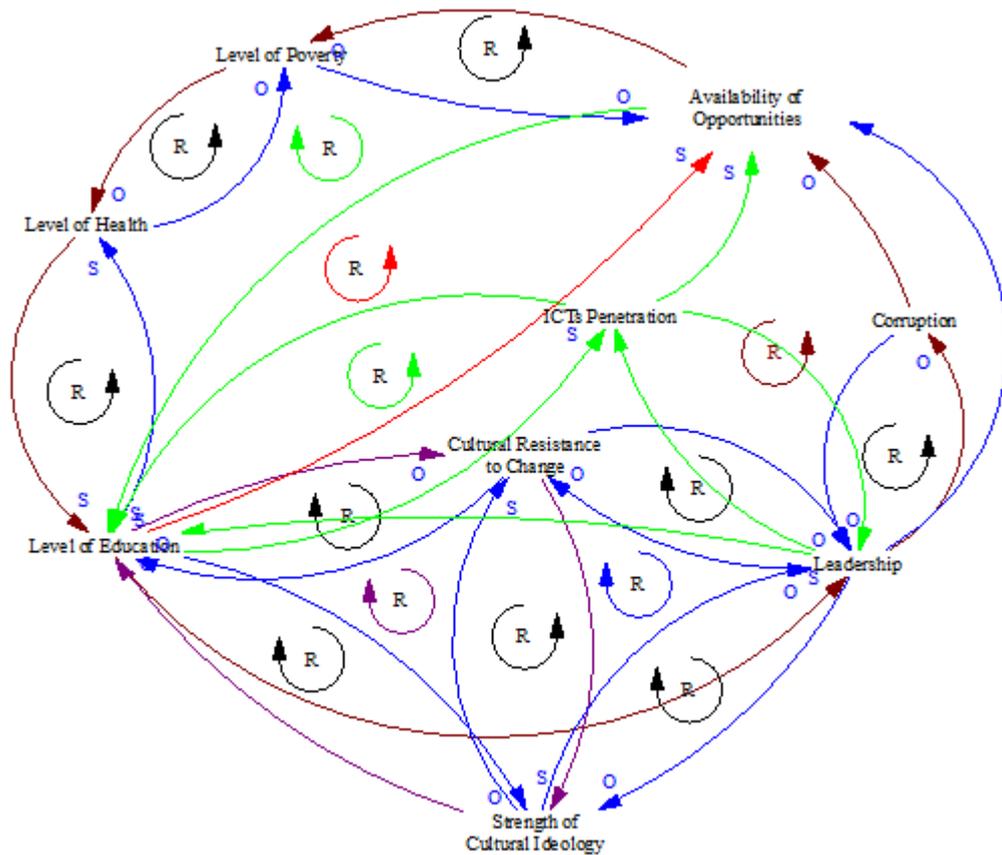
The Feedback Structure of a Influences on Poverty Level

The causal loop diagram depicts a set of feedback structures tying together impact factors, including the one of interest to this research, *Level of Poverty*. It is these feedback structures that drive the dynamics affecting the Poverty Level. All the feedback loops in the system are positive feedback loops shown with the R (re-enforcing loop indicator) at the center of each loop. From systems dynamics studies, [8 & 9] positive feedback loops can either create exponential growth or exponential decay in the system [10, 11]. A move from poverty to extreme poverty is obviously the case of exponential decay in the economic ability of individuals or families to cope as they compete for increasingly scarce resources. Several positive feedback loops directly include *Level of Poverty* as a variable or influence factor:

1. From *Level of Poverty* to *Level of Health* and back to *Level of Poverty*.
2. From *Level of Poverty* to *Availability of Resources* and back to *Level of Poverty*.
3. From *Level of Poverty* to *Level of Health* to *Level of Education* to *Availability of Resources* and back to *Level of Poverty*.
4. From *Level of Poverty* to *Level of Health* to *Level of Education* to *Cultural Resistance to Leadership* through *Corruption* to *Availability of Resources* and back to *Level of Poverty*.
5. From *Level of Poverty* to *Level of Health* to *Level of Education* to *Strength of Ideology* to *Leadership* through *Availability of Resources* and back to *Level of Poverty*.

Any combination of these will explain the accelerating decline in economic welfare measured by *Level of Poverty*. Interestingly, in this model we see that factors such as *Corruption*, *Strength of Ideology* and *Resistance to Change*, which most will easily identify as causal factors on the *Level of Poverty* are not direct influences but rather indirect ones through their impacts on other factors such as *Level of Education*, *Leadership*, *Corruption* and *Availability of Resources*. The direct influences such as *Level of Health* and *Availability of Resources* in their separate feedback loops with *Level of Poverty* can drive *Level of Poverty* up or down. Higher levels of health, with all things being equal drive poverty down. Conversely, a lowering in the Level of Health will drive poverty up. The same is true for the loop with *Availability of Resources*. So leverage lies in driving one or more dominant positive feedback loops linking *Level of Poverty* in a way that creates accelerating decline for poverty. This will happen when direct influences such as *Level of Health* or *Availability of Resources* are pushed upwards.

A Modified Poverty Model with Penetration of ICTs as an added Influence Factor



The Feedback Structure of a Influences on Poverty Level & ICT Impacts

In the modified Causal Loop Diagram, the influences to and from the *ICTs Penetration* are shown in green. *ICTs Penetration* is shown to have a direct impact on *Level of Education*, *Leadership* and *Availability of Resources*. What is remarkable of *ICTs Penetration* as an influence factor is that it's unidirectional in the sense that an increase in *ICTs Penetration* adds to *Level of Education* and *Availability of Resources* but a decrease in *ICTs Penetration* does not result in a decrease in either stocks but rather that they don't grow as fast. This amounts to a cumulative effect on the two influences that directly affect the *Level of Poverty*. And the cumulative influence is to work to an accelerating decrease in the *Level of Poverty* even with small levels of *ICT penetration*. This provides real leverage.

VII. ICT MAPPING TO DEVELOPMENT NEEDS

As with cultures, the different regions in the world are endowed differently in terms of distribution of natural resources. There are not many places in the world that share the exact types and quantities of resources, have similar soil types, climates, and are occupied by people that possess the same skills. This means that the approach to *ICT implementation* needs to be tailored to fit the environment in which it is being introduced. Fortunately, *ICTs* have the added advantage of being very versatile and easily adapted to fit different contexts. This often means that the purpose of the *ICTs* should be established before the infrastructure is put in place. The more specific the purposes established, the more efficient the *ICT* [4].

VIII. ICT CHALLENGES

ICT has led to a culture where everyone has the capacity and ability to post information they have over the internet to be accessed by other people. Compared to their printed version, the electronic data has led to the question on how such information can be trusted. This is in the form of reliability, veracity, authenticity, and validity. This is because the printed version of the information is often meant for commercial purposes; hence the authors make an effort to appear authentic in order to retain their customer, whereas most of the electronic data found over the internet is free [7].

The cultures that have existed over time, especially, in the developing countries like Nigeria can be a challenge to deployment of ICT. In the Nigeria scholarly world, for example, intellectuals may rebel against technology on grounds that it threatens individualism in thought and insight. Apart from intellectuals, Nigerians generally became comfortable doing things the way they are accustomed to, and only rarely welcoming minor changes. A large-scale introduction of ICT threatens this status quo and will be easily resisted [7].

ICT systems and applications are not cheap to install and maintain. According to the International Telecommunication Unit and the United Nations Program on Youth, among the Least Developed Countries, the 32 countries that were sampled on the criteria that they offered the least affordable broadband showed that subscribing for a fixed broadband costs the subscriber more than half the average monthly income. These costs do not include the initial installation and the subsequent repairs. This shows that although ICT may be recognized as a valuable tool for reducing extreme poverty, it may not be affordable. Illiteracy has emerged as one of the most significant factors that affect the rates of success of programs and projects within the local communities. In order for people to use ICT infrastructure efficiently, they must have knowledge of how such networks operates. Among the populations where technological advancement is still a myth, availing the ICT infrastructure to such people will be problematic [2].

IX. RECOMMENDATIONS

Many ICT programs have failed or have not reached their full potentials because their foundations are based on the presumed needs rather than the actual needs of the communities targeted. In fact, some of these have increased the cases of poverty, instead of reducing them due to the increased bills, the targeted populations have to pay. In Nigeria, to ensure the success of an ICT program, it is important to complete a comprehensive study of the target population in order to understand their ICT needs, and how the ICT can be best mapped.

Implementation of ICT infrastructure would require continued evaluation on the operations, and uses, to help determine areas of improvement. This will reveal if additional training is necessary, or if the ICT meets the needs of the community.

X. CONCLUSION

ICT has emerged as one of the best placed competencies the human populations have to help in starting the processes that will eventually lead in the reduction of extreme poverty. In order for the ICT to be successful, there is a need to ensure that it is well mapped and sustainable. This involves taking into consideration all the stakeholders involved, and ensuring that the future needs for the ICT sector are catered for.

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