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Impediments to the Growth of Information and Communication Technologies in Africa's Least Developed Countries, LDCs

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ABSTARCT

The paper under took a critical examination of the impediments to the growth of the ICTs in Africa's Least Developed Countries, LDCs. It began by exploring the "window of opportunities" ICTs hold for the LDCs. The paper however argued that these benefits can only touch on the lives of this section of the world if ICTs are made affordable, and the issue of poverty is adequately addressed. Among the several road bumps against ICT diffusion in LDCs that the paper identified are illiteracy, poverty, poor ICT infrastructure, and weak policy and regulatory framework. It is the paper's position that these obstacles, no matter how daunting they look, are surmountable given the right government policy and collaboration among the government, the private sector and civil society. The work offered elaborate measures of how to dismantle the road blocks against ICTs' penetration in LDCs.

Key words: Impediments, Information, Communication, Technology, Least Developed Countries

1. Introduction

We live in an information age. Now, information has become everything. It is power, it is wealth, and it is life. The lord in today's world is not the landowner with a vast number of slaves to till the ground. The lord is not the one with an awe-inducing physique like that of the biblical Goliath that could roar and the whole world would go into hiding.

A new lord has emerged! He is the one who has and commands the greatest amount of information. He rules and dominates. He decides who gets what, how and when. Now, information can be the difference between disaster and safety. This is the incontrovertible reality of our time.

ICTs are the driving force behind the new wave of information sweeping across the face of the earth. With their enormous capabilities, they now play major roles in education, learning and research in general, agriculture, health, commerce and even in poverty alleviation (Ajayi 2002), by providing information that can enable poor people to participate in more of the decisions that affect their lives (Human Development Report, 2001).

On the basis of access to information, the world has been split into two: the information-rich (information society), and the information-poor. The information-rich societies which could be referred to as the developed countries (first world), include Western Europe, the US and Canada, Australia, New Zealand, Japan (Igwe, 2002) and China. The information-poor societies, also referred to as the least developed countries (third world), Igwe (2002, p. 445) has been identified to include countries in "mostly non-European southern hemisphere."

Austin (1990) defines Least Developed Countries as low-income countries suffering from long-term constraints against growth. These growth constraints include low levels of human resource development and severe structural, economical, social and political weaknesses. LDCs are vulnerable to external shocks and natural disasters and are ill-equipped to develop their domestic economies. The United Nations has identified 48 LDCs and of this number, 33 are in Africa (Table 1). Therefore, 68.75% of the world's LDCs are located in Africa.

Table 1: The 48 Least Developed Countries as recognised by the UN General Assembly

Countries	**Africa**	Americas	Asia & Pacific	Arab States	Year of entry
Afghanistan			X		1971
Angola	X				1998
Bangladesh			X		1975
Benin	X				1971
Bhutan			X		1971
Burkina Faso	X				1971
Burundi	X				1971
Cambodia			X		1991
Cape Verde	X				1977
Central African Republic	X				1975
Chad	X				1971
Comoros	X				1977
Djibouti				X	1982
Equatorial Guinea	X				1982
Eritrea	X				1998
Ethiopia	X				1971
Gambia	X				1975
Guinea	X				1971
Guinea Bissau	X				1981
Haiti		X			1971
Kiribati			X		1986
Lao (PDR)			X		1971
Lesotho	X				1971
Liberia	X				1990
Madagascar	X				1991
Malawi	X				1971
Maldives			X		1971
Mali	X				1971
Mauritania				X	1986
Mozambique	X				1988
Myanmar			X		1987
Nepal			X		1971
Niger	X				1971
Rwanda	X				1971
Sâo Tomé & Principe	X				1982
Sierra Leone	X				1982
Solomon Islands			X		1991
Somalia				X	1971
Sudan				X	1971
Tanzania	X				1971
Togo	X				1982
Tuvalu			X		1986
Uganda	X				1971
Vanuatu			X		1985
Western Samoa			X		1971
Yemen				X	1971
Zaire	X				1991
Zambia	X				1991
Total 48	29	1	13	5	

Source: United Nations General Assembly, December 1998 (Note: Djibouti, Mauritania, Somalia and Sudan are listed as Arab States, but are nevertheless located in Africa.)

Africa's LDCs have very poor state of telecommunications infrastructure and are located mostly within the sub-Saharan African region.

Since this paper focuses on the impediments to the growth of the ICTs in Africa's Least Developed Countries, it is wise that we set out by defining what ICTs mean before touching on the other aspects of the paper: ICTs and the "Windows of Opportunities" for Africa's LDCs, the road bumps and bridging the digital divide.

2. ICTs: What are they?

Information and communication technologies (ICTs), according to the World Bank Group (2000), ICT Strategy Paper: "Bridging the Digital Divide," "include both the information infrastructure – wires, transmitters, computers – and the information technology, i.e. the application and content that travel through these infrastructures" (cited in Pigato, 2001, p. 1).

ICTs are the various technologies powering communication and information transfer among nations, organizations and individuals at tremendous speed. They are driven by the convergence of computers, telecommunications and traditional media.

3. ICTs and the new "Window of Opportunities" for Africa's LDCs

The LDCs constitute the low ICTs environments of the world. They share some common features like widespread illiteracy, poverty, low per capita income, inadequate investment, technological dependency on the industrialised North, etc. One striking implication of all this is that they have continued to play the catch-up role in every area of life. Worrisome as the picture painted above, the ICTs hold a "window of opportunities" for the LDCs, a majority of which are in Africa. What follows is a discussion of the enormous potential of ICTs.

3.1 Education

Today, ICTs are playing greater role in teaching, learning and research in general. We now talk about e-learning, e-library, e-book, e-research, etc. The ICTs are bringing increased education at reduced cost to the doorsteps of many who otherwise would not have had access to it either because of their work schedule, time, cost, distance or as a result of a combination of other factors. The distance learning programmes in many countries are e-propelled.

In 1997, the African Virtual University (AVU), an interaction instructional telecommunication network established to give the countries of Sub-Saharan Africa direct access to some of the highest quality academic faculty and learning resources throughout the world, was launched (Ajayi, 2002). Through the satellite technology, AVU is delivering distance education with telephone call-back intervention from the students at learning venues. It is based in Nairobi, Kenya. More recently, the hype is about building information and knowledge economies. This can only be powered by the ICTs.

3.2 Commerce

The ICTs have revolutionalized the act of buying of and selling of goods, products and services. Physical proximity is no more a prerequisite for these actions to take place as the buyer and seller can now transact businesses without getting to meet or know each other. Buying and selling, including advertising can now be done on-line. This has helped to save time, cost, hazards and risks associated with travelling.

As Van Crowder (1997) observed, "ICTs give micro and small enterprises access to market information (faster and cheaper than printed material), input information prices and output markets and it may strengthen forwards linkage to the market" (cited in Pigato, 2001, p. 3). SMEs can take advantage of this to launch themselves into success.

Although many African states are yet to take full advantage of ICTs as tools for enhancing livelihoods and creating new business opportunities, African leaders meeting in Zambia in 2001, observed that the world is in the middle of an economic revolution, made possible in part by advances in information technology which has reduced the cost of communication across the globe and has made possible the integration of national systems of production and finance that has greatly increased the scale of cross-border flows of goods, services and capital (*ANC Today*, vol. 1, No. 26, 20-26 July 2001).

On the African continent, it has been observed that ICTs can play a significant role in achieving a common market, foster intra-regional trade and accelerate Africa's integration into the global economy.

3.3 Health

In advanced countries, it is now possible for medical experts to apply telecommunication and computer technologies in health care delivery. It is known as tele-medicine. For LDCs, it is an option worth exploring.

Besides, research evidence shows that medical errors are killing more people each year than breast cancer, AIDS or motor vehicle accidents put together. About one in ten patients admitted to a hospital is unintentionally harmed. ICTs can make a vital contribution in reducing medical errors, thereby saving lives and enhancing efficiency.

Computerized Provider Order Entry (CPOE), which allows physicians to enter order and request into a computer rather than handwriting them, has brought improvement in the following ways:

- improved communication;
- complete and accurate clinical information;
- computerized orders and request – medication, labs, radiology, allied health professionals;
- clinical decision support at the point of care;
    - Drugs-drug infection
    - Allergy checking
    - Ordering using evidence-based practice
- Knowledge-driven care

(http/europa.eu.int/information_society/activities/health/docs/studies/risk/management).

Besides, the ICTs can be used to establish distance learning and health education programmes to improve the worrying condition in the health sector of the LDCs.

3.3 Poverty Reduction

It is estimated that a greater percentage of the world's poor are located in the LDCs. Even though poverty is a global phenomenon, Pigato (2001, p. 1) has established a direct link between poverty and lack of access to ICTs. As he observes, "The two poorest regions of the world (Sub-Saharan Africa and South Asia) are also those with the lowest access to information and communication technologies." He therefore concluded that, "The gap in access to and use of ICTs, the so-called 'digital divide' often follows and reinforces existing inequality and poverty patterns" (p. 1).

But the good news is that ICTs can enhance people's daily lives by increasing access to information relevant to their economic well-being, healthcare, agriculture, finance and credit scheme, etc. The United Nations shares this optimism. Its Human Development Report (2001) believes that ICTs along with bio-technologies can make significant contributions to reducing world poverty, because it can overcome barriers of social, economic and geographical isolation, increase access to information and education, and enable poor people to participate in more of the decisions that affect their lives. It has also been observed elsewhere that ICTs are major tools for "enhancing livelihood and creating new business opportunities". Experts say these technologies have the potential to process and disseminate vast amounts of information and therefore can have a far greater impact on the lives of the poor than informal information network.

3.5 Conflict/Disaster Management and Control

The world has become a world of conflicts, tensions, and disasters. The promised Paradise is not yet in view. Conflicts arising from injustice, jealousy, strife, religious fanaticism are replete. ICTs provide tools for constant monitoring of flash points and areas prone to disasters. This surveillance provides early warning mechanisms that may help nip in the bud such festering trouble spots before they define themselves in crises and disaster that could consume an entire nation or even nations. ICTs tools are today being used to provide early warning signals to inhabitants of areas prone to disasters.

3.6 Communication

The ICTs has revolutionalised the ways in which humans communicate, offering a lot of possibilities. In the preface to his work, *Electronic Reporting*, Agba (2001, p. vii) puts it this way:

> Thanks to the advances in communication technology, the entire world has shrunk into a small community. Thus one's neighbour is no longer only the fellow who lives next door. He could be in the remotest part of the northern hemisphere separated from one not only by time and distance, but also by differences in language, culture, norms and value. Yet what happens to one is known by the other and vice versa within a split second.

Communication globalism powered by the ICTs has helped in the realisation of the "global village" concept. It has accelerated trans-border flow of data and integration of a nation's communication system into a global grid (Ogundimu 2002). The security implication of this linkage is, however, acknowledged. The downsides to communication globalism have been well-documented by Okoro (2002). Yet it has brought obvious benefits to the world.

In spite of these "window of opportunities" which the ICTs hold, they are yet to take firm root in many states in LDCs. Does this suggest that these nations are oblivious of the enormous potential of ICTs? The answer certainly cannot be in the affirmative. If my assertion is right, then what are the obstacles?

4. The Road Bumps

Abi nitio, I have demonstrated that the ICTs are yet to take firm root in many African states and others LDCs. Even with the recognition by the Economic Commission for Africa (ECA) since 1999 that, "Information and Communication Technologies can no longer be seen as a luxury for the elite but as an absolute necessity for the masses" (ECA 1999, p. 2), the question begging for answer is: Why the poor state of ICTs in the region? It is the answer that the paper attempts to provide in the succeeding discourse.

4.1 ICT Education/Limited Human Capital

Sound ICT education at all levels will be a panacea to the problem of the limited human capital in the ICTs sector of LDCs. But the reality on ground does indicate that governments in LDCs are yet to give ICTs education its pride of place. In a study focusing on "ICT Investment Opportunities in East Africa Regional Market Analysis: General Conditions and State of Technology in the East Africa Region" James, Kartano, and Miller (2004) identified "shortage of ICT skills," among other factors as an impediment to the diffusion of ICTs in the region. Their findings show "... a higher demand than supply of trained technology professionals, and in each country, a major in-house training is required to transform new employees to be fully productive" (cited in Nwankpa, 2006, p. 7).

Though, they acknowledged government efforts to create ICT education in these countries, they reported "lack of adequate ICT facilities at some universities, resulting in students with good theoretical knowledge but little practical hand-on experience." Is this not the state ICT education in some developing countries, including Nigeria?

In Nigeria, it was only in 2005 that the federal government introduced a mandatory ICT training in the nation's higher institutions. The then minister of education, Prof. Fabian Osuji had told the nation: "There would henceforth be a universal mandatory ICT training (UMICT), a subject major that all our graduating students anywhere must offer before graduating" (*The Record*, 2005, February, p. 1). The programme only took off in a few universities in the country. It is yet to spread to all the nation's universities.

Again, in the words of Mansel and Wehn (1988) a wider range of "facilitating skills" are required for the design, installation and maintenance of equipment such as telecommunication infrastructure and computer network. These industry skills, Pigato (2001) points out are extremely in short supply in many developing countries. The problem of ICT education and limited human capital may constitute the highest road bumps against ICTs diffusion in the LDCs.

4.2 Illiteracy

Related to the above problem is the worrying low level of illiteracy in LDCs. Being ICT-compliant requires a level of literacy (ability to read and write) in foreign languages, especially English, and computer education. Though radio, television, telephone messages may beat the barriers of illiteracy (since messages routed through them can be couched in the mother-tongue) the other technologies require specialized skills. For example, Pigato (2001) points out that effective use of e-mail and the internet requires not only literacy but also technical and computer literacy, i.e. the ability to operate and interact with computer-mediated information.

But the literacy level in LDCs of the world is on the low side. Even South Africa that leads the African continent on e-readiness with an info state of 76.1 (in 2003), an "estimated 45% of the population are illiterate resulting in a limited parochial network information exchange" (O'Farrel & Norrish, 1999, p. 4). Fouche (1999) warns that this could have serious implications for a web-based information system which operate on a different principle (cited in O'Farrel & Norrish, 1999).

Experts say given the low level of literacy (reading and writing) let alone computer literacy in LDCs, the opportunities presented by new digital information systems are a long way from reaching the majority. It is, therefore, safe to conclude that direct access to computer-based information for the inhabitants of LDCs is likely to remain a preserve of the educated elites unless literacy can be considerably raised by a well-thought out government policy to make education (including ICT education) compulsory, affordable and qualitative.

4.3 Poor ICT Infrastructure

ICTs do not exist in a vacuum. They rely on physical infrastructure (electricity and telecommunication to serve any useful purpose where they exist). But in Africa in general and LDCs in particular, the state of infrastructure is poor. As this UN Human Development Report (2001) observes:

> Much older technologies have yet to reach the world's poor (LDCs). Electricity, in widespread use since the invention of light bulb in the 1870's, is still not accessible for some two billion people, a third of the world's population (http://www.undp/hdr2001).

Even where power supply and telecommunication services exist, they are erratic and inefficient. In Nigeria, for instance, even with the deregulation of the electricity sector and the privatization of the government's electricity company, Power Holding Company of Nigeria, not much has changed! It is still "Never Expect Power Always." This has increased the running cost of the few firms engaged in providing ICT services. This burden is passed on to the consumers in form of increased cost. Even the transport network are either non-exist or in deplorable state. All this affects the cost of doing business and tends to scare potential inventors in the sector.

Even with the deregulation and liberalisation of the telecommunication sector in 2001 (in Nigeria) which has increased access to telephone in urban centres, over 60% of rural dwellers do not have access to telephone (Radio Nigeria Network News, Monday, 15 May, 2006). Even though this percentage must have dropped by now, there are still more telephone lines in urban centres than in the rural areas. This is why the Nigerian Communications Commission (NCC) 2012 figure of 120 million mobile phone subscribers in Nigeria (NCC, 2012) should not be taken as a true reflection of the state of telephony in Nigeria because an average Nigerian has the penchant for acquiring and using four, five or even more GSM phones at the same time. This must have shot up the NCC's flaunted figure.

Moving away from Nigeria, statistics shows that Manhattan in New York and Tokyo each have more telephones than the whole of the Sub-Saharan Africa (see *ANC Today*, vol. 1, No. 26. 20 – 26 July 2001). There is even more cellular telephone in Thailand than the whole of Africa (Ajayi, 2002). The teledensity in Africa is one line per 100 inhabitants. All this points to the state of ICT infrastructure in Africa, with the telephone as a case study. This is in spite of invention of the telephone since 1876 by the Scottish Alexander Graham Bell.

It has been suggested that without a developed ICT infrastructure, Africa has little chance of building the kind of cross border linkage within the continent and with global markets that has so vastly benefited other climes. The problem of poor ICTs infrastructure does have a link with government policy and regulatory framework.

4.4 Weak Policy/Regulatory Framework

In every society, it is the government that provides direction and sets the rule for the game. Writing in the *Enterprise Impact News*, issue 20, June 2003, Rona Wilkinson asserts that "An enabling policy and regulatory environment is crucial for both the telecommunications and value added markets" (p.1). To assert that LDCs do not acknowledge this fact is to be accused of bias. There seems not to be a defined path yet. Nzepa (2006) puts it this way: The continent (Africa) sometimes looks schizophrenic about the course to take. Should the continent put emphasis on building infrastructure or human capacity? Lacking a clear response to that makes the bed for inconsistent policies with the potential to exhaust the scarce resource at hand, and increase the burden of bridging the digital divide" (cited in Nwankpa, 2006, p. 11).

Beyond that, even with the deregulation of the telecommunication sector in many LDCs, one common feature is a weak regulatory framework for protecting both new market providers and domestic consumers of cellular telecommunication services (Ogundimu, 2002). In 2005, it was in the news that MTN (Nigeria) allegedly bribed federal lawmakers with recharge cards to influence government policies to the company's advantage. Though MTN and the money-sharing legislators have since denied the allegation, many Nigerians

believe it is true. This is official corruption that is eroding the capacity to implement and enforce public interest policy.

According to IT Web Report, African telecommunication regulators face many challenges, such as lack of capacity, political interference and the use of regulatory tools not designed for a developing market (cited in Nzepa 2006). Besides, the deregulation and liberalization of the telecom market has attracted more players, and this is pushing up competition. With increased competition has come the need for effective regulation if the benefits of ongoing reforms are to be tapped. But politicized regulatory bodies cannot bring out the best from the sector.

It is a known fact that although many African states and other LDCs have started ICT policy reforms, service penetration, quality, tariff and interconnectivity have not yet vastly improved. In Nigeria, sometimes subscribers to one GSM service provider find it difficult to connect the other fellow on another network. The law on interconnectivity is yet to be strictly enforced. Sound regulatory policy can tackle this problem.

With specific reference to African states, Jenson (2001) has also identified the following as some of the road bumps against ICT diffusion on the continent:

- The existing usage of the radio spectrum. Many of the countries in Africa do not have adequate facilities to manage their radio spectrum allocation for use by telecommunications and Internet operators, either nationally or regionally. This has resulted in congestion in some wavebands and lack of a transparent process and difficulties in obtaining spectrum from the regulators;
- The market orientation and openness of the national government to private investment. Many countries in the continent are still coming up from "nationalism era" and many sectors of the economy are still dominated by inefficient parastatals with close links to government executives;
- The general investment climate in the country, such as the level of inflation, import duties, access to local capital and foreign currency;
- The resources the national government and their international cooperating partners are allocating to national information and communication projects (cited in Ajayi, 2002, p. 1-2).

5. Bridging the Digital Divide

Now that some of the major road bumps on the ICT highway have been identified, how can the digital divide between the world's industrialized nations and the LDCs be bridged?

The time to seek solution is now and LDCs must begin by revisiting government policies affecting ICT development in the region. It is along this line that Wilkinson (cited earlier) has observed that enabling policy and regulatory environment is crucial for both the telecommunications and value added markets. This calls for liberalization of telecommunication market and an effective, strong and transparent regulatory framework for the implementation of policies. The government may not have all the expertise needed in this regard. Therefore, the private sector and civil society must be involved. In addition to providing an enabling regulatory policy, government should be committed to the development of physical infrastructure. This includes reliable electricity, increasing mobile phone coverage in rural areas, upgrading systems, good transport system, etc.

Shortage of skilled human resources has been identified as one of the impediments to ICT diffusion in LDCs. To tackle this problem, therefore, government needs to show strong and serious commitment to the development of ICT skills through education. From the primary school level through the tertiary institution, functional ICT education should be provided. What is required for students at all level is a practical hand-on experience. The private sector equally needs to partner with the government in this regard. In-house training is required to transform employees to be ICT-compliant.

For private ICT training institutions, there should be a development and standardization of scheme for ICT-training. ICT schemes need to be accredited by relevant government agencies. This will ensure the evaluation of capabilities and skills of students graduated from such institutions.

Policies that encourage investment from the world's industrialized nations should also encourage the transfer of both technology and technical know-how to the LDCs. This is one way to augment the shortfall in human resources.

For every government policy to succeed, the people need to be involved. Norrish of the FAO could be thinking along this line when he asserted that there needs to be a move from looking at technology and asking "what can we do with this" to looking at people's needs and asking "which technology might help?" (cited in O'Farrell & Norrish 1999, p. 2). Every stakeholder must be involved because it is only in this way that technology needed by any group of people (including the rural poor) can be ascertained. Therefore, Wilkinson (2003) contends that:

> Stakeholder participation is necessary in all... areas of ICT development... ICT projects targeted at rural people will fail if they are not firmly grounded in the economic and social realities of village life (p. 2).

Even when all the ICTs infrastructure have been put in place and ICT education provided, the issue of poverty needs to be addressed. People need to be economically empowered if ICTs are to make any sense to them. Otherwise, ICTs with their vast impact in poverty reduction will be lost. This paper's position is that government of LDCs must address the widespread poverty in their various regions. After all, poverty affects one's perception of reality, determines the kind of education (if any) one would acquire, affects everything one does in life. The poor cannot be ICT-compliant!

6. Conclusion

The mandate of this paper was to point up the impediments of the growth of ICTs in Africa's LDCs. But before settling down for this task, we tried to demonstrate the "window of opportunities" they provide for such poor regions of the world. This ranged from education, commerce, health, poverty reduction, conflict/disaster management and control to communication. But for the impact of the ICTs to be felt in the areas enumerated above, it must be affordable to a greater percentage of the people.

But such factors as low level of ICTs education, limited human capital, illiteracy, poor ICTs infrastructure, weak policy/regulatory framework, among others, were identified as major road bumps against ICTs penetration in Africa's LDCs. It was against this backdrop that the paper called for a concerted approach to tackling these problems. But the government must lead the way through well-thought out policies that favour ICT growth in their various regions. Government of LDCs must address the issue of poverty for ICTs to make any sense to a majority of their population living below the poverty line.

However, today's world has become a world of ICTs. Africa's LDCs cannot afford to de-link. If they do, it is at their own peril!

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