

# **Unintended Outcomes in Information and Communication Technology Adoption: A Micro-level Analysis of Usage in Context**

Patience Akpan-Obong, PhD  
Assistant Professor, Government  
School of Applied Arts and Sciences  
Arizona State University – Polytechnic Campus  
7001 E. Williams Field Rd, Bell Hall  
Mesa, AZ 85212

Tel. 480-727-1489

Email: [patience.akpan@asu.edu](mailto:patience.akpan@asu.edu)

## **Abstract**

Research on the applications of information and communication technologies (ICTs) for socioeconomic development often proceeds from a systemic level concentrating on the actions of states and their agencies. While there is budding research on adoption of ICTs by community-based organizations, not much has been done on usage patterns at the individual level. This paper contributes to the discourse by presenting a micro-level analysis of patterns of ICT usage by a section of the civil society. Specifically, it examines the impact of context on utilization of ICTs, illustrating how new patterns and functionalities emerge in distinctly novel forms. The research reinforces a common fact: technologies are cultural artefacts and come bundled with a set of ideas. However, particular usage patterns and context can converge to significantly transform the nature and functionalities of the technologies.

## Introduction

Much of the theorizing on information and communication technologies (ICTs) and development emerge from the perspective of the potential impact of the technologies on the economies of developing countries. Assumptions are made about the utility of ICTs as tools for socioeconomic development in language that often implies a technological determinism. Many developing countries have responded to the global discourse on what has become known as ICT4Dev by formulating policies and implementing projects and programs to facilitate the utilization of these technologies as core development tools. In particular, African countries are embracing ICTs as viable tools for economic development. Also, international development agencies such as the Canadian International Development Research Center (IDRC) have funded ICT-centered research and projects.

Toward the end of the 1990s, the discourse drove the programmatic agenda of the World Bank (Knowledge for Development Program) and the G8 (Digital Opportunities Taskforce). It remains an integral part of the United Nations Millennium Development Goals initiative. These ICT-centered programs and initiatives proceed from the mostly utopian conception of the capacities of the technologies in promoting independently, or in concert with other variables, the development goals of organizations, countries or regions. However, recent evaluation research indicates that results of adoption and implementation of ICTs are mixed. This comes as a surprise only to those who conceptualize the technologies as fixed instruments, unchanging and unchangeable. The array of outcomes of implementation of ICTs prompts a number of questions about the nature of new technologies in settings outside the sites of production, renewing research interest in the significance of contextuality in the adoption and application of technologies. Essentially, the extent to which context determines the outcome of technological infusion remains a matter of interest.

This paper contributes to the discourse through a micro-level analysis of patterns of ICT usage by a section of the civil society. A set of interrelated questions defines the scope of the research: How does the interaction of context (through structural constraints) and practice produce new forms and functionalities of ICTs? Are the outcomes significantly different from original conceptions and designs? Do the outcomes present a framework for problem-solving or are they simply temporary measures papering over fundamental challenges? For instance, will the deployment of cyber cafés to increase access compel investment in those areas? How does this investment contribute to the improvement of conditions of living at the grassroots level?

To successfully address these questions, one adopts an integrated theoretical model of contextualist and structural analyses. This framework facilitates explanation and understanding of the usage patterns, constraining factors, coping mechanisms and the new realities that emerge from the interaction between context and iterative practices.

## **Research methodology**

The analysis is anchored on a case study of ICT usage conducted in Nigeria during three field trips, the most recent being in January 2007. More than 450 people from various populations participated in the research through semi-structured interviews and questionnaires. Other research methods included content analysis of relevant policy documents, observation and anecdotes. Much of the data and comments used for this paper are generated from observations in cyber café as well as responses to questionnaires administered in 2001 and 2007 to 408 college graduates aged 18 to 30. These participants were selected from among members of the National Youth Service Corps (NYSC). Corps members are recent college graduates (having completed at least four years of post-secondary education) who are mandated by law to serve the country for 12 months in places outside their “states of origin” and college or university location. Those who responded to the questionnaire emerged from 70 broad disciplinary backgrounds, representing 31 (of the 36) states of the country and Abuja, the federal capital city.

Questions were asked about respondents’ patterns of ICT usage and the factors that enhance or hinder the process. Beyond the infrastructural constraints such as poor electricity and high costs of the technologies, respondents identified four major issues as factors that hindered their full engagement with the technologies. These are: access, awareness, affordability and availability. The study shows how users confront these factors in their daily ICT activities through various coping mechanisms and interpretations of the technologies and related concepts. These mechanisms generate research interest because they significantly alter the conception and functionalities of some of these technologies. On one hand, the research underscores the role that issues of awareness, affordability, access and availability play in the diffusion levels of these technologies in developing countries. On the other hand, it highlights important, albeit unintended, outcomes from the interactions between context and recurrent practices as users construct new realities through the various coping mechanisms. This points to new research areas, and provides insights for the formulation of ICT-for-development policies in developing countries.

The paper is organized in four sections, including this introductory section. In the next section, I set out the theoretical model that frames the research. This is followed by an interpretive analysis of responses of participants in the questionnaire portion of the larger research, as well as observed practices and interactions at cyber cafés in selected major cities in Nigeria. I conclude with a brief discussion of the common themes emerging from the responses and ways that Nigerians navigate (and in many cases alter) many ICTs to adapt to the context of usage.

### **Theoretical framework: An integrated model of contextualist and structuralist analyses**

Avgerou has rightly noted that much of the discussion of ICTs in developing countries is “directed toward developing general knowledge for the implementation of

information technology innovation without considering in a systematic way variations of the organizational and the broader context within which the innovation is embedded.” (2001: 43). In reality, she argues, the extent to which any organization achieves increased production through information systems (IS) innovation will be determined by its context. Indeed evaluative research of ICT-centered strategies for development implemented in and by developing countries and development agencies in the height of the ICT4Dev discourse show differing outcomes (Thioune, 2003). The explanation of some of this diversity is often framed in terms of the argument that it is too early to evaluate projects of ICTs in development (ITU, 2006). However, it is clear that a contextualist approach provides a more accurate explanation for these ambiguities.

Avgerou, adopting a contextualist analysis compares the IS innovations in Cyprus with the Emilia Romagna region in Italy showing how the same strategies produced different outcomes. She argues that innovations should not be implemented without attention to the specific context. The thrust of her argument is that the context of IS innovation in developing countries is very significant because it “involves the transfer of technologies and organizational practices which were originally designed and proved useful in other socio-organizational contexts” (Avgerou, 1996, 2001). In turn, Guittierez (1995: 27) contributes to the discourse by drawing attention to the ways a contextualist approach allows for the articulation of a particular phenomenon in a complex environment where historical precedents have a pivotal role in the “development of understanding and the qualitative confirmation of hypotheses.”

The notion that technologies adopt different forms when applied outside their context of production is not new. Jacques Ellul’s *Technological Society* (1964) changed the way one looked at technology especially at a time when technology intersected with development theory of modernization and decolonization. Many others in recent times have also argued that technology embodies socio-cultural and ideological symbols and meanings. (See for instance, Kalu, 2000 and Akpan-Obong, 2004).

Indeed, this was the major criticism of the “technology transfer” rhetoric of the 1970s in development theory. Critics, such as Makinde (1986), argued that technology cannot be transferred from one domain to the other with the expectation that its applications will produce the same outcomes. Thioune (2003) equally argues that while ICTs “are credited with the ability to transform, and deep and significant changes are expected from their widespread use in Africa,” there are challenges such as “adapting ICTs to local conditions and uses in developing countries, and allowing each country to understand these innovations and adjust them to their own development needs” (2003: 2-3). Many developing countries are already doing this as Thioune’s case study of four African countries’ utilization of ICTs in poverty reduction programs show (Ibid). The case study of patterns of ICTs usage in Nigeria presented below is an important contribution to research in this area.

One acknowledges extant research on contextuality. This is therefore not a re-inventing of the wheel. However, one extends some of the current analyses in two ways. For instance, while Avgerou’s analysis concentrates on information systems adoption in

organizations, this paper focuses on societal adoption and usage of ICTs, premised on the understanding that just as context matters in organizations, they matter even more in countries as units of analysis. This is even more so in developing countries, geographically and symbolically removed from the context of production. This distance inevitably propels them to “translate” the technologies differently from the original intentions. A discussion of how context alters outcomes in the adoption of technological innovations is interesting by itself. However, such analysis is akin to driving into a dead end – and therefore no resolution.

An integrated model of contextualist and structuralist analyses extends the discussion by facilitating an examination of the outcomes of contextual application of innovations. One makes the assumption that the unintended outcomes lead to new forms of realities and utility in the harnessing of ICTs either as tools for socio-economic development or simply as means of communication and information gathering at the individual level. The process – actions, reactions and interactions of actors and iterative practices – within various contexts – creates new technological forms that have new functionalities to meet the specific needs of users.

Structuralist analysis is rooted in Giddens’ body of work on the “relationship between human agency or action and the creation of order and social institutions” (Stillman, 2006: 113). It highlights “the processes through which ICTs are shaped under the influence of and at the same time contribute to the shaping of the social relations of the organizations within which they are introduced.” (Avgerou, 2001). It refers to iterative and recurrent practices which eventually become new forms of existence or social order. It bridges the binarity between human agency and structure by elaborating ways in which the interaction between agency and structure create new realities.

An integrated model that captures both elements of the two analytical approaches highlights two major issues in the case study which follows. First, it shows how the context shapes usage of certain ICTs in Nigeria. This context includes not only the infrastructural constraints but also the policy framework. The policies created the environment for ICT usage primarily by deregulating the ICT sector through the establishment of institutional mechanisms. They also raised the priority level of ICT acquisition and usage as tools in the achievement of macro socioeconomic goals. It can be argued that while Nigeria’s ICT sector is mainly private-driven, it would not have developed as rapidly as it has done without a clear and intentional policy framework. Secondly, an integrated model highlights the new realities in usage and technologies and how these change the nature of the technologies. The conceptualized model is represented by the diagram below.

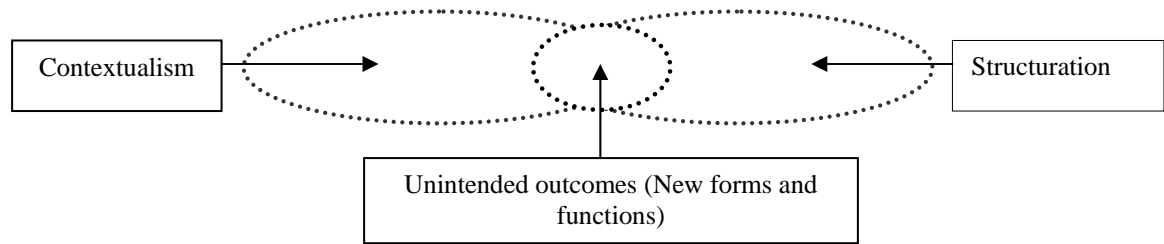


Fig. 1: Integrative model of contextualist and structural analyses

### Usage in Context: ICTs in Nigeria

Many forms of information and communication technologies are used in Nigeria, some in more innovative ways than occurs elsewhere. This is a pattern that carries over from the early days of now-old technologies of information and communication. The early radio, for instance, performed a community function that exceeded that observed in Western countries. While families did gather together in American homes to listen to the radio, especially during major events such as war and sports, in Nigeria as recent as the 1980s, not only did families share single radio units but entire neighborhoods also did. During major events such as Nigeria's participation at international soccer competitions or announcements of a military takeover, entire neighborhoods or villages could be found congregating in the homes of the one or two people in the area that had a radio set.

Development agencies and government ministries exploited these channels to reach people, conferring new meanings to the idea of community radio. In the classic definition, a community radio is a special-interest radio station that targets its programming to a specific audience. (Sakolsky and Dunifer, 2001; LouieTabing and UNESCO, 2004). Until the 1990s in Nigeria, there was no private radio station in the country. Even now, a community radio station operating within the classic model is not common as the few private radio stations are deeply commercial reaching out to as diverse an audience as possible in pursuit of advertisement revenues. In the past and even now, "community radio" has been defined contextually in Nigeria with the emphasis placed on the ways large audiences can be reached through the radio rather than on community-based programming. The concept of community radio in Nigeria is similar to the cinema – large numbers of people gather in a single place to receive whatever is on the air.

Many new technologies of information and communication in Nigeria today are similarly multi-user and multiple-usage community (or communal) technologies. The Internet, for instance, becomes a communal technology in greater dimensions than what obtains in industrialized countries. Cyber cafés have become the modern village square or community centers where people of all ages and classes gather to use the technology directly or have others perform certain tasks for them, as will be explained later in the

paper. Computer usage has also become pervasive generating related socioeconomic activities such as computer repairs, manufacture of electricity back-up technologies and retail trade. One draws attention to the mushrooming of computer villages in many large cities in the country. In the absence of large computer stores such as Best Buy, Staples and Future Shop (in Canada), the computer villages approximate the functions of these stores because one can find all computer-related items in these places. They are also villages in more than just the name.

The computer village is indeed a mini village. It consists of many retail stores and shops of various sizes, many of which sell the exact same item next to each other. The owners, sales assistants and/or apprentices open the shops early at dawn and spend the rest of the day there. They have their meals there – either those brought from home – or bought from itinerant food vendors. Many set up board games at the entrance of their stores and can be found playing when business is slow. For many “villagers,” their children spend the day there. The older ones help with customers while the younger children can be found playing in tight corners outside the stores either by themselves or with other children also spending the day in the village with their parents or guardians. Both the traders and regular customers know each other and may even socialize outside the village.

Indeed in the wider society the marketplace is not only an economic space but plays important social and political function in the lives of the people. Cultural associations are formed in the marketplace. Political groups are also formed either as market unions or as organizations that participate in the greater body polity. Computer villages are therefore large marketplaces with different wares. They epitomize the communal conception of ICTs in Nigeria. This communal view of ICTs has undisputedly contributed to the rapid growth observed in the sector. Awareness and interest in the technologies increase in a society where people easily share their cell phones and total strangers can walk up to someone and ask for use of his/her cell phone. Cell phones are also used as pay phones and it is not unusual to find people hawking phone usage. Anyone who has a need and can afford the per-minute cost has access to the cell phone, an extremely personal technology in other societies.

Between 2001 when this research was begun and 2007, there have been greater levels of diffusion of the various ICTs. However the growth in the telecommunications sector has been phenomenal and bears some emphasis in this paper. Prior to 2001, telecommunications was one of the slowest sectors in the Nigerian economy. Indeed, it had stagnated so much that until the mid 1980s, there were only 200,000 functional telephone lines in Nigeria. The capacity of the country’s national telecommunication carrier was 260,000 lines, operating on analogue exchanges. There was a significant change in 1985 following the break up of the colonial Post and Telecommunication (P &T), a unit of the Ministry of Communications, into two distinct government agencies. The Nigerian Postal Service (Nipost) was created out of the postal division of P&T to handle postal communications while the telecommunications division was merged with the Nigerian External Telecommunications to become the country’s first (and for a long time only) national carrier, the Nigerian Telecommunications Limited (Nitel). With the

creation of Nitel to provide both internal and external telecommunication services, the number of telephone lines in the country gradually rose to 400,000 by the end of the 1990s. Of the 400,000 lines, less than 60% were actually functioning.

It soon became apparent that merely creating a national carrier was not sufficient to increase the country's teledensity. A clearly defined policy framework was required. The emerging debates culminated in 1992 when the military government of Ibrahim Babangida enacted Decree No. 75 of 1992. While the objectives of the decree were broad, they included the creation of the Nigerian Communications Commission (NCC). The Commission set in motion the process that resulted in the formulation of the National Policy on Telecommunications (NPT) aimed at helping the country to "achieve a modernization and rapid expansion of the telecommunication networks and services to enhance national economic and social development (and as) a major means of integrating Nigeria into the globalized telecommunication environment." (Federal Republic of Nigeria, 2000)

The first step toward the achievement of the NPT objectives was the development of the mobile telephony sector. The process was politically intense and took almost a year, but eventually digital mobile licenses were auctioned and issued to four providers including Nitel, the national carrier. The licences allowed the companies to deliver digital cell phone services on the global system of mobile communication (GSM). The choice of technology itself had gone through heated debates but the consensus was that the GSM would better serve the needs of Nigerians and it became the preferred platform of the service providers.

A clear policy on telecommunications was the engine that propelled developments in Nigeria's telecommunications industry. The nature of the drivers (of the engine) was equally crucial. During the debates leading to the formulation of the NPT, stakeholders in the private sector had strongly argued for their involvement in the industry. Many commentators in the media repeatedly said government had no business providing phone services. They cited the perennial problems with public utility services in the country blaming the poor services on the direct involvement of the government. Notable of these were power generation and distribution, and production and supply of petroleum products (with frequent scarcities in these areas fuelling violent national unrests and riots). As a principal actor in the country said in an interview:

It is wrong for the government to run (public utilities). To use ICTs for development, the government should provide the enabling environment for private sector to thrive through regulation, fairness, protect investments, and (ensure that) laws are obeyed and complied with. Government should try to help the service providers by providing market for them by patronizing these businesses.

Perhaps for this reason policymakers adopted a private-sector driven approach for the telecommunications industry. This created the environment for the mobile telephone industry to take off and flourish the way it has. However, while the role of the private

sector can be credited for this development one must also highlight the function of the unique policy framework. For instance, while the policy assigns significant responsibilities to the private sector, the state regulator, the NCC, continues to exert a strong grip on the industry. In the process, it has extensively checked excesses of the operators in ways that ensure quality and relatively customer-oriented services. An example of how NCC's hands-on approach facilitates the operation of the industry was its intervention in 2006 when Nitel – still the only national carrier at the time – blocked access to the national backbone by one of the mobile telephone service providers, thus breaching the interconnectivity agreement between the operators. Nitel, a competitor in the cell phone service business, used its capacity as a national carrier to gain unfair advantage over its competitor. The NCC intervened and ruled against the national carrier.

The NCC also set up a Consumer Affairs Bureau to process complaints by customers against telecom operators. In 2005 and 2006, hundreds of such complaints were filed and resolved by the Bureau. Its website lists 463 for 2006 and 411 for 2005. It also explains the procedure for managing the complaints.

If the Bureau is satisfied that the service provider breached terms of its contract with the consumer, or acted contrary to the code of practice as approved by the NCC, the Commission takes appropriate action without delay which in most instances will get the service provider to ameliorate the situation. (NCC, 2007, available at <http://www.ncc.gov.ng/index11.htm>)

The top ten complaints filed against the operators by customers in 2005/2006 were “related to inability to recharge, Billing/Rate, Connection issues, Disappearance of Credit, Service Interruption, Defective Equipment, Bonus Related Issues, Mast Related Issues, sending/charging for multiple SMS in place of one, and Network congestion.” (Ibid.) This list does not exhaust the problems encountered by Nigerians in the course of using telecom services in Nigeria. Also, one is by no means arguing that processing less than 1,000 complaints in two years has any significant impact on the industry. However the point can be made that the existence of the CAB keeps the operators on the straight and narrow path in their relationship with the millions of Nigerians who use their services.

The paradox is that when the telecom policy was released, many Nigerians criticized it for its overemphasis on the development of the mobile telephony sector. Many critics suggested that the policy was geared toward the elites while developing the fixed phone sector would have had a greater and wider impact on the majority of Nigerians. Developing the fixed-line sector was considered to be cheaper and more grassroots-oriented. Conception of the cell phone as technology of the privileged was well founded. The structure at the time was such that only the very wealthy and connected could afford to own a cell phone. The process for acquiring one was intensely complex and involved a common Nigerian factor, “man-know-man.” In other words, it was easier to obtain service if one was acquainted with top officials in Nitel or Ministry of Communications, or knew someone else who was. An international passport was also a required document before one could even start the process of applying for a cell phone

line. And then the wait time was excruciating and regularly ran up to two years. The cost of initial line and activation (excluding the cell phone itself) was at least ₦100,000 (approximately \$1,000). With a per capita income of \$300 at the time, only few people could afford to have a cell phone.

However, when the first three mobile phone service providers rolled out their services on the GSM platform in August 2001, a basic package cost ₦30,000, a 70% reduction from what Nigerians were familiar with. Also, because of the digital nature of the technology, users could have their phones activated within minutes by inserting the subscriber information module (SIM) card that comes with the technology. The package was still expensive and with the initial rollout concentrated in a few big cities, the cell phone was still a dream for many Nigerians, 65% of whom live in the rural areas. But it took only six years – 2001 to 2007 – for the cost to drop so drastically that it now seems that every Nigerian is a cell phone user – or has the capacity to own a phone and a line. The cost of initial package in January 2007 was ₦5,000 – and that included the phone itself, line and SIM card. A participant in the research said, “That’s a revolution.” About 95% of cell phone users in Nigeria have prepaid packages (ITU 2006) which makes the technology even more accessible. The problem for many then is ability to recharge the phones and have the credit to make calls as well as keep their lines from getting disconnected. The providers de-activate phone lines that have been dormant – has no credit – for 14 days.

As the cost of acquiring a cell phone line in Nigeria goes down drastically, so has the number of users risen, exceeding the most optimistic expectations. Before August 2001, there were about 100,000 analogue cell phone lines. At the end of 2001, the total of all cell phone lines was 266,461 on both the analogue and the three GSM networks. By January 2007, the number had exceeded 33 million (Nigerian Communications Commission, 2007). In 2001, only 35.9 % of participants in this research had used a cell phone in the month prior to their participation in the research. In January 2007, 100% of the respondents not only had used a cell phone in the month prior to the research, but owned at least one cell phone. A few owned more than one.

The sophistication of usage had also increased. In many Western countries, the cell phone is used primarily for communication, though a lot of young people are finding multiple uses for the technology, namely text messaging and music. In Nigeria, the cell phone is no longer simply a voice communication tool. Rather, it is used for text messaging, taking photographs, Internet activities (e-mailing, web browsing and search) and other miscellaneous activities such as checking the exchange rate between Naira, the local currency, and foreign currencies, time, alarm clock, calendar and games. In Western societies people routinely carry photos of their loved ones in their wallets. In Nigeria, people store photos of their loved ones in their phones. A common pastime among those who can afford camera phones is to show each other photos of their children and other significant people in their lives. Not surprisingly too given the poor state of electricity supply in the country, cell phones also serve as flash lights with the backlight on the phone. It is also common to find cell phones that have flashlight capability built into them. A button on the key pad turns on the flashlight.

Sophisticated cell phones equipped with web application protocol (WAP) grants users access to the Internet without requiring a computer, telephone, modem or electricity (though electricity is still required to charge cell phone batteries). Cell phone marketers (usually representing their offices in Europe) promote the utility of the latest generation of phones as a solution to infrastructural constraints such as access to the Internet and interconnectivity among the providers of GSM services. It is now common to find people owning four cell phones with each subscribed to the four digital mobile phone providers (or 12 from the beginning of 2007.) That way, users can easily make in-network calls without having to deal with the hassles of interconnectivity between the networks. Also in the process users:

*Enjoy different network advantage available at different locations in Nigeria, as well as the cost differences.*

In-network calls are also usually cheaper, with some companies offering free calls between midnight and 3 a.m. Other reasons for owning more than one cell phone as reported by respondents to the questionnaire include the problems of interconnectivity among the operators.

*I got two networks at the time when relationship between different network services didn't seem cordial and connecting became difficult.*

*Variety, the need to have options.*

*Due to lack of network coverage in most rural areas by most network operators.*

When GSM providers tally up the number of subscribers the duplication and triplication of subscriptions is not accounted for. The NCC, which is the custodian of industry statistics, compounds the problem by using “subscriber data” and “connected lines” synonymously. There is no distinction between the actual number of people who are users and the number of connected lines because number of subscribers is presumed to be equal to the number of connected lines. The actual number people who own cell phones is less than the number of connected lines though, conversely the number of people with access to the technology may actually be higher than the official numbers indicate. In this we see another area where context conveys different interpretations of universally accepted concepts such as access. In the United States, access to technology (especially those as “personal” as the cell phone) is conceptualized in individualistic terms. It is different in Nigeria, especially as interpreted through the ubiquity of business centers and cyber cafés as points of access to the public.

The dynamics of the cyber café, more than anything else, exemplifies how context changes usage and functionality of technologies. These centers use broadband wireless technologies to provide customers with access to the Internet. Services such as basic e-mailing, instant chat and VOIP, Skype and Internet Call are offered to users for a fee. Cyber cafés therefore provide surrogate ownership to people who would otherwise have

neither access nor ownership. In a society where ownership is usually defined in communal terms, public access to ICTs is synonymous with personal ownership especially because of the relational dynamics observed in cyber cafés and business centers across the country. For instance, many of the respondents to the questionnaire said they had “personal Internet access.” A follow-up question was:

*“Approximately, how much do you spend on your personal Internet access in a month?”*

One respondent said he paid N4, 000 (about \$40) a month on Internet access. Further probing showed that he was actually referring to how much he spent to access the Internet at cyber cafés rather than how much he paid to an Internet Service Provider for Internet services. Respondents also counted access to the Internet at work as personal access. This is common in a society that often does not make distinctions between the private, public and communal property. (This would explain why a former state governor in Nigeria was reported to have routinely paid for personal items and services by writing checks drawn from the state treasury!) Generally, the responses indicated that participants interpreted access and ownership synonymously such that they clearly “owned” their access to the technology that they use in cyber cafes, at work, in school or in a friend’s home or office. While this paper does not focus specifically on the Internet, a further examination of cyber café activities is necessary to further stress the point about how context changes ICT usage in Nigeria.

**Cyber café as communal space:** There are two primary options for accessing the Internet at cyber cafés: some customers choose to pay the per-minute “browsing” rate or simply pay a flat fee to send or receive e-mail. The first option works for people who have some level of computer and Internet literacy as the minutes begin to run as soon as they log in. For most people, the cheapest way of “browsing” is to type up e-mail messages elsewhere (at home or office) and bring them to the cybercafé on a diskette. (Browsing is a word that assumes a different meaning in Nigeria, usually referring to all Internet activities such as writing and reading e-mail messages.) Also, rather than reading their messages online, they copy and paste in a word processor and save in a diskette or flash drive to read and respond offline elsewhere. For people who cannot do this, they end up paying for both the word processing and the cost of sending the e-mail, either through the cyber café’s account or a customer’s Yahoo! or Hotmail account.

To increase wider access beyond the commercial cyber cafés, the National Information Technology Development Agency (NITDA), had shortly after its inauguration in 2001 planned to set up mobile Internet units (MIUs) similar to mobile libraries to travel from one local government area to another teaching people the benefits of the Internet and how to use them. There were also plans to provide points of access through Local Information Infrastructure in the 774 local government areas of the country. By January 2007, when the follow-up research was conducted, none of these plans had materialized beyond a few outlets in Abuja, the federal capital territory.

But even if NITDA had achieved its goals and spread Internet usage in the country through MIUs and the LII, the strategy was predicated on the assumption that one access centre was sufficient even in places where there may be as many as one million people. As stated earlier, a greater percentage of Nigerians live in remote rural areas with inaccessible roads that are worse during the rainy season. Certainly, a few people in the nooks and crannies of the local government areas might have pressing enough needs to travel to the local government headquarters to send e-mail. But the experience at a government cyber café in Abuja where the waiting period ranged from 30 minutes to four hours foreshadowed a situation where “going to town to send an e-mail” would be a full-day’s activity for many rural dwellers. This is already evident in cell phone usage. While many rural dwellers have and use cell phones on a regular basis, many do not have electricity. They therefore must travel – trek or pay public transportation – to places that have electricity to have their cell phone batteries charged (at a cost). Some also have to travel for some distance to buy the pre-paid cards without which their cell phone connections may become deactivated for dormancy.

Others have suggested that eventually, telecentres, as understood in the West (as community-based communication centres with free access to the public) will be put in every Nigerian village. A touch-tone technology (as observed) in Cape Town, South Africa would bypass the need for literacy, as symbols rather than letters, would be used to guide the user through the system. A less utopian scenario involves setting up village telecentres with skeleton trained staff to assist users (as is the case in many of the cyber cafés in the cities). While the concept of communality in ICT usage is pervasive in Nigeria, even Nigerians seem intuitively aware that their needs go beyond access to the Internet. This is indicated in the slower growth of the technology than the cell phone which has a lot of benefits over the Internet as a means of communication.

Accounts of the wonders of telecenters and ICTs general and their prospects for universal access always take it for granted that all rural people in Nigeria are dependent on the information that emanates from the Internet. Similar assumptions were made in the early days of the discourse that linked development with communication and information. During this research, a participant spoke about how information on appropriate planting seasons and prevention of malaria will be useful to the rural dweller. This information will be made available on the Internet and made accessible to rural dwellers, he said repeatedly. Again, there is an assumption here – and some may call it arrogance – that the “information from above” will be superior to the local knowledge systems. A village farmer is not likely to depend on information from “outside” – from people who are not familiar with his soil and its needs – to tell him when to plant his seeds. Some soils are better suited for the planting of certain seeds than for others, and the soil variation can be vast even within the same locality. To be able to deliver useful information, the experts must be part of the local community, and if they are, there are more immediate and trusted means of disseminating their knowledge (the town crier, marketplace, the stream or well, village hall, etc.) than the Internet. A woman whose child is suffering from malaria already knows what she needs to treat her: money to buy the medicines that she is probably more familiar with than the “outsider.” She is therefore less likely to rush to the Internet to find how to treat her baby. This point is not to deny the utility of ICTs to

people in rural areas. But the research shows that the ICT needs and usage of the “average” Nigerian are very different from the assumptions made about them. Again, this would explain why it is the late entrant in Nigeria’s ICT sector, the cell phone, that has taken off, leaving the Internet very far behind. The cell phone has an immediate communication need that the Internet does not.

At another level, many participants in the questionnaire suggested that government could increase general access by subsidizing the cost of acquiring ICT training and the technologies themselves. They also said the government could get into the business of setting up cyber cafés to charge lower rates than are obtainable in commercial centres. Some of the interviewees also think that the Internet Service Providers (ISPs) should charge lower rates so that cyber cafés can offer their services to the end users at more affordable rates. Said a participant:

*ISPs have to break even, I agree but it’s not something that they will break even overnight by embarking on cutthroat prices. There should be no monopoly. We have to encourage as many ISPs as possible to go to each of the state capitals. Monopoly will eliminate competition and when there’s no competition, it means there’ll be a dictation to the people in terms of the price, the people are held to ransom by the solo ISP in the state concerned. There must be level playing field, competition, awareness, transparency and openness.*

Another respondent suggested that providers of the various ICT services in Nigeria should take advantage of the huge population by reducing their costs to make their services more accessible. His argument is that population is a strength that the Nigerian ICT industry can use.

*For instance, if five million people have access to the telephone and can talk to another five million people, it is a lot of empowerment. You begin to look at the traffic ... if the investors provide these 10 million telephones, and we have to provide at affordable price to these people, then it is not going to take a long time for the returns to come. And if this happens, then the providers can offer their services at two Naira per minute because that is what Nigerians can afford. In the end, both the investors and Nigerians benefit and telephone usage spreads.*

An initial assumption in this research was about how certain factors such as literacy and other institutional and infrastructural constraints would hinder the diffusion of the various ICTs in Nigeria. The problems exist, and these include poor electricity supply and the general problems of development. However the people have over the years established various coping mechanisms to deal with factors that would otherwise have presented grave challenges. Again, the cyber café is a site that exemplifies many facets of Nigerians’ engagement with ICTs. For instance, to deal with the problems of poor electricity supply, owners of cyber café invest in generators and power back-up gadgets. The generators automatically switch on when there is failure in the public power supply (as on the average, a business loses public power for at least one hour every day).

When there is no gas to fuel the generators (another common problem in Nigeria), the back-ups would supply power for about 20 minutes thus giving users time to save their data and quit the systems. During the follow-up research in January 2007, one observed that in the cases when this happened, cyber café patrons did not abruptly leave. Many stayed back to chat with each other – even if they were total strangers. Some stayed in hope that there would be electricity soon or just because they were not in a hurry to be anywhere else. The cyber café then became a site for social interactions and networking among patrons.

Another coping mechanism is the use of staff in cyber cafés to type e-mail messages as well as perform other services for clients. This process bypasses the need for anyone to be IT-literate or literate at all. In offices (both public and private), it is common to find workers who do nothing else but “operate e-mail” for their organizations or paying members of the public. Again, there is “ownership” in this process because the operator becomes part of the communication as he or she (often she) types deeply personal information for the client. The client usually sits on a chair or stool and reads out the hand-written letter (or dictates if s/he came without written material) to the staff. As the staff types, the client is reading on the screen and pointing out any errors that might have occurred (if s/he is literate, otherwise accepts that whatever is typed is accurate). While this goes on, the two have a conversation about whatever the issue of the day is – or the client explains the background of the e-mail, and his or her relationship with the recipient. In this context, there is no separation between the client and staff regarding who is doing the work and who owns the access.

At one of the centers during the first part of the research, a middle-aged couple came in to send e-mail to their daughter in the United States. There was something about their comportment signifying the importance of the occasion. There was a sense of ceremony around them, starting with the clothes they wore (all dressed up) and spoke in a hushed and reverential tone to the receptionist at the centre. They had written up the message on a lined paper, which they held as if of great value. Their inability to use the technology or lack of access from their home did not appear to pose any obstacle in their perception of the momentousness of the event. Rather, they appeared to perceive their ability to pay for the service, and more importantly, their being the parents of someone who lives in the United States and has Internet access as setting them apart from “ordinary” people on the street. In passing, one notes that these scenes had disappeared during the follow-up research. As a result of the intense diffusion of cell phones, these parents in 2007 were more likely to be speaking with their daughter on their cell phones than send an e-mail.

The growth of both mobile telephony and fixed lines has, unsurprisingly surpassed that of Internet subscription in the country. Access to cell phones is relatively cheaper and easier. But more importantly, it is a standalone technology (even though it still requires electricity to charge the battery). The Internet, on the other hand, relies on electricity, computer, modem and telephone connectivity. While broadband wireless connection to the Internet bypasses the telephone infrastructure, it also depends on electricity and is mostly available in large business organizations and cyber cafés. Not

many Nigerians can afford dial-up access to the Internet from home and fewer still can afford wireless Internet access or a computer.

Besides its relative affordability and accessibility, the cell phone does not depend on any level of literacy – a major hindering factor to wider diffusion of the Internet in the country. Indeed, some of the cell phones available in Nigeria have been customized such that even those who cannot read or dial numbers can use them. For instance, stored phone numbers have images that are linked to individuals so that when the phone rings, a user can recognize the image and know who the caller is even if s/he cannot read the numbers. One of the principal actors in Nigeria's ICT industry said at an interview in January 2007 that his company was beta-testing a product that would allow actual photos of family members and friends to be linked to phone numbers. When a call comes in, the photo of the caller pops up on the screen. To dial, the user can press a button and a list of the photos comes up and s/he pushes another button that dials the selected person. The product was expected to be commercially available by April 2007. There are also voice-activated phones that again provide a detour for literacy constraints.

The cell phone is further attractive because there are no charges on incoming calls. This has itself given rise to the phenomenon known as “flashing” where someone dials another person's number but quickly hangs up right after the first ring. That call is free but a user succeeds in alerting the other party who then can choose to call back – or not. This makes it possible for younger people, especially students, to have cell phones without paying for the cost of every communication. This is also why the most popular cellular service plans are the pay-as-you-go or prepaid packages. As much as 95% of cell phone subscriptions in the country are prepaid plans (ITU, 2006). Also, the networks enable automatic text messaging (unlike in the US where users have to subscribe to SMS or pay much higher costs to send and receive text messages). To make it more attractive, it is cheaper to send text messages than to make voice calls, and all incoming messages are free. (For further analysis, see Akpan-Obong and Foster, 2007.)

Prior to the ubiquity of cell phones in Nigeria, the spread of cyber cafés was a welcome relief for many Nigerians but particularly those who have relations living overseas. It was a fairly easier way to stay connected with relations. Many Nigerians in the Diaspora may still remember the first e-mail they sent to Nigeria or received from home and the attendant excitement. The process initially was challenging too. Ibukun Odusote, the woman known as the “Mother of the Internet in Nigeria,” was one of the first people in Nigeria to have direct access to the Internet in 1991. She recalls her own excitement when she received her first e-mail from a colleague in South Africa. She eventually became a communication conduit for many Nigerians in the Diaspora who would send e-mails to their friends and family in Nigeria through her. She would print out the e-mails put them in envelopes, address and go around Lagos to deliver them, at her own cost.

Those sending e-mail to Odusote had no idea about what she had to do to deliver them. They were just excited that they did not have to go through Nitel anymore. Reaching people in Nigeria from abroad by phone was a constant nightmare. As I wrote

elsewhere, calling Nigeria from Canada and the US, for instance, was usually an all-day day event.

It wasn't too long ago that we spent hours on the phone trying to get through to Nigeria. In many cases, we would call a number and ask the person to travel across town to bring someone else to the phone. We would arrange for the day and time to call. Sometimes, it worked and the connection was made. Many times, it didn't. It was either the person was waiting but we couldn't get through; or we connected but the person wasn't there. (Akpan-Obong, 2007)

Now, all that one needs to do is pick up the phone and dial a Nigerian number. While there are still some kinks in the system and poor connectivity, a call usually goes through after a few attempts. Interestingly, it is usually easier for Nigerians to call international numbers from their cell phones than for Nigerians in the Diaspora to call Nigerian numbers. Still, it is obvious that communication is much better now, all things considered.

**ICTs and new social cleavages:** While the diffusion of the cell phone indicates equal access in greater degree than ever before, these developments are also generating different social dynamics in ICT usage in general. For instance, accessing ICTs in cyber cafés shows an important development in the ways Nigerians engage with ICTs and emerging class cleavages. In the cyber cafés, people perceive their access to and use of these technologies as functions of either equality or entrance into a higher internally constituted socio-economic class. Given the cost of access to these technologies and the geographical locations, only the fairly wealthy and urban dwellers can use them. During the research for this paper, it was observed that this economic, social and geographical disparity may lead to new class cleavages though it is too early to know if the new class formation would break away from earlier indices of class distinctions such as education and property, reinforce them or create new ones.

Among “e-mail operators,” their knowledge of the technologies sets them above the level of those who come in to pay for their services. The relationship dynamics changes depending on the location of the cyber cafés and the class of the clientele. In one centre opposite a university campus, most of the clientele were university students and faculty. Their membership in the university community across the street defined the terms of the relationship between them and the staff. In some cases, this relationship was adversarial (like when the client refused to pay for services, complaining that the connection was too slow and he did not complete his transaction) or servile/domineering (when the client was a professor).

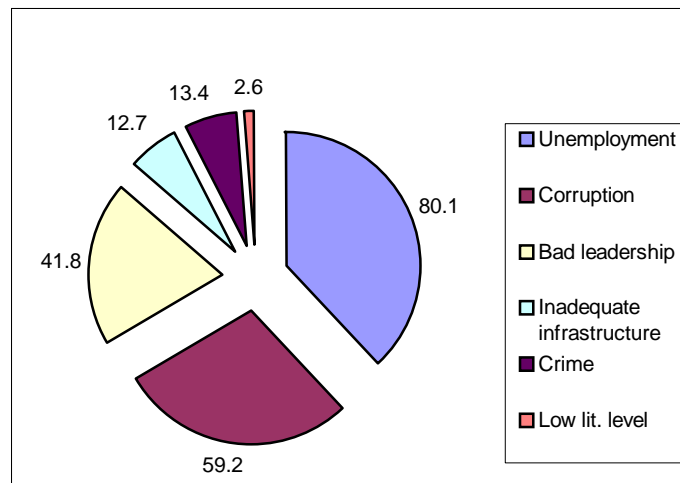
In bigger cities such as Lagos where the clients were more affluent and educated, they related to centre staff with the superiority that their socio-economic class privileges them in other situations. However, the reverence shown the client by center staff was mediated by their knowledge that a “real Oga” (“big man”) was more likely to send out his/her personal assistant, secretary or messenger to do whatever needed to be done in a cyber café (such as e-mailing and web search) to avoid mingling with the masses. A

“super real Oga” would have the facilities in his office with his personal assistant running their operations. But as the follow-up research shows, even this is changing. The “Oga” and “Oga Madam” can maintain their position in the socioeconomic hierarchy by the kinds and number of cell phone that he uses. While anyone can have a phone, line and SIM card for N5,000, ironically not many people want to spend so little on the technology. Status is now associated with the expensiveness and sophistication of a cell phone.

### ICT4Dev: Emerging Issues

In the first part of the research in 2001, participants in the questionnaire portion of the research were asked to choose from a list of ten issues what they considered to be the “three most important socio-economic concerns in Nigeria today.” The issues were: unemployment, inflation, low literacy level, corruption, poor health services, and inadequate infrastructure –such as electricity, communication facilities and pipe-borne water, bad roads – hunger, crime and bad leadership. More than 80 % of the respondents chose unemployment. Almost 60 % chose corruption and more than 41 % picked bad leadership. Three other issues – inadequate infrastructures, crime and low literacy level – were also selected.

Chart 1: Top most important socio-economic concerns in Nigeria (by percentage of times selected)



The ten issues were deliberately selected to reflect the objectives and aspirations of policy makers and Nigerians concerning the capacities of ICTs to generate socio-economic development in the country. They were used in constructing the statements in the matrix section of the questionnaire, included to find out the ways in which the statements of policy makers, especially as contained in the policies on ICTs, are reflected in societal beliefs and expectations about the possibilities of ICTs. This section was also aimed at providing the connections between the top most important socio-economic concerns in the country and the role of ICTs in effecting changes. A list of 11 statements beginning with “ICTs will ...” were read to respondents who were asked to indicate if

they strongly agreed, agreed, neither agreed nor disagreed, disagreed or strongly disagreed with each.

More than half of the respondents strongly agreed that ICTs would stimulate socio-economic growth in Nigeria, while 35 % simply agreed. Respondents also strongly agreed (by 38%) and agreed (by 41%) that ICTS would create employment, while 42% strongly agreed ICTs would improve their standard of living. About 32% of respondents strong agreed (and 31% agreed) that the technologies would raise literacy rates in the country. Many were however ambivalent about the capacity of the technologies to check corruption and inflation – two issues respondents identified as major socio-economic concerns in Nigeria. Some respondents wondered how ICTs could check corruption, with some suggesting that the technologies might actually open up new avenues for corruption in the country.

Table 1: Expectations of the potentials of ICTs (by percentage of respondents)

<b>ICTs will ...</b>	<b>SA</b>	<b>A</b>	<b>NA</b>	<b>D</b>	<b>SD</b>
Stimulate socio-economic growth	52	35	8	3	0
Create employment	38	41	13	5	1
Facilitate health delivery	36	44	12	5	1
Raise literacy rates	32	31	15	13	5
Check corruption	9	18	34	25	10
Check inflation	10	24	32	21	9
Reduce crime rate	14	28	19	24	12
Eliminate hunger	8	13	28	35	14
Solve the problem of bad leadership	12	25	18	28	13
Politically empower Nigerians	20	33	21	18	5
Improve my standard of living	42	40	9	5	1

*Legend: SA – Strongly Agree; A – Agree, NA – Neither Agree nor Disagree, D – Disagree, SD – Strongly Disagree*

Six years later, the issues have not changed but attitudes have. More respondents disagreed about the claims of ICTs than did in 2001. More than 80 % of respondents either strongly disagreed or disagreed that ICTs would achieve any of the objectives that constitute the matrix in Table 1. Notably, even among those who strongly disagreed or disagreed that ICTs had achieved the goals embedded in the statements said the technologies have affected their lives in the last five years. One correspondent who disagreed and strongly disagreed with all the statements except two – strongly agreed that ICTs stimulate socio-economic growth and agreed that the technologies create employment – said:

*At least I have improved a little about my knowledge of computers. Before I couldn't chat or search for information apart from sending or receiving e-mail.*

A respondent who agreed strongly with five of the statements also said the technologies affected him personally:

*They help me in business transactions. I can even talk abroad with ICT.*

(This was a reference to her ability to make calls over the Internet and on her cell phone.)

Another respondent who strongly agreed or agreed with eight of the statements also agreed that ICTs affected him in a personal way.

*It helped me in my gaining access to the outside world. It helped me in knowing and learning new things about my career.*

One respondent strongly disagreed with seven of the statements, disagreed with two and agreed with one – ICTs help to reduce crime rate in Nigeria – said the technologies did not affect her life because:

*The economy has not been stable. We need something more efficient and sustainable to put light into technology development.*

## **Conclusion**

This statement by one of 408 respondents to the questionnaire used for this research succinctly sums up the issues raised in this paper. Nigerians from all facets of the society are engaging with information and communication technologies, especially the cell phone. As at January 2007, there were 33 million connected cell phone lines in the country and it is estimated that the number has now reached 40 million (August 2007). There is growth, albeit less phenomenal, in other sectors such as fixed telephone lines and computer and Internet usage. In some areas, Nigerians have utilized these technologies for socio-economic activities. At the micro-level, this can be observed through operations of cyber cafés and computer villages.

While ICT usage in Nigeria is innovative in several areas, the evidence suggests that Nigerians have not significantly altered their traditional activities. In this sense, the technologies enhance, but do not transform, their routine activities. An important outcome of the interaction of technologies with the unique Nigerian context is the way they adopt new functionalities. For instance, the cell phone serves multi-purpose often different from its conceptualization at the site of design and production. Nigerians also innovate mechanisms to cope with what would have been structural constraints. For instance, flashing and SMS allow users to cope with the cost of making phone calls. Cyber cafés also expand access and ownership such that those who cannot afford a computer and Internet access at home can use the services of these commercial centers. Not only have the technologies acquired different or altered functionalities, concepts have also changed in definitions. For instance, access and ownership are understood as synonyms such that communal access to technologies also equates personal ownership.

As well, poor interconnectivity among telecom operators in the country has made ownership of multiple cell phones subscribed to different networks common place.

This paper shows how important it is for research in the ICT4Dev field to address the discourse from a micro-level perspective. This facilitates an understanding of how ordinary people engage with ICTs and their attitudes about the technologies. This research has attempted to do this by presenting and analyzing data on ICT usage in Nigeria and responses to a questionnaire administered to fresh college graduates in the country. An integrated analytical model of contextuality and structural analysis was applied to explain the outcome of the interactions between technology and context. This contributes to the wider research on ICT4Dev because it can facilitate an understanding of the unique evolution of technology usage in other countries, especially in the sub-Saharan African region. Further research can examine how different ICTs morph at the site of usage and what new forms and functions are created. It will also be interesting to see what structural constraints other African countries experience and their unique coping mechanisms.

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