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ABSTRACT

Most existing ICT for development (ICT4D) literature tends to focus mainly on design, transfer and implementation issues. There is limited focus on the impact of ICT projects on development and little concrete analysis of these initiatives in terms of their long-term developmental impact. In this paper, we use Sen's notion of capabilities as an evaluative space for ICT project assessment. We employed the freedom concepts of the capability approach to focus on the developmental impact of such projects. We based our evaluation on the Pre-paid Electricity Billing system in Nigeria. Our analysis shows that the pre-paid system failed to fully achieve its developmental potentials. The study concludes with some implications for policy makers advancing an agenda for" ICTs for Development."

Keywords: ICT, Development, Capability Approach, Developing Countries, Nigeria

INTRODUCTION

There has been an increasing investment in ICT initiatives in developing countries for social, economic and political development. Yet, the impact of these investments on development is difficult to determine. The ICT for development (ICT4D) literature is mainly limited to, and clustered around, design, transfer and implementation issues (Bhatnagar and Singh, 2010).

These studies tend to focus solely on the benefits of ICT infrastructure and on the identification of constraints within the structure of institutions in developing countries (Madon, 2004), rather than seeking to inform policy relating to areas in which ICT can serve more strategic and broader development goals (Kamel et al., 2009; Thompson and Walsham, 2010). Hence, there is a need to highlight the development aspects that characterize many ICT4D projects (Grimsley and Meehan, 2007; Thompson and Walsham, 2010). In addition, some of these studies have been criticized for lacking rigor, being descriptive rather than analytical and often lacking a concrete foundation around research methods (Heeks, 2010). Hence, there is a call for more theory-driven approaches to the evaluation of ICT impact (Heeks, 2010).

The majority of the world's population reside in developing countries, which are unable to provide adequate access to resources such as suitable housing, clean water, education and health facilities for satisfying basic human needs. Furthermore, due to the denial of political and basic civil rights, the majority of the people in developing countries lack the freedom to make choices in their own lives (Sen, 1999). This situation presents moral circumstances with which we should all be concerned (Walsham et al., 2007). This paper suggests a wider theoretical lens to help foreground the complexity and multiplicity of ICT development initiatives in developing countries. In particular, we draw upon Sen's (1999)capability approach (CA) to provide a theoretical lens with which to evaluate the scope and limitation of the developmental interventions surrounding the introduction of the pre-paid electricity billing system in Nigeria. The contribution of this paper is to it allow an evaluation of ICT4D projects by moving beyond the space that focuses on economic growth to consider and operate in the space that concentrates on the effective opportunities people have to achieve what they consider to be valuable in life.

The rest of the paper is organized as follows. The next section reviews the relevant literature on the relationship between ICTs and development, focusing on the concept of capabilities as the key concern of our study. This is followed by a section providing details of CA and some selected key concepts upon which the authors will draw to evaluate the impact of a development initiative in Nigeria to enable householders to have better access to a consistent supply of electricity. The research method, research setting and the analysis of the case are then presented. The final section concludes the paper and demonstrates implications for research and practice.

ICT AND DEVELOPMENT

An appreciation of the field of ICT4D cannot be complete without unpacking the notion of development. The optimistic camp argues that ICT will lead unproblematically to rapid economic development. Members of this camp suggest the facilitation of market mechanisms (e.g. deregulation, structural reforms, and privatization) as the means to economic growth in developing countries (UNDP, 2001). The more critical camp on the other hand suggests that ICT interventions need to shift from market driven economic reasoning to consideration of the social conditions that sustain it (Avgerou, 2003). This perspective suggests that the means towards poverty alleviation lie with improvement of basic healthcare, education infrastructure and reforms of government and bureaucratic structures (Ngwenyama et al., 2006; Ciborra and Navarra, 2005).

However, Sein and Harindranath (2004) note that the ambiguous findings and diverse opinions from both camps are due to a lack of conceptual clarity on the role of ICT in national development. They suggest that ICT needs to be conceptualized in its many facets, perceptions and its manifold impacts on societies. Walsham (2003) argues further that ICT is deeply implicated in the approaches we adopt in the name of "development." In this light, we see

Prakash and De (2007) who argue that the notions of development influence the choice of technology design and usage and unless these notions are consistent with the contextual dimensions, their desired consequences might not ensue.

Furthermore, the belief in the superiority of scientific and technical knowledge over indigenous knowledge and traditional practices continues to persist (Puri and Sahay, 2007).

This makes developmental initiatives problematic at the long run. The reason for this could be as a result of the ill-formulated intervention strategies that guide development (Soeftestad and Sein, 2003), or little consideration for the local factors that affect implementation and usage of systems when they are shaped in the context of more advanced nations (Maumbe et al., 2008). Decades of research that examines the role of ICT4D reveals that technology has failed to achieve its intended purposes (Heeks, 2002; Soeftestad and Sein, 2003) and there is not yet evidence to show that investments in ICT lead to economic growth and improvement of basic needs in developing countries (Avgerou, 2003; Akpan, 2003). This has led Walsham et al. (2007) to call for more emphasis on the aspect of development being pursued, which will be discussed in the following section.

THEORIES OF DEVELOPMENT

There has been a considerable debate over the definition, explanation and practice of development over the past few decades. However, it is not the intention of this paper to provide a universal definition of development – definitions are contextual and contingent upon the epistemological, methodological or ideological orientation of their purveyors (Simon, 1997) but rather to provide a brief summary of the different meanings of development and adopt an appropriate conceptualization that is applicable to this study. Historically, when the discourse of development began in the 1940s, progress was viewed from the perspective of economic growth theory that had occurred during the period of 1930s and the 1940s, predominantly in the western countries (Sen, 2004). This has been exemplified with the universal use of gross national product (GNP) or per capita income to measure development outcome.

Overtime, in the post-World War II era, the debate on development centered on modernization, dependency and of late, human-centered development (Anand and Sen, 2000; Schuurman, 2000; Simon, 1997). The modernization theories were very prevalent in 1950s and 1960s with prescriptive assumptions about how states emerging from colonialism could achieve "modernity" (Akpan, 2003). In this view, poorer countries can become more developed by following the path already taken by more developed countries who have utilized the power, the availability of capital, a skilled workforce and an entrepreneurial class to achieve growth (Sein and Harindranath, 2004). This view of development has enjoyed a long-standing dominance on the account of the power of its institutional advocates (Simon, 1997) and has been adopted by international agencies, national governments and global powers such as the World Bank and the International Monetary Fund (IMF) in promoting developmental initiatives in countries under their support (Zheng, 2009).

While concentrating on internal constraints to development, the structure of the international political economy and the ways in which it negatively affected the development efforts of countries in the south were over looked by modernization theorist. To correct this "oversight", the dependency theory emerged in the late 1960s and 1970s from the work of Raul Prebisch then the director of the United Nations Economic Commission on Latin America and his colleagues while they were assessing the trickle down effects of economic activities in rich nations on the economy of the poorer nations (Ferraro, 1996). Their study suggested that the process that leads to economic growth and development in developed countries results in the under-development of the poorer countries, which are mostly formerly colonized countries

through the debt trap, negative terms of trade and technological-industrial dependency (Akpan, 2003). In this view, under-development of poorer nations is not accidental; rather, it is caused by the forces that enriched the rich nations (Ferraro, 1996).

In addition, both the modernization and dependency theories are based on economic growth models. Their implementation are typically top-down with limited participation of the beneficiaries of development (Chakravarti, 2005). Late in the 1970s, there was increasing evidence to suggest that only a few poor countries had managed to restructure their economy, increase their growth rates and take advantage of the benefits of technological and scientific advancement (Madon, 2000). The majority of poor countries were unable to attain economic growth as they were faced with growing indebtedness, social inequality, increased poverty and environmental damage (McMichael, 1996).

By the end of the 1990s, international agencies such as the World Bank, IMF and others began to review their understanding of development, and acknowledged that its current policies were not having significant impact on poverty reduction (Frediani, 2007). These experiences have contributed over the years to the redefinition of the goals of development with much greater emphasis on non-economic aspects, which focus on the creation of conditions that support the realization of human well-being and freedom (Escobar, 1995; Sen, 1999; Madon, 2000). This approach is called the human development approach, and it acts as an alternative to the economic growth theories discussed above. The focus of this perspective is on building capacities and creating societies where individual potential can be realized (Prakash and De, 2007). This development approach resonates from Amartya Sen's capability approach (CA), which focuses on the expansion of human freedoms both as the primary end and as the primary means of development (Sen, 1999). According to Jolly (2010), the CA is more flexible, less dogmatic, and is multi-disciplinary and clearly directed to long-term international goals of sustainability, stability, equity and human rights. The approach has been adopted by the United Nations Development Program (UNDP) and is reflected in the UNDP report on human development published annually since 1990 (HDR, 1990).

In information systems (IS) studies, most ICT4D researchers often explicitly or implicitly take the perspective of development as economic growth and/or modernization (Zheng, 2009). This paper intends, however, to shift from the dominant perspectives (modernization and dependency) and to explore the value of a human development viewpoint in the discourse on ICT and development. The conceptualization of development as proposed by Sen would be used as the theoretical basis of this paper.

SEN'S CONCEPTUALIZATION OF DEVELOPMENT: THE CAPABILITY APPROACH

Sen's (1999) CA, which concentrates on what people are effectively able to do and be, informs the theoretical approach in this paper. The CA is essentially concerned with "freedom," which in a broad sense refers to the effective opportunities people have to live the kind of lives they have reason to value. This contrasts with other philosophical approaches that focus on people's income, expenditure and consumption (Robeyns, 2005). The CA is used in a wide range of fields, most prominently in development studies, social policy, welfare economics, and political philosophy. In IS studies, very few authors have applied the CA (Madon, 2004; Zheng, 2008; De, 2006). This could be as a result of the difficulty to find a balance between its conceptual richness and its potential to be operationalized for development research and practice (Kleine, 2010).

While Sen's CA has identified the need to expand beyond the dimension of income deficiency for the conceptualization of poverty, he has not specified a list of valuable capabilities or

functionings. This has attracted criticisms that it is an unworkable idea, incomplete and unspecified (Robeyns, 2005; Nussbaum, 2000). Sen intentionally resists prescribing a set of capabilities, rather he emphasises the need for a democratic process to identify the list of valued capabilities that are culture and context sensitive. As such, this study adopts the interpretive approach to help explore the context and culture dependencies of the capability approach which corroborates Sen's view. In the next section, we review some key concepts of CA that is relevant to this study.

KEYS CONCEPTS OF THE CAPABILITY APPROACH

Functionings and Capabilities

Capabilities have been referred to as what people are effectively able to do and be (Robeyns, 2005), or the freedom that people have to enjoy valuable beings and doings (Alkire, 2005). These beings and doings are referred to as functionings and are constitutive of a person's wellbeing. Examples of functionings are various states such as being healthy, being literate, resting, being able to travel and so on. Robeyns (2005) explains that the difference between capabilities and realized functionings is between the freedoms or valuable options from which one can choose on one hand and achievements on the other. Moreover, Alkire (2005) noted that it is important to concentrate on capabilities rather than functionings because people value free choice. For example, a person who is fasting is in the state of under nutrition, which may be likened to a person who is starving. But in the one case, the person fasting could eat and chooses not to; whereas, the starving person would eat if he/she could (Alkire, 2005).

Well-being and Agency

The CA recognizes the importance of both agency freedom and well-being freedom. A person's capability can be evaluated in relation to his/her well-being whether defined in an elementary fashion (nutritional status) or in a more complex manner (self-esteem). Therefore, Sen (1999) speaks of well-being freedom or well-being achievements. Or capability can relate to agency, one's ability to pursue and realize the goals that he/she values and has reason to value. According to Sen (1999), an agent is someone who acts and brings about change as opposed to someone who is forced, oppressed or passive. Hence, Sen also speaks of agency freedom or agency achievements.

The distinction between agency and well-being and between freedom and achievement can be clarified with an example. Let us suppose Paul and Collins are both successful sports athletes in the United Kingdom. Paul now decides to represent England in the commonwealth games in Nigeria for two weeks where he will have to face life-threatening situations due to political instability. He thus makes the choice of trading-off an aspect of his well-being (facing life threatening situations) to exercise his agency freedom (representing England). Collins shares the concern with the high rate of kidnappings in Nigeria, but chooses not to sacrifice his achieved well-being (stable life situation) for these agency goals (representing England).

Freedoms and Unfreedoms

Freedom refers to the effective opportunities people have to live the kind of lives they have reason to value (Sen, 1999). Poverty refers to lack of freedom, unfreedom, thus development requires the removal of major sources of unfreedom such as systematic social deprivations, neglect of public facilities, tyranny or poor economic opportunities. According to Sen (1999), the freedom centered approach is generically similar to the "quality of life" approach, as both focus on the choices humans have and their capacity to exercise them and not merely the income or resources that person commands. Freedom is central to development process for

both effective and evaluative reasons. The effective reasons concerns achievement based on the free agency of people to do things he/she values while the evaluative reason concerns an assessment of progress primary in terms of whether the freedoms that people have are enhanced (Sen, 1999).

The relation between individual freedom and the achievement of social development goes well beyond the constitutive connection – important as it is. What people can positively achieve is influenced by political liberties, social powers, economic opportunities, and the enabling conditions of basic education, good health and the encouragement and cultivation of initiatives (Sen, 1999). In addition, Sen (1999) noted that the institutional arrangements for these opportunities are influenced by the exercise of people's freedoms, through the liberty to participate in social choice and in making public decisions that impel the progress of these opportunities.

Roles of Freedoms

In his well-known book Development as Freedom, Sen (1999) argues the expansion of freedom as both the primary end and the primary means of development. They can be called respectively the "constitutive role" and the "instrumental role" of freedom in development. The constitutive role of freedom relates to the importance of substantive freedom in enriching human life. The substantive freedom includes elementary capabilities like being able to avoid such deprivations as starvation, under-nourishment, escapable morbidity, premature mortality, as well as the freedoms that are associated with being literate and numerate, enjoying political participation and uncensored speech and so on (Sen, 1999). The instrumental role refers to the means of achieving development and the overall freedom people have to live the way they would like to live.

Sen (1999) proposes five distinct instrumental freedoms that directly or indirectly enhance the capabilities of people. They include: political freedoms – freedom of expression and participating; economic facilities – freedom to participate in economic activities; social opportunities – entitlements to health and education; transparency guarantees – freedom to interact with one another under guarantees of disclosure; and lucidity and protective security – social safety nets for preventing the affected population from being reduced to abject misery. According to Sen (1999), these instrumental freedoms supplement one another, and can furthermore reinforce one another. For example, the provision of social opportunities, such as health and education, can enhance people's participation in policy making. In addition, Sen (1999) argues that the extent to which the five instrumental freedoms are secured is informative about the level of development of an individual, household, or community. In this paper, we examine how Sen's instrumental freedom might be interpreted and applied to the context of the prepaid billing system to ascertain the developmental impact of the project. The "incompleteness" of the CA is seen as a major strength for this study as it allows the application of the approach to be used in a different context without losing its philosophical fundamentals.

METHODOLOGY

An interpretive approach was adopted for this study. The research was carried out at the headquarters of the Power Holding Company of Nigeria (PHCN), which is in charge of governing the use of electricity in Nigeria. Data collection was conducted via semi-structured interview. Sixteen face-to-face in-depth interviews were conducted and recorded with various key players (see Table 1) in order to ascertain the impact of the system on the activities they

value the most. Each interview lasted approximately one hour, and was carried out within a month during the research fieldwork in August 2010.

Table 1 Participants interviewed

Participants Interviewed	Reasons
Head of Technical Operations	Explore his views of the project at operational and management levels
Five PHCN staff	Explore their views based on the direct involvement in the IS implementation
Two Contractors	Explore their views based on the direct involvement in the IS implementation
Eight electricity consumers	To get information about their perspective of the system and ascertain impact

The participants of the study were selected based on snowballing and convenience sampling (Bryman, 2001). Snowballing sampling is made with a small group of people who are then used to recruit other people and the convenience sampling is making selection based on opportunity (Bryman, 2001). Interview transcripts were iteratively read and re-read to identify categories from the data. The categories were then organized and linked to the theoretical concepts.

CASE STUDY

The Nigeria Context

Nigeria is the most populated developing country in Africa with approximately 140 million people (NPC, 2006). The country has been under the influence and control of the British until 1960 when it gained its independence. Since then, the country has passed through a series of democratically elected and military regimes with attendant political, social and economic instability (Uhegbu, 2004). Successive government policies have been articulated against this backdrop of political, economic and social instability. There is a lack of continuity with each new regime implementing completely new policies. This instability has contributed to poor infrastructural development and economic growth and its effect on national development can be reflected in poor social arrangements such as power supply, healthcare and education, high levels of corruption and a low gross national income (GNI) per capita of $1,160 (Mursu et al., 2000; World Bank, 2009).

However, Nigeria recognizes the importance of ICTs for development, which was reflected in its National Policy for Information Technology (NNPIT, 2001). The vision statement in the policy document anticipates: "to make Nigeria an IT capable country in Africa and a key player in the Information Society by the year 2005, using IT as the engine of sustainable development and global competitiveness." The government established the National and Information Technology Development Agency (NITDA) to undertake the implementation of this policy. To achieve the vision, ICTs need to be used in the areas of health, education, poverty eradication, creation of wealth, job creation and global competitiveness in order to improve accessibility to public administration for all citizens and bring transparency to government processes within the country (NNPIT, 2001).

Electricity and the Power Holding Company of Nigeria (PHCN)

Electricity plays a very significant role in the socio-economic and technological development of every country. Uninterrupted power supply is the hallmark of a developed economy. Any country with an epileptic power supply suffers development setbacks and risks losing potential investors. It is widely accepted that there is a strong correlation between the availability of

electricity and socio-economic development (Sambo, 2008). The history of electricity production in Nigeria dates back to 1896 when electricity was first produced in the city of Lagos, 15 years after it was introduced in England (Okoro and Chikuni, 2007). Despite the fact that electricity has existed in the country for over a century now, its distribution and generation has been at a very slow pace.

For over 20 years prior to 1999, the power sector did not witness substantial investment in infrastructural development (Sambo, 2008). During that period, new plants were not constructed, and the existing ones were not properly maintained, bringing the state of power generation and distribution to an impoverished level. In 2001, electricity generation dropped from the installed capacity of 5600 megawatts (MW) to an average of about 1750 MW, as compared to a load demand of 6000 MW (Sambo, 2008). Also, only 19 out of the 79 installed generating units were operating. Regrettably, the majority of Nigerians have no access to electricity and the supply to those provided is irregular. This is even more chronic in rural areas where the lack of access has negatively affected the local economy and the growth of small industries and businesses, which would have served as an important source of employment and income (Ikeme and Ebohon, 2005).

In the urban areas, the epileptic and erratic power supply has severely affected economic expansion resulting in the collapse of businesses which cannot sustain the high cost of maintaining private generating plants, and a subsequent loss of jobs associated with these failures (Ikeme and Ebohon, 2005). The Nigerian experience draws attention to the importance of electricity for economic development especially for a developing country and the prevailing importance of enhancing the operations of the electric power industries if they are to effectively boost the economic development process (Ikeme and Ebohon, 2005).

Background to the Introduction of the Pre-Paid Electricity Billing Project

It is this backdrop that led the federal government to embark on an aggressive power sector reform with the aim of resuscitating National Electric Power Authority (NEPA) and making it more effective, efficient and responsive to the growing populace. In 2000, the Nigerian government adopted a holistic approach of restructuring the power sector and privatizing the business units of NEPA (Okoro and Chikuni, 2007). NEPA was unbundled into seven generation companies (GenCos), one transmission company (TransysCo), and eleven distribution companies (Discos). This was done to break NEPA's monopoly and allow the entry of independent power producers (IPPs). In 2004, a new structure came into effect called the Power Holding Corporation of Nigeria (PHCN) (Okoro and Chikuni, 2007), and in 2005, the Nigeria electricity regulatory commission (NERC) was established with the responsibility for tariff regulation and monitoring the quality of services of PHCN (NERC, 2009).

A major problem faced by PHCN was how to collect its revenue. Electricity consumers, both individual and corporate, had defaulted on their electricity bills. This drove PHCN to adopt alternative methods of collecting revenues. Before the introduction of the pre-paid billing meter, PHCN were using the analogue electric billing and fixed billing meter. With the analogue billing meter, the meter records the amount of power consumed after which a bill is sent to the consumer for payment. However, PHCN officials did not consistently record monthly meter readings. Hence, some consumers did not receive their bills at the appropriate time while some received over-estimated bills that they found difficult to pay. Another group of consumers that did not own meters used to get monthly fixed bills that did not reflect how much electricity they consumed in a month.

PHCN was also accused of inefficient and corrupt practices such as collecting bribes from consumers before their electricity was reconnected. Hence, PHCN officials were violently

prevented from disconnecting consumers with outstanding arrears. Some frustrated consumers would go as far as making illegal connections to get power. Some even left their electrical appliances switched on even when not in use so as to psychologically compensate themselves for the high billing rate and sporadic power supply. To put it simply, when consumers manipulated meter readings, tampered with the meter or made illegal connections directly to the distribution line, PHCN would lose revenues needed for maintaining existing systems, connecting new consumers and building new plants. Due to revenue loss and the huge debt owed by consumers, PHCN introduced a cash collection policy called Revenue Cycle Management (RCM) that involved using private organizations such as designated banks in the collection of money paid. Thus, consumers were expected to pay their bills at their banks. This was to facilitate regular and prompt payment of bills, since consumers did not need to travel far outside their area to settle their outstanding bills.

At that time, the presentation of a PHCN bill was a pre-condition for opening a bank account. However, many still claimed they were too busy to visit the banks in order to settle their bills. PHCN carried out an aggressive media campaign to persuade consumers to pay their bills through television, radio, and billboards. However, this did not yield the expected results; hence, the pre-paid billing system was introduced in 2006. With the prepaid system, consumers purchase a prepaid voucher containing a 13 digit personal identification number (PIN) similar to a pre-paid credit card at any PHCN distribution center. The consumer keys in the 13 digit PIN to the prepaid meter, and if it is valid, the prepaid system accepts the vouchers and adds electricity credits to the consumers account. The consumer consumes electricity until the system runs out of credits, at which point the system interrupts electricity supply. The PHCN's prepaid billing system has a similar working mechanism as the PAY AS YOU GO mobile.

Consequences to PHCN, the Consumer and Electricity Consumption Patterns

Prior to the introduction of the prepaid billing meter, PHCN officials would normally visit every consumer's house, read their meter and send them their bill. Sometimes, these bills were over-estimated and sent to the consumers. But, with the new prepaid system, consumers no longer felt cheated as they paid only for the energy they consumed, thus they paid their bills more regularly. The new pre-paid billing system was also a cause for concern to consumers. There were complaints that the new system had introduced new forms of extorting money from the consumers. PHCN officials were reputedly reluctant to install the pre-paid meters because it blocked one of the profitable avenues of making illegal money. Hence, if consumers wanted the meter installed, they needed to pay a large bribe or else they would have to continue with the analogue meter. A consumer stated that:

> "I applied for the new meter for over two months but they never came to fix it. I just visited the office and one of the staffs explained to me the matter. So to avoid further delays I tipped one of the PHCN officials to get the new meter or else PHCN will continue cheating me."

Despite this, the project has been beneficial in terms of education. Suppliers took advantage of the project by educating both staff and consumers on the usage of the prepaid billing system and its benefits. Other various campaigns were also used to create awareness of the new system through the use of media such as posters, billboards, radio and television. The media campaigns were also successful in prompting citizens to exercise their right to access electricity. The PHCN in collaboration with the National Power Training Institute of Nigeria (NAPTIN) provided training workshops with regards to the new system. Apart from the staff, the consumers noted that they had now acquired valid knowledge through the practical experience gained from using the prepaid meters. For example, having received the prepaid

meters for the first time, householders used trial and error methods to determine which appliance consumed the most electricity by plugging and unplugging electrical appliances and switching them on one by one and watching the meter to see how quickly the units got used up. As a result, householders learnt new consumption patterns and ways to save electricity. On the other hand, some PHCN officials were using their skills they learnt in a fraudulent way. Some consumers connived with PHCN officials to temper with prepaid system by programming it in such a way meter readings are not reflected on the main server. Consumers either pay far less of what they should have paid on an accurate billing or sometimes nothing. One consumer admitted that:

> "I can't afford electricity tariff because I am jobless…I paid the technician and he programmed the system in such a way that all the electricity coming into the house doesn't read on the PHCN server".

When asked concerning this issue, a PHCN official indicated that:

> "Many of the PHCN staffs have been working for 10 years and are yet to be confirmed as permanent staffs. They are frustrated with the little pay they received and look for other avenues to make money".

Consequences to PHCN, the Local Community and Supporting Enterprises

In order to assist in the distribution and connection of the pre-paid systems, native contractors were hired to supply the pre-paid billing meters and other electrical equipment. Also, ad hoc electricians, who were locals, were hired as independent contractors working for an indigenous electricity subcontractor that supported PHCN operations throughout the country. These electricians were usually roadside electricians with no formal education but had acquired their skills through vocational training. However, during the bidding process of the project, top PHCN officials and politicians contracted the jobs for the supply of computer equipment to friends and relatives. One of the contractors stated:

"With the help of my friend who is a top politician, my company was able to secure the job."

Another contractor who failed to get the contract stated:

> "It is normal you need to put your people as priority because Jama'ar ka su ne arzikin ka, meaning [your wealth is measured by the amount of people you have]"

One official noted the importance of remaining significant in family relationship by stating:

> "This is a way I can keep my relevance amongst my friends and family...if I don't help them then who will?"

Another consumer stated:

> "What goes around comes around…if my friend doesn't help me, then one day if he comes back asking for help I will reject him."

System Design Issues and Political Consequences

Many of the respondents felt let down by PHCN and their councillors. The citizens expected to be provided with adequate information about the billing system; however, in our study, the design of the prepaid billing system allowed fewer opportunities for citizens to voice their opinions concerning system outcomes such as information and documentation, budgets and the allocations of funds. Arguably, none of the stakeholders from the demand side were included in the requirements and design of the pre-paid meter. Many of the respondents

interviewed noted that, they had never heard of the new system until the community councillors informed them that the analogue meter was going to be replaced with the prepaid meter. Citizens rely on councillors for most of their community needs because they provide a significant link between the local authority and the communities that they serve. The respondents felt that PHCN had decided only to convince ward councillors to legitimise the prepaid meter project. Questions were raised regarding the intentions of the councillors, which resulted in the loss of confidence in the mandate given to them. The stakeholders from the supply side such as the Government, PHCN and the contracted firms were the only ones in charge of the entire design and implementation of the system. When asked about this issue, the head of technical operations stated:

> "During the system demonstration forum, which involved all stakeholders, there were a lot of conflicts and disagreements concerning the system that were too much to handle. As a result we didn't want to involve the members of the public, because we felt there would be an increase in conflict and disagreement that could slow down the system design and implementation."

Several consumers mentioned that since the councillors won their elections, it was now more difficult to find them since many of them spent more time serving various party political interests rather than the interests of the community in general.

> "We voted them (councillors) in, but their interest is not for the community, but their personal gains. We only accepted pre-paid because we were desperate for a better electricity supply (consumer)."

CASE STUDY ANALYSIS AND DISCUSSION

Drawing on the human capability approach to development, Sen's five instrumental freedoms were used as pillars for the case study analysis with the aim of understanding the developmental impacts of the prepaid billing system.

Economic facilities

In terms of economic facilities, the introduction of the pre-paid billing system resulted in the boost of economic activities of the communities affected. Locals could benefit from this intervention in the form of temporary employment and wages in return for supporting PHCN operations during the installation of the pre-paid system. On the other hand, the case also reveals a major issue affecting the conduct of economic activities in the country. There was a high rate of nepotism and favouritism. For example, many PHCN officials and top politicians contracted the jobs for supply of IT equipment. On one hand, it gave PHCN officials the opportunities to help their friends and families and also keep their relationship intact. On the part of the friends and relatives, it enhanced their capabilities of participating in the economic activities, accessing electricity services and also maintaining existing relationships with friends and family members. On the other hand, citizens who did not have contacts in PHCN were unable to secure the contract for the job, thus depriving them the freedom to participate in economic activities. In Nigeria, nepotism and favoritism is systematic and a cultural norm. It is expected that every individual who has the power should help his relatives and friends or else he is regarded as a foe in the society. In our case, results show that in the subject of economic facilities and from the human development perspective, the project has not enhanced the capability of Nigerian people at least to a level that shows clear positive outcomes.

Transparency guarantees

Transparency guarantees have a clear instrumental role in preventing corruption, financial irresponsibility and underhand dealings. In our study, the prepaid billing system was designed in such a way that consumers could see the amount of electricity they consumed and thus ostensibly developed enough confidence in the system to start paying their bills, monitoring their consumption and modifying their behaviour. Thus, it could be argued that consumers were afforded some transparency. However, the case also reveals a key deficiency that contributes to the capability deprivation of Nigerian citizens to have better access to an electricity supply. The high level of poverty in the country raises corruption and other illegal activities. PHCN staff and electricians are paid very low wages and as a result saw an opportunity to earn money, though fraudulently, by only issuing prepaid system to citizens who were willing to pay a bribe. Consumers who were unwilling to pay the bribe would have to continue facing the challenges of the old manual meter such as over-estimated billing and the hassles of connection and disconnection. The case illustrates that poverty led to illegal activities such as bribery that, in turn, increased mistrust towards the PHCN officials and the pre-paid billing system, resulting in people's unwillingness to use it. In relation to this point, considering the issues mentioned so far, it is clear that poverty has undeniable effects on Nigerian citizens, their decisions (e.g., to work for less or to give/receive bribes), their job opportunities and so forth that consequently influence the installation and utilisation of the pre-paid billing system (in our case) that has resulted in an inability to properly take advantage of the ICT intervention.

Social Opportunity and Protective Security

While the freedom to learn the new system has a parallel to Sen's social opportunities, the freedom to save energy is a direct parallel to Sen's social opportunities and protective security. According to the human development approach mentioned earlier in the literature and the findings of the case study, the formation of capability was suitable and had several positive outcomes for citizens, since PHCN tried to enhance the knowledge of staff and consumers by training them. Besides, consumers now learnt new ways of saving electricity which immensely contributes to a sustainable environment. However, the second part of social opportunity, which is related to how people make use of their knowledge, raises concerns. Due to the high level of poverty in the country, many PHCN officials who have a very good knowledge of the system connived with consumers by tampering with prepaid meter in a way that actual electricity readings are not programmed correctly to the main server. As such, consumers pay less or even nothing. This confirms that despite the positive outcomes the social opportunities may have brought, the overall effect has not been entirely successful.

Political Participation

With regard to political participation, people's participation in the overall level of governance is of great importance. However, the decision to initiate the pre-paid billing project was without citizens' consent. Policy making was in a top-down fashion and councillors failed to reflect the interest or desire of the community they were meant to represent. Some councillors, perhaps, did not feel a sense of responsibility to represent their communities since they were not elected in a free and fair election. The 2007 elections in Nigeria were marred with violence and irregularities, which allowed councillors to assume office even though they were not the people's choice. Therefore, in our case, Nigerian citizens suffered deprivation of agency freedom in terms of being able to participate in public affairs. Our findings correspond with Ciborra and Navarra (2005) concerning a need for the reforms of bureaucratic and government structures to enable government interactions with citizens. The

pre-paid billing system objectives were specified particularly on the basis of governance reform, with its supply side perspective, rather than on the basis of human development; that is, taking the needs of the demand side into consideration. Thus, Nigerian citizens suffer deprivation of agency freedom in terms of being able to voice their opinions. This, in turn, had adversely affected people's capability to monitor government activities and expenditures during the project initiation.

DISCUSSION AND CONCLUSION

In this paper, the authors examined the developmental impact of ICT projects by concentrating on the introduction of the prepaid electricity billing system in Nigeria to enable citizens have access to electricity supply. The study was informed by Sen (1999) capability approach, which was used to highlight the extent to which the prepaid electricity system contributed to enhancing people's freedom to participate in developmental activities and then derived some implications on economic development. It also sheds light on the "relational features" of capabilities. In other words, a capability in one space is often related to capabilities in another space. The capability failure of consumers to be involved in the system design gave rise to their exclusion from being integrated into the policy making of the project. This, in turn, contributed to capability failure of consumers to monitor the government activities with regards to the project.

Furthermore, the introduction of prepaid billing system has provided consumers the freedom of transparency with the elimination of estimated billing. Despite this, corrupt PHCN officials were still collecting bribe from consumers to have the prepaid system installed in their homes. Hence, government policies need to move beyond the distribution of ICTs to the consideration of the local conditions that enhance people's freedom to pursue a life that they have reason to value, including participating in economic, social and political activities.

Finally, the CA approach has been criticised of been difficult to operationalize in an empirical setting. However our study substantiates the argument of Zheng (2008) that key concepts of the approach can be used as sensitizing devices in analysing empirical cases. In suggesting the potential for future research, the limitation of this study is recognised. The study was limited in that only a single focused case study was undertaken under sever time limitations; however, there is scope for undertaking a longitudinal study on the basis of current result to further provide insight on developmental issues as the country continues to expand the implementation of the prepaid electricity billing meter. The findings of the study cannot be generalised; however, the concepts can be developed further and explored in similar research settings.

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