The Explosion of Mobile and Wireless Technologies – An Opportunities for Mobile Government to Speed up Service Deliveries: A South African Perspective

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Abstract : *In this paper, we investigate the rapid surge in mobile and wireless technologies, and mobile phone in particulars. We also outline four emerging application areas where mobile technologies hold great potential for mobile government to catalyze government effort for rapid service deliveries. We conclude by highlight the lack of research on mobile technologies in the social science, and the need to rapidly expand efforts in this research area.*
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1. The Emergence of Mobile Technologies in Africa

In the late 1990s the African public was obsessed with the internet which was experienced through the desktop Personal Computer (PC) and dial up modem. Although, it was very expensive to manage this but because many internet users in Africa wanted to keep up with the pace of technologies advances, it left Africans with no choice. Those who took the advantage of this are the Universities, research institutions, corporate business and some government functionaries. However, in the early 2000s came the emergence of mobile communications and computing technologies ("mobile technologies") which actually outpaced the Internet and the PC. This was because the price of owing a PC is expensive couple with the cost of maintaining the internet. By this, mobile devices have become the computers of Africans. Therefore the rate of the growth and diffusion of mobile technologies in Africa cannot be underestimated. However, until recently there was little notice of this trend in the media, and it remains largely unexplored by researchers.

Recent data (Hannah, B, 2009) highlights the spread of mobile technologies in Africa as far larger and more important socio-economic phenomenon than the spread of the internet. According to industry reports, by 2009 mobile phones were being shipped annually than automobiles and personal computers in Africa. This is simply because in Africa, mobile phones have becomes the computer of Africans – a situation that is not seen as digital divide any more but digital difference (ERMB, 2009). Also, De Bruijn et al (2009) argue that, in Africa, mobile cellular phone is considered as a thing of luxury and as tool of prestige, but also as something with much practical value.

Recent reports prove that in South Africa there are more than 42 million mobile telephone subscribers (out of 47 million population), rivalling the total number of mobile phone subscribers in other parts of developing countries in Africa. This means that in the developing countries of Africa, the use of cell phones is exploding (Donner, 2008) while the use of internet remains relatively limited due to illiteracy and its high cost. Unlike the PC-based Internet, voice driven information gateway can serve the billion of users who cannot read or type. In fact, mobile phones are now appearing broadly in the many communities of Africa; places where conventional wired phones never existed.

However, South Africa is yet to fully adopt the civilian application of mobile technologies, despite the major roles of South Africa in the developing of many underlying technologies. Both cultural and regulatory differences are some of the most common reason for this disparity (Gruber and Verboven, 2000). Mobile phones use in Europe and Asia surged in the late 1990s as a combination of regularity around the Global System of Mobile Communications (GSM) technology and telecommunications deregulation which help in consolidating consumer markets. With these, Finland and Japan are the world's leaders in mass use of mobile telephony, with Sweden, Norway, Hong Kong, South Korea and South Africa close behind. The rapid technological advances in the field of mobile technologies and its widespread integration in social and cultural practices in South Africa has created a widespread opportunities for educators, researcher, business communities etc.(Kress & Pachler, 2007). In fact as at 2005, it was argued that South Africa has the fourth largest digital cellular market outside of Europe (Janet & Wesson, 2005). This means that mobility is no longer about technological revolution. Rather it is more about how business and government can provide better social infrastructure through mobile applications and services (Kushchu, 2007) bearing in mind that mobile cellular technology has become something with much practical value (De Bruijn et al, 2009). However, the government is yet to take the full advantage of this in order to improve service delivery for better dividends of democracy.

2. Promising Opportunities for Digital Government (i.e. An Mobile Government)

Mobile wireless technologies are creating new opportunities for efficiency and creativity in digital government in four main areas. These are service delivery and urban management, economic development, urban design and bringing in the digital difference. This section discusses the mentioned areas.

2.1 Improving the Service Delivery and Urban Management

The capacity to convey and/or receive information from the citizens and public employees on the go presents numerous prospects for mobile government to improve in service delivery as well as management of urban areas in Africa.

The ability to swiftly and inexpensively send information to mobile devices users provides the possibility of micro-managing users of urban services in real time. For example several cities in the Europe have deployed a system which feeds drivers with information about available spaces in various parking lots as they enter the city (Webrakasa, unknown date). This system potentially reduces traffic congestion caused by drivers manually searching for parking space.

In addition, mobile users can become data providers to the public service by acting as real-time probes or sensors about urban conditions. Citizens could allow urban managers (e.g. Police) to monitor location with respect to fire explosion or crisis in a particular geographical area. Another practical example is giving the drivers on the road the power to allow the urban managers (e.g. the traffic police) to monitor location and speed, accurate real time models of a particular road network and traffic flows could turn out to be a reality.

2.2 Economic Development and Human Empowerment

Throughout the history, connectivity has been a forerunner to economic development. Coastal cities prospered when the oceans were the principal route for trade. However, towns that were bypassed by rail or interstate highway systems in South Africa wither easily without development being noticed in these towns and were cut from the rest of the economy.

There is no different in what we are witnessing today, but the critical connections in addition to all those mentioned above now are air transportation and digital telecommunications networks like the internet (Townsend, 2001). Therefore, wireless technologies present a number of opportunities for improving connectivity.

- ✓ **As an *alternative local communications infrastructure***. Wireless mesh networks can be easily and inexpensively deployed to be used as an alternative communications infrastructure during urban emergencies.

- ✓ As a way of ***extending the utility of wired connections*** away from desktops and buildings. Wireless data services such as CDPD, GPRS, and wireless LANs can create bubbles of bandwidth that carry the benefits of connectivity past a single location at the end of a wire. (Section 3 describes this in greater detail).
- ✓ As a *primary connection* to global communications grids in isolated or underdeveloped regions. This is typically achieved using 2-way dedicated satellite service.

2.3 Improve Urban Design through Creating mediated spaces

Mobile wireless technologies provide the opportunities to supplement traditional urban spaces that can be accessed through mobile terminals or handsets. Primitive examples of such 'mediated places exist in museums and exposition halls as well as the apartheid prisons that have served as tourist attractions such as the Robben Island.

Traditionally, information about places likes this has been archived, stored and accessed far from the places it actually is about. Libraries, online databases, and the World Wide Web have all help disembody information from the place in which it is created. This has been a valuable service; yet it does however steal from places their individuality.

Ronald Alber, the president of the Association of American Geographers suggested that mobile wireless technologies offers us the opportunity to gather archived information about a specific place and make it accessible in that place. This is true and doing so in many places will reinforce the identity of the places concerned. Due to this, people's aspirations to travel to these places and learn about them will continue to rise. South Africa is one of the leading countries in tourist attractions and thinking of this will bring much development to of business tourism.

Most of the debates about this kind of services are taking place in the private sector. Given the traditional
local control over street signage, the creation of mediated spaces needs to be conducted in a more open
fashion with the aid of professional urban, architectural and information designers.

2.4 Bridging the Digital Divide. Linking the Digital Difference

Stated simply, the "digital divide" is the gap between the technology haves and have-nots. One does not have to look far to see the sign of digital divide. There are people who have Internet access 24 hours at home and at work and there are people who do not have access to Internet both at home and at work. Rural citizens are less likely to have Internet access that suburban citizens enjoy. However reports has shown that more than 90% of South African has mobile phones that have Internet capabilities. A mobile phone subscriber can sit in the comfort of his/her own house or work place, in his/her bedroom, inside the car and access the Internet and do anything he or she wants at anytime of the day. This makes the inequality of Internet access equal and the framing of this is more of digital difference than a divide.

Perhaps the most stimulating possibility presented by the new wireless technologies is their abilities to help overcome geographical constraints on access to broadband services. With this in hand, more mobile friendly Internet application could be deployed to mobile devices in the form of widgets as well as normal mobile friendly Internet applications for citizens to make use of. This will definitely reduce the level of queues in many government service offices. An example of this implementation is deploying an Internet based application where people can apply for driver's license or make booking for a driver's test online.

3. The Free Movement of Wireless

Despite the slow speed with which the public sector (section 2) and the research communities (section 4) has begun exploring the many possibilities of mobile and wireless communications for mobile governance in Africa, activists around the world have seized the opportunities of the new technologies for broadband wireless Local Area Networking to dramatically transform the nature of urban public spaces and last mile broadband services.

Using an IEEE protocol for low-power wireless Ethernet on the unlicensed ISM (Industrial, Scientific, and Medical) 2.4 GHz spectrum, these activist have deployed off-the-shelf technology in busy urban areas such as park, malls, parking stations, restaurant, university campuses and also provided free wireless connections back into the high-speed Internet. As a result, these urban areas are being transformed from disconnected information backholes (Castel, 1996) into a broadband haven where precincts between home, work and the street are increasingly blurred.

This is an indication that wireless connectivity can be thought of as an amenity, just like the open space, light or air, which radically change the thinking about exploitation model. Government can partner with institutions to build public wireless LAN in various government public places. We strongly believe that wireless LAN that will consent to VPN usage will increase the amount and complexity of this activity if given a chance. This will further erase the line between workplace, home and public places.

4. Lack of Research on Mobile Technologies and Development in Africa

Unfortunately the opportunity that mobile technologies present government of Africa to implement better service delivery and viable dividends of democracy are hindered by lack of research on their social and economic impact. This issues are addressed in this section.

4.1 Research Needed for the Social and Economic Implications of Mobile Technologies

There is a convincing need to identify, understand as well as predict the social economic impacts of mobile technologies and the communication services they are used to deliver. In addition, it is essential to understand the role that mobile technologies play in the spatial and physical settlements. The added value of mobile technologies over fixed-line and desktop technologies is in the freedom of movement it gives to users. Yet most of the researches have focus on the relationship between the users and mobile phones and not between the users and the environment (Horan, 2000). This however represents a noteworthy knowledge gap, both conceptually and methodologically.

The lack of research on the social and economic measurement of mobile technologies is a major gap in our capacity to understand how the 21st century urban region will develop as well as how rural area will embrace technology innovations. Mobile technologies and information services such as location based services are re-visiting the importance of a place in the information city. In order to study mobile communications and computing technologies, it is fundamentals to depict from anthropology,

information and decision sciences, geography and urban planning and design. Therefore, to overcome the lack of knowledge in this area, we will need to build a lifelong interdisciplinary research endeavour.

4.2 Impediments of Social Research on Mobile Technologies

Social research on mobile communications and computing has suffered in Africa even though Africa is one of the largest adopters of mobile technologies. However, this is largely due to slow adoption rate by the governments. Yet in the Western Europe and America where mobile culture has developed rapidly, there have been few systematic studies on this topic. Even though it seems obvious that there must be social consequences, the telephone as well as the mobile telephone have aroused very little academic interest and have received hardly any criticism (Schemman, 1999).

One rationalization for the lack of scholarly interest in mobile technology is that their progression was incremental. Unlike the release of Netscape in 1994 which radically transformed the internet cellular telephony was not that much a new technology as a new idea for organising existing technology on a larger scale (SRI International, 1998).

Difficulties in making a distinction between various type of mobile technologies have also contributed to the lack of social science research in mobile technologies. Large amount of computational power are integrated into the design of mobile communication devices, driving a union between mobile telephones and mobile computers. New products every time strives to integrate the functionality of both a telephone and Personal Digital Assistant (PDA). Couple with technologies such as Bluetooth, which allows mobile devices communicate through short range distance, very soon a constellation of portable electronic devices will be integrated into a personal "body net" (Mitchell, 1994).

Finally, dramatic differences between countries in Africa (where more than 200 languages are been spoken in a country), gender, and generations create impediments to research, the result of which are rarely generalizable beyond any single sub-group. Teenage mobile users are the most frequently studied population, because of their role as the future consumers. However, the way technology is used in by teens in a particular country is barely an indication of the rest. Unfortunately, much of our present knowledge about mobile users is based on a few limited studies of young students.

5. Conclusions

The infrastructures and realities of Africa in general and South Africa in specific present various challenges for the integration of Mobile-Government in the way government runs its business to ensure quality service delivery and better dividends of democracy. Mobile phones are largely a pervasive presence in the larger part of the community and it although not free, is stable and nearly ubiquitous. There are numerous advantages for using existing technology and infrastructure for government to ensure quality service delivery. However, little research has been done on the use of mobile technology in social research in an African context which is differ distinctively from the rest of the world as the technology is not primarily used for the mobility that it offers but for the ability to access communities, collaborate and communicate. There are very limited applications on mobile available to support government business in ensuring quality service deliveries.

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