A study of Mobile Technology Capabilities and Challenges in Library Service Delivery

*Tamunoene, Goddyson A. (MCPN, MSCE, CISSM, MIWO)*

[ene.tamuno@*gmail*.com](mailto:ene.tamuno@gmail.com), [*gtamunoene@gmail.com*](mailto:gtamunoene@gmail.com)*, 234-8037570939*

*Joyce A. Barth-Nengia (CLN)*

*Library and Information Science,* [*ajoyce985@gmail.com*](mailto:ajoyce985@gmail.com) *2348063430949*

*Port Harcourt Polytechnic, Port Harcourt*

Abstract:

Mobile Technology has provided faster access to and delivery of information and other related services; it is also challenging the libraries and information centers to change round, modify and upgrade their services approach by implementing the new technological changes. Nowadays all mobile devices are gradually becoming an integral part of all and sundry thereby redirecting connectivity and interactions globally with dynamic feature compare to the static state of the computer technology. From the study, Mobile Technology capabilities will greatly support all forms of information access, storage, transmission etc. and provide help to researchers and users of research content to the strengthening of their relationship and providing enhanced user oriented services to existing users. The challenges facing mobile technology were also identified with a view of recommending to developers needed areas in satisfying local users. The study discusses on the capabilities and challenges of mobile technology in general services delivery.

**Keywords: Mobile Technology, SMS services, Library, Capacity development.**

**Introduction**

Mobile technology has been considered as a next step into the evolution of information technology (IT), its incomprehensive features offers the possibility of transferring information within a space and time-independent context, which subsequently leads to the enrichment of the value delivered by mobile technological platforms (Barile 2010). The world, especially the information sciences and technology is facing a transformation of happenings from operations of information digitalization towards mobile data transmission (Saxena & Yadav 2013, Mohamed & Gill 2008).

Mobile technology, as a new wave in the expansion of opportunities has made possible by invention of the Internet that has not only penetrated into personal lives of individuals but has also transformed the nature of work, communication and data transmission and other related services delivery (Hanson, 2011, Hahn, 2008). Hanson concludes that new skills, new jobs and new degrees have been created as a result of mobile technology and social media’s intervention into business activities.

According to Mills (2009), mobile technology emphatically deals on three technological categories; mobile and wireless networks, the mobile Internet and mobile devices. This is further considered to include all devices, protocols and infrastructures that allow one to communicate, interact and exchange data with an individual or system anywhere and anytime. In such expression, interaction and the exchange of information anytime, anywhere is what actually distinguishes mobile technology from fixed networks and stationary IT.

Mobile technology has made communication and information access very convenient and timely to users from the comfort of their own homes and offices, and from wherever they are while on the move with their cellular phone units or PDAs (personal digital assistants). The worldwide mobile telephone subscriptions are at 3.3 billion-equivalent to half the global population as a leading proof of mobile technology significance and capabilities. This statistics are substantial evidence that people everywhere interact with information (Volmer, 2010).

As today’s cellular phones have more features and capabilities than ever before, including mp3 players, picture messaging, streaming video, and. become more data-capable, fewer people need a computer to collect information. People use a cell phone as their primary interface for surfing the Web, listening to music, watching television, reading books, and interacting with friends. So over the past ten years, the mobile phone has become one of the major interfaces people use to access and share information.

Libraries are technological-based social institutions, linking people with related and relevant information. These institutions are increasingly not static and domesticated within a static domain but dynamic in nature, features and applications. As most library users owning a mobile phone, and increasing numbers of these being smart phones, hence, libraries can take the advantage of mobile technology. It can and will help novice and experienced librarians, information center managers and researchers to stay relevant in an increasingly mobile society.

Based on the revolution of new technology, the need to be aware of technological changes, peer forward, and prepare for the future of library mobile interaction for these classes of information professionals is paramount. They must be proportionate with this trend and integrate themselves into the mobile realm if they wish to utilized and deliver its enhanced features for appropriate services delivery.

Mobile technology and its components offers tremendous flexibility opportunities for those who want to take its advantage in library and information related services deliveries. With a simple 2/3/4G connection, a user lying on a beach can access e-books and multimedia content from a local networked information center or databank. Such devices can access networks and its content can be continually streamed over an intranet, extranet or internet thereby providing content on demand and making it unnecessary maintaining a paper copy of the material. Google is presently developing such featured devices for mobile first, and the desktop second. Apple on the other hand is a midst making its desktop computers behave more like its mobile devices. Aside from offering convenience, mobile technologies present new opportunities for libraries to promote access and expand reach (Lippincott, 2008).

**Categories of Mobile Technology Services Delivery:**

Mobile Technology offers enhanced services delivery in an incomprehensive manner that includes:

1. **SMS notification services;** Libraries provides alerts on latest news, events and notices via SMS and MMS to users at wherever location. Users can also be notified instantly with notices of alerts such as- arrival and suggestions about new books, intimated of indented documents by users, reserved documents for collection, appraising overdue books, outstanding fines, reminders to return library items, renew books, library circulars, e-journals subscribed, change in timings and updated information about the overall administration and management etc. Such notifications can be generated automatically using Integrated Library Management System Software (ILMSS) and such messages can be sent to group of users simultaneously through many free applications and intermediary websites/clients (Paterson & Low 2011).
2. **Formal Education, Distance Learning and E-learning;** Students are very versatile in using their mobile phones and various mobile applications. Academic libraries can harness this advantage to lead implementation of library services through mobile devices to support distance learning, formal education, and research activities in clearing environment by making the information resources ubiquitous. Library services should also blend with teaching and research practice of colleges/universities, scientific community or other patrons whom they serve (Needham & Ally, 2008).
3. **My library**: A library is a personal archive space where users can find information and resources of their choice, hence, alerts users to check records, renew resources, request items, track interlibrary loans and document delivery requests, set up email notices for new books, journal articles, and set up preferences for catalogue searching etc (Paterson & Low, 2011).
4. **E-resources with Mobile Interfaces:** Most publishers are already delivering e-books (both text and audio) that are accessible via mobile devices. Hence, it offers access to a variety of databases and digital resources such as e-resources (Books, Journals, dissertations, audio books, streamed music, films, and images) which can be used on mobiles. These collections can either be downloaded from the portals onto users own mobile devices or libraries lend mobile devices with the collections already on them. A large collection of audio books both free-and subscription based services are available for download and also transferable to and via mobile devices. Libraries can make use of multimedia messaging service (MMS) on mobile devices to share e-resource (Barile, 2010)
5. **Mobile document supply:** The mobile environment and technology presents a plethora of new opportunities for sending request documents, scanned images and monitoring the use of such collections as well as the automation of administrative operations. It can support electronic funds transfer, supply chain management, e- marketing, online marketing, online transaction processing, electronic data interchange, and automated inventory management systems etc (Karim, Darus, & Hussin, 2006).
6. **Library Virtual/Audio Tours:** These programs have been quite significant in annexing the nonusers to libraries and further help the remotely located or users located in different geographical locations. Library users, who do not have time or inclination to attend an on-site workshop, can get access to library tours through their mobile devices. Audio/virtual library tours can be produced fairly quickly, inexpensively, and could reduce the amount of staff time spent in helping new users to orient themselves in the library and explaining the facilities available (Karim, Darus, & Hussin, 2006).
7. **Mobile QR Code;** QR (Quick Response) code is basically a two-dimensional bar codes that can contain any alphanumeric data and often used to store text, etc., known as ‘mobile tagging. Data can be translated into a QR code by any QR generator and users can simply enter the data to be translated, and the generator produces the code, which can then be displayed electronically or in printed format. Decoding the information can be done with any mobile camera phone that has a QR reader, which is freely available online for most devices (Kas, 2008).

Finally, the design of mobile devices and services is pretty imperative to accessibility and information dissemination as this is more inclusive of diverse communities, hence, libraries will need to address the ongoing accessibility dissemination challenges of her e-resources mobility in this era of mobile technology efficacies.

**Mobile Technology Capabilities**

Empirical research on the impact of mobile technology in developing countries is fragmented. It is most often assumed that access to mobile networks will enable ‘leap-frogging’ or ‘catching-up’ by developing countries and thereby supporting and improving new forms of business, social interaction and services deliveries. Even when such research focuses on the characteristics of demand for this technology, it emphasizes the individual characteristics of users rather than the relational networks that facilitates it services deliveries. It is certain that the significance and nature of mobiles use vary across developing countries and that difference in usage patterns exist between wealthy and poor countries. For instance, in poor urban areas of Chile “the mobile phone space is not the space of mobile freedom that advertising images and marketing campaigns present (Sebastian, 2008).

Some outlined capabilities include:

1. **Online Social Networks proliferation:** Online social networks are proliferating by providing new opportunities for interactive learning that could enhance technological skills in implementing mobile and other IT based services deliveries. By manipulating, searching, and experimenting with information, making choices about how to present and visualize data, and engaging in dialogue with others about such content, these new platforms provide a basis for ‘integrative’ learning through which new types of data can be combined on mobile and other platforms. Although many of these opportunities are based on computer interactivity, an increasing number of ‘more-than- mobile’ services are making mobile technology a viable option for supporting meaningful integrative learning (Nagi, 2010).
2. **Geographical mapping and crowd sourcing:** One set of applications that is developing rapidly is the use of geographical mapping and crowd sourcing of real-time data in response to human and natural crises. These initiatives are often responsive to local demand for information, and they are providing opportunities for the entrepreneurial provision of digital data platforms on which local information can be placed. For instance, Open Street Map is supporting an editable map that can be viewed and edited anywhere in the world and is being used in support of relief work and disaster management (Mary, Shaji, Aihua & Leslie, 2010). All of these applications involving open or real-time data require users to make creative uses of mobile communication networks.
3. **Enhancing poverty reduction measures:** While it is clear that mobile networks are capable of supporting poverty reduction measures, it is still unclear whether the mobile revolution can support activities involving more complex information-sharing in which intensive data communication and display require the processing capability of the personal computer. Nevertheless, mobile phone applications are extending access to those engaged in entrepreneurial activities and the provision of social services. These applications provide better information about markets, promote the distribution of messages to large numbers of people without the Internet, and enable the development of mobile remittance services (Sebastian, 2008).
4. **Building Capabilities:** The prospects for building capabilities are changing dramatically with the spread of mobile networks and its applications that can support learning and others by collaboration. With the support of these networks, there is a possibility for many to establish themselves as hubs if they can create the necessary infrastructure and skills and put associated legal policies in place. There has been substantial growth of outsourcing alongside the availability of software applications supporting entrepreneurship in business and supply chain management. Platforms for mobile team-working and collaboration, employing resources access to individuals and smaller companies in developing countries, provide the foundations for new approaches to knowledge management and learning. Such resources for skill or capability building include manuals for community activists, multimedia training kits, digital literacy resources, training on standard software packages, and region-specific information packages.
5. **Building online capabilities:** Mobile networks are becoming powerful tools for collecting information that stimulates the imagination and provides clues for new directions in social and commercial activity. When combined with local knowledge, some of this activity is likely to be idiosyncratic, while other activities are likely to become candidates for entrepreneurial initiatives and the development of products and services that can be commercialized, such as mobile networks serving as platforms for other services. This progression is typical of services such as Esoko, a Ghanaian service that allows uploading of market and other data using mobile technology, and App Zone in Sri Lanka, which enables developers to create, test and sell applications which are then promoted by the mobile operators (Booth, 2009).
6. **Provision of Digital Capabilities for Entrepreneurship:** Online social networks are becoming essential for the filtering, adapting, and exchanging productive information. Recent developments supported by mobile networks and other digital technologies are offering better tools for building and sustaining social networks as means necessary for the purpose of building capabilities for digital entrepreneurship. Online sociability is an end rather than a means when it occurs in support of information exchange activities such as advertising jobs, providing information that is difficult to find, accessing government services, or communicating with friends or family (Harsha, Dimuthu, & Ayesha, 2011).
7. **Increasing access to tools required to create and use advanced software**: Mobile networks are increasing access to open source software, which offers the opportunity to acquire an understanding of the tools required to create and use advanced software productively in developing regions (Juan & Edward, 2008). Taking advantage of these opportunities requires background knowledge that can be provided by a relatively modest level of technical education.

**Challenges of Mobile Technology**

The rapid spread of mobile technology in developing countries is increasing access to an enormous range of communication and data services deliveries that are highly valued by most business and global entrepreneurs in various countries. Most of these services utilize software applications that support new forms of network collaboration. However, while the flow of the mobile technology has been faster than any other information and communication technology in human history, the capabilities for using this technology to its full potential have been slower to develop (Kas, 2008). Relevant studies has proven that, the rise of mobile technology and some of its usage characteristics and users are correspondingly increasing, but whether access and utility of these mobiles is contributing to mobile services delivery or not (Jonathan, 2008)

Besides the capacities of the mobile technology in providing mobility and dynamism in information communiqué, it is also providing a new basis for entrepreneurship and social innovation. But amidst all these, certain challenges exist:

1. Complex global problems of mobile access and cost.
2. Complex challenge of knowledge acquisition essential for developing innovative applications that are responsive to their local needs that seems neglected.
3. Needed digital skills of operational expertise and understanding of information structures when mobile technology is used as a medium for communication.
4. Information search and selection skills, communication and content creation skills, and strategic skills needed to use mobile technology in ways that support individual or professional goals.
5. Another pressing concern about mobile technology in the service delivery is issue of privacy management. The risk that patron usage information can be used and exploited by law enforcement official and those who commit identity theft. Mobile technology is changing the relationship between libraries and their users-by expanding services and posing new challenges to reader's privacy.
6. Issues related to trust and security - libraries should be wary of entrusting user information to locations in the cloud that may offer a different level of protection from that provided by in-house library infrastructure (Mills, 2008).
7. Some digital content can only be accessed on certain devices, and this can have a "chilling effect" on learning and library service because it locks some people out (Hanson, 2011).
8. Lack of appropriate mobile-friendly academic content to meet learners’ needs.
9. Difficulty in supplying content to an increasingly mobile student body.
10. Problems in finding and accessing the content needed for mobile learners from the library perspective
11. The use of wireless devices is increasing rapidly, yet there is concern in the scientific community that this technology could have adverse side effects.
12. Lack of staff awareness and familiarity-setting up text alerts, for instance, requires technical expertise from staff who understand how the library management system produces notifications, as well as staff or consultants who can help to set up an interface with a sim-card modem or a suitable service in order to deliver those notifications as text alerts the death of technological expertise among staff members and increasing staff reductions and other cutbacks (Jacobs, 2009).

**Limitations or Barriers to Mobile Technology:**

Application of mobile technology in libraries has facilitate librarians and libraries to provide very fast information services to the users and there are a lot of benefits of this application but there are some limitation of this technology which are discussed as:

1. Less bandwidth speed: In India internet speed on mobiles phones are the major problems. Due to slow downloading and uploading speed users have difficulties in accessing these services from their mobile phones.
2. Initial cost: The initial cost for the installation of these services is quite high and as we all know that libraries depend upon their host institutions.
3. Content ownership, licensing and digital rights management: In the digital era and continue increase in the numbers of users it's very difficult for the libraries to maintain ownership and copyrights of the digital contents. There are many changes in the technology but it's very difficult to control the flow of information.
4. Privacy & Security: It's very difficult for the libraries to maintain their privacy and security of their resources. Due to mass use of these e-resources the mishandling and miss-use of e-resources such as violation of copyright laws, wrong distribution, modifying, etc are the common things. It is necessary for the libraries to develop tools and techniques to stop such kind of practices.
5. Lack of trained staff: In the field of library and information science there is lack of technically known and skilled staff that can manage and take care of all these things.
6. User education: Users are less aware of how to access and use library resources. They need some kind of user education programme so that they can effectively and efficiently use library services (Lippincott, 2008).

Mobile phones are still viewed by majority of persons as devices for making phone calls and text messages, so they often don’t associate them with other activities such as information seeking. However, people are increasingly dependent on their mobile phones and there is a growing minority who do use them as diaries for taking notes and for e-mail and internet access. As a result there may be an increase in expectation from Library and information managers/users that libraries could in the future provide some services in a mobile friendly way.

**Conclusion**

There is a growing influence of mobile technology in general services delivery, especially as network access becomes more affordable and reliable, and mobile technologies and its applications seen as mainstream acceptance in research content collection, storage, research content access and dissemination which cannot be over emphasized. This trend will likely continue, and one way for domestic and other users to react to this emerging technology is to acquire mobile-tech skills and operators and managers of libraries and information centers should develop and utilize portal that are and could be mobile-easily accessible via web-enabled mobile devices.

**Recommendations**

This study therefore recommends as follows in relating to the context of this paper:

1. Acquire the needed mobile technology skills.
2. Apply the acquired mobile technological skills and it relates technology
3. Acquire the appropriate hardware and software based specifications and requirements.
4. Develop and implementation road map of:

* Educating state –holders from developed literal framework
* Coordinating the application technology framework for operators and other users
* Test run the application and processes from unit to the whole.

1. Managers of library and Information Centers should in an appropriate train the trainer knowledge based empowerment procedure.
2. Finally, regularly play around the system to properly utilize and understand, "Mobility is a dynamic feature of automated libraries and digitalized information centers, hence, a giant stride towards a round-the-clock study and applicable approach will help in the **“*Information Literacy in Nigeria through Innovation and Technology enabled library Services for sustainable Development*"**

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