DELIVERING SERVICES FOR LIBYAN CITIZENS THROUGH UTILISING MOBILE SERVICES: LITERATURE REVIEWS AS A SECONDARY DATA

[1]ALI ABDULRAZZAQ AL-SAWAD, [2]WADHAH ABDUL-HAMZA ABDUL-HUSSAIN, [3]WAN ROZAINI SHEIK OSMAN AND [4]NASSIR JABIR AL-KHAFAJI

[1,2,3,4]School of Computing, Universiti Utara Malaysia, Kedah, Malaysia

Abstract- Rapid growth of the mobile technology and the subsequent penetration of mobile phones in developing countries creates new environment and opportunities for the governments to communicate and deliver its services on 24/7 basis to citizens. The recent stats by International Telecommunication Union (ITU), 2014, Mobile devices are growing fast in developing countries, where 2013/2014 growth rates are expected to be twice as high as in developed countries (26% compared with 11.5%). Therefore, the present study serves to clarify the appropriateness of the use of mobile devices that are scattered intensely in Libya to provide basic electronic services to Libyan citizens. In addition, the present study serves to clarify the appropriateness of the use of mobile devices. It is to review of the experiences of other countries that take the advantage of this technique to provide services to their citizens.

Index Terms- Libya, Mobile Devices, M-service, M-government, e-government

I. INTRODUCTION

Information and communication technologies have played a pivotal role in the development of a nation, region, or continent, especially in developing countries, where it gives impacts of ICT on the citizens of these countries [1]. Pandey and Sekhar [2] stated that, Good governance depends on provision of good services, quick response mechanisms as well as and above all accountable and transparent process mechanism.

However, this can be easily achieved through the use of Information and communication technology in public sector [3]. On the other hand, the progress in the use of mobile devices has seen a significant increase in developing countries.

According to latest report from ITU, by end 2014, 55% of all mobile-broadband subscriptions are expected to be in the developing world, compared with only 20% in 2008 [4], as shown in Figure 1:

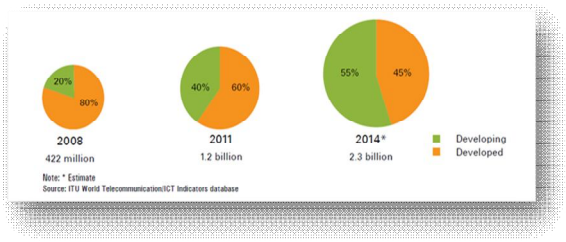

Figure1: Mobile-broadband subscriptions 2008, 2011 and 2014 [4]

While in Africa is expected to see a significant increase in mobile versus fixed. Figure 2 illustrates this expectation [5].

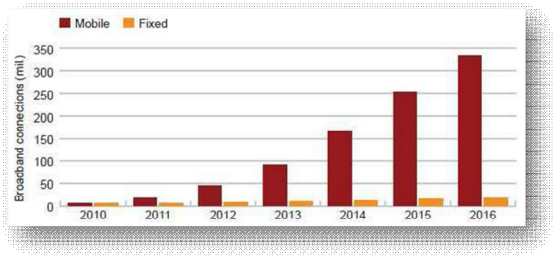

Figure 2. Africa, mobile and fixed broadband connections, 2010-2016 [5]

Increase in the use of mobile devices in developing countries has led to an increase in the use of the Internet. Where, as illustrated in Figure 3, in developing countries, the number of Internet users has doubled in 5 years, from 974 million in 2009 to 1.9 billion in 2014.

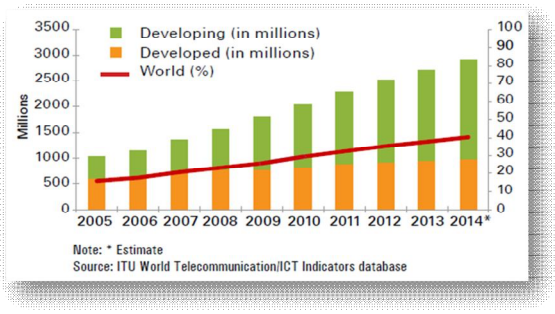

Figure 3: Individuals using the Internet, total and percentage, 2005-2014 [4]

Moreover, improving public sector has become a priority for sustainable socio-economic development. Recently, the Internet and Mobile devices have altered the way business is transacted the world over, and is changing the way government interacts with citizens and businesses Information and

communication technology (ICT). Mobile devices, especially, are immense tools to make governments more open and transparent. Therefore, in Libya, the use of fixed telephone is very few and it decreases continuously (figure below). On the other hand, Mobile phone penetration in Libya has increased dramatically over the last years and Libyan government (post-revolution) has backed ICT development through significant infrastructure investments and national policies targeting ICT use in education and government. The decrease of fixed telephone is illustrated in Figure 4 as World Bank Group in 2014 reported [6].

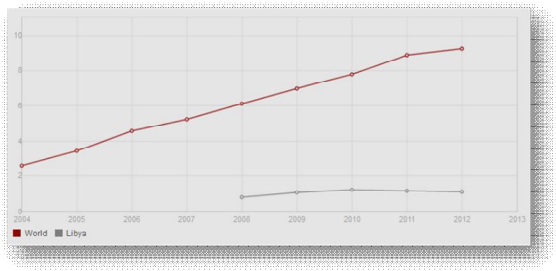

Figure 4: Fixed broadband Internet Subscribers in Libya (per 100 people) [6]

II. RESEARCH MOTIVATION

Most of the African countries including Libya are still far on the implementation of e-government in a comprehensive way or at least just to deliver basic services to citizens [7]. Where, Libya faces a number of challenges from the technological aspect. Those challenges are diverse and puzzling as the country acutely lacks of required technological infrastructures in the public sector. On the other hand, Libya has a population more than 6 million, whereas its area is 1,759,540 sqm (Figure 5 Libya map), and the people live in separated areas and this brings many challenges to the new government in Libya for building and developing the infrastructure of communication system.

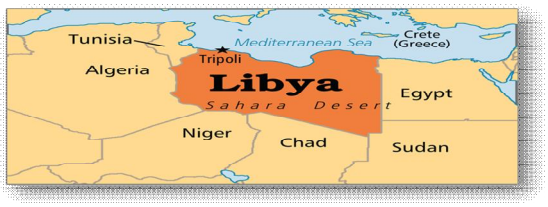

Figure 5: Libya Map

Meanwhile, the mobile devices can help to overcome such difficulties in addition to facilitate in delivering the basic electronic services for citizens. According to World Bank Group in 2014, the number of mobile devices in Libya, insignificantly increased, as shown in the Figure 6. As well as, 96 % of populated areas are covered by mobile phone services. Where, both networks Almadar and Libyana have more than 9.5 million subscribers (143 % of population).

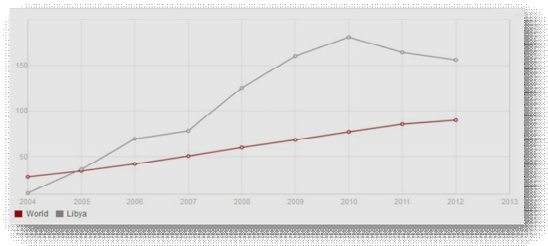

Figure 6. Mobile cellular subscriptions (per 100 people) in Libya [6]

In addition to mentioned beforehand, it is indeed that at the present time, all e-government services are in Libya and these services are very few and out of service entirely due to domestic political turmoil. Where, the last survey that was conducted by United Nations [8] assert that was mentioned previously, show Figure 7:

Central African Republic	0.0000	0.0000	0.0297	0.3446
Guinea	0.0000	0.0000	0.0491	0.2696
Libya	0.0000	0.0000	0.3743	0.8502

Figure 7: Countries with no online services [8]

Different countries have different resources and capabilities. It is possible to imagine 24/7 electronic interactions with the government in developed countries but it is difficult to achieve the same level of efficiency and flexibility in developing countries [9]. Libya faces great challenges in achieving 24/7 services [10]. Thus, the only solution is to use features m-government to deliver the services in Libya during 24/7. Where, mobile phones in Libya are much more affordable and accessible than land-based Internet connections and many users access the Internet primarily through their mobile devices [11]. Thus, the use of the mobile device is useful in providing services and dealing between the citizens and the current government. In the next section this study strives to explain M-government.

III. M- GOVERNMENT

The growth of digital government is not uniform throughout the globe. USA and most of the European countries are at much advance stages and many Asian and African countries are still toiling hard to achieve the same level as them. Therefore, the current Libyan government can curb these challenges through harnessing the wireless and mobility components to achieve their aims and the provision of electronic services that are necessary to citizens at the moment. On the other hand, the application of e-government in developed countries have proven successful, while in developing countries is still a high failure rate [10]. This happens due to the gap between electronic government project and its implementations in developing world [11]. According to Hameed, Shukur, Al-khafaji and Al-Farhan [13] M-government refers to the use of ICTs by government

institutions with the help of mobile technologies to deliver electronically the services to the public. M-Government can also be defined by Sareen, Punia and Chanana [14] as "use of mobile and wireless communication technology within the government administration and in its delivery of services and information to citizens and firms"

Similarity, Vanka, K.Sriam and Agarwal [15] said that: "Mobile government (m-Government) is a functional subset of all inclusive e-Government that utilizes the unique features of mobile and/or wireless technologies like cellular/mobile phones, laptops and PDAs (personal digital assistants) connected to wireless networks for provision of location based government services and information to officials and citizens/businesses at anytime and anyplace (24/7 Operational Model)" M-government is in its early stage of development and may be defined as a strategy and its implementation involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits to the parties involved in e-government including citizens, businesses and all government units [16]. Figure 7 depicts the main services that are provided by M-government [17]:

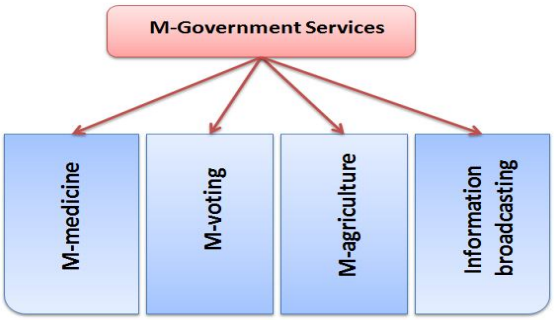

Figure 7: M-government services

A. M-Government Kinds

Mobile Government operates on four different levels represented by the following interactions:

- M-Government to government (MG2G), which refers to inter-agency relationships and the interaction between governmental agencies.
- M-Government to business (MG2B), which describes the interaction of government with businesses.
- M-Government to employee (MG2E), which is concerned with the interaction between government and its employees.
- M-Government to citizen (MG2C), which refers to the interaction between government and citizens.

There are various examples concerning each type of interactions regarding different sectors of society, such as education, public safety, justice, and employment. By now, around the world, the most developed type is mG2C [18]. In Table 1 adopted from Hameed et al., [13] illustrate the examples m-services in many countries:

Table 1: M-Services applications

Government Agencies	Applications	Descriptions
UK	SMS for people with hearing disabilities	Citizens with hearing problems can be contacted by the police via SMS.
Netherlands		SMS messages are sent to citizens with hearing problems during emergency situations. Instructions include, "Go home" or "Leave the place," so they can easily respond or react.
USA	Special notification cases	SMSs are sent to citizens in case of energy blackout.
UK		Police may send notifications to citizens about potential terrorist threats or attacks.
Malaysia	SMS floods warning systems	Automatic measuring devices are installed to monitor water level. When flooding occurs to a certain level, the control center sends a message to affected citizens.

UK		In case of emerging floods, information is sent via SMS, emails, fax, and television.
Sweden	Mobile automobile parking	Registered drivers can log in and log out parking spaces using their mobile phones. The fee is automatically charged to the driver's account; the transaction receipt is likewise sent via SMS.
India	Health Awareness	Communicating information in engaging ways via games tailored for different demographic and social groups.
Uganda		SMS-based HIV/AIDS awareness quiz.
Peru	Remote Data Collection	CELL-PREVEN – Sending SMSs with real-time data on symptoms experienced by clinical trial participants. This medium enables immediate response to adverse symptoms.
Singapore	SMS Notifications	Providing parking ticket reminders, national service obligations, and passport renewal notification.
Kenya	Money transfer	M-PESA enables money transfer from one mobile phone user to another even without requiring bank accounts.
Argentina	M-Voting	Allows citizens of La Plata to vote via SMS for preferred public investment projects.
Estonia		M-Voting takes place during 2011 elections.
Korea	M-Police	Police offers information retrieval via mobile devices; tickets are printed on the spot.

IV. LIBYAN COMMUNICATIONS INFRASTRUCTURE

Recent years, Libya was able to emerge from economic isolation, which had a significant role in causing stagnation in the oil industry, and the economy. The telecom sector consists of an operator is owned by the state and it provides postal services and telecommunications (Libyan Post, Telecommunication and Information Technology Company "LPTIC", General Post and Telecom Company "GPTC"). Libyan Telecommunication and Technology (LTT) Corporation provide Internet services and two mobile phone networks in Libya. They have the lowest price among African countries. In 2004, Libyan Telecommunication penetration of the market began and it was one of the lowest in Africa and in just two years it made a great leap.

According to Fgee and Alkallas (2013) Libya in 2008, became the first country in the African continent that was able to break the barrier with a 100% penetration load" which has resulted to the success of mobile phone networks to replace a large number of fixed lines (more than half of fixed lines).

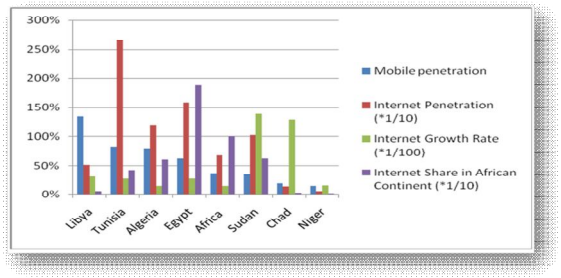

Figure 8: Comparison of ICT Usage in Libya & Neighboring Countries with Africa Continent (Verma et al., 2012).

Figure 8, shows a comparison between various parts of ICT usage. Libya has the largest share in mobile usage in northern Africa. The Libyans, whom have been one of the highest users in Africa, are also involved in mobile networks, the Internet, and in a wide range of information services, and mobile generation. It's currently growing significantly around 100% per year under the new policy of the current government to develop the field of telecommunications (World Bank Group, 2014). It has given contracts worth more than $70 million from the General Authority to Telecommunication Company Alcatel to supply and install fiber-optic networks. Jamahiriya corp. will extend over 1600 km in 11 separate, links for most the cities in Libya. And with that huge investments, from the government to build the next generation of fiber-optic networks, which is a backbone of national communications, and increase services subscribers ADSL and broadband services. But unfortunately, the security situation prevents this progress which is difficult to apply the electronic government in Libya at the moment. So, considering to take advantage on wireless services is the only solution with massive proliferation of mobile devices. ITU (2012) reported that, twenty-four cities in Libya have high-speed wireless Internet access and a project to build a fiber network covering over 13,000 km of Libyan territory is underway. Therefore, the provision of government services to citizens through mobile devices is the only solution and is unique in the current period to the Libyan government. Table 2 depicts the most important techniques available in Libya:

Table 2: most important techniques available in Libya

	Libya NET	Libya ADSL	LibyaMAX	Libya FTTH	Libyana Net
Speed	56 Kb/S	512 Kb/S	Up to 2 Mb/S	Up to 8 Mb/S	Up to 8 Mb/S
Bandwidth	Unlimited	7 Gb/Month	15 Gb/Month	10 Gb/Month	1 Gb/Month
Line	Phone Line	Phone Line	Wireless (WiMAX)	Fiber Optics	Wireless
Device	Modem	ADSL+2 Device	WiMAX Device	FTTH Modem	Libyana Net modem. Data SIM Card.
Payment	Per Hour	Monthly	Monthly	Monthly	Monthly & Annual
Device price included		✓	✓	✓	✓
Device price		120 LYD	120 LYD Or 220 LYD	??	335 LYD
Email	✓	✓	✓	✓	
Cost	Libya Net 400 DMS / Hour	Libya ADSL 20 LYD / Month	Libya Max 40 LYD / Month	Libya FTTH 40 LYD / Month	Libyana Net 15 LYD / Month

CONCLUSION

Governments around the world are racing to provide quality services to their citizens. In every region of the world, from the developing to the developed countries, the national governments and localities seek to lay the information online and use new technologies to simplify the operations that were formerly complicated to citizens. Moreover, in countries like Libya, the expectations of public from the new government are very high. The delivery of services has to be highly efficient to meet these expectations and the use of technology for delivery is inevitable. And the traditional ways of delivering services are no longer sufficed. Therefore, this paper strives to gain an in-depth understanding of the appropriateness of the current conditions on the exploitation of the proliferation of mobile devices in the provision of services to citizens in Libya. Where, according to ITU (2014), in developing countries, mobile-cellular penetration will reach 90% by end 2014. While in Libya mobile-cellular penetration reached to more than 9.5 million subscribers (143 % of population). This development paves a way for the new government in Libya to concentrate on modernizing public service delivery systems to improve the efficiency and effectiveness of their services. To sum up, this paper has presented a theoretical concept. For further research, it is suggested that a more practical implementation of concepts can be done. It will help in refining the mobile government model for Libya to a higher degree.

REFERENCES

[1] W. Munyoka and F. Manzira, "Alignment of e-Government Policy Formulation with Practical Implementation: The Case of Sub-Saharan Africa," World Academy of Science, Engineering and Technology International Journal of Social, Human Science and Engineering, vol. 7, no. 12, pp. 368-373.

[2] R. Pandey and K. V. Sekhar, "From e-Governance to m-Governance—The Way Forward," E-Governance Techno-Behavioural Implications. www. excelpublish. com, pp. 117-128, 2013.

[3] W. Munyoka and M. F. Manzira, "From E-Government to M-Government–Challenges Faced by Sub-Saharan Africa," in The International Conference on Computing Technology and Information Management (ICCTIM2014), 2014, pp. 86-99.

[4] D. B. Schuster, "International telecommunication union-Challenges for the plenipotentiary 2014-The time for change," Communications Magazine, IEEE, vol. 52, no. 2, pp. 57-61, 2014.

[5] N. Jotischky and S. Nye, "Mobilizing public services in Africa: The m-government challenge," Informa Telecoms & Media 2011.

[6] World Bank Group, World Development Indicators, 2014: World Bank Publications, 2014.

[7] Z. A. lmabruk Abdelsadeq, S. Ismail, and Z. H. Abdullah, "Study of the Availability and Awareness of E-services in

Higher Education in Libya," in The Third International Conference on E-Learning and E-Technologies in Education (ICEEE2014), 2014, pp. 26-38.

[8] United Nations, E-Government Survey: E-Government for the people, Delta Partners Analysis, 2012

[9] L. Siragusa, K. C. Dixon, and R. Dixon, "Designing quality e-learning environments in higher education," Proceedings ascilite Singapore, pp. 923-935, 2007.

[10] S. Verma, S. Kumari, M. Arteimi, A. Deiri, and R. Kumar, "Challenges in Developing Citizen-Centric E-Governance in Libya," Int. Arab J. e-Technol., vol. 2, no. 3, pp. 152-160, 2012.

[11] C. Jones, Furthering democracy in Libya with information technology: Opportunities for the international donor community: Centre for International Governance Innovation, 2012.

[12] R. Heeks and S. Bailur, "Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice," Government Information Quarterly, vol. 24, no. 2, pp. 243-265, 2007.

[13] A. G. Hameed, B. S. Shukur, N. J. Al-khafaji, and H. A. Al-Farhan, "Utilizing Mobile Applications as a Channel of Interaction between the Citizens and the Government: Design M-Police in Iraq," in the Third International Conference on e-Technologies and Networks for Development (ICeND2014, Beirut, Lebanon, 2014, pp. 1-7.

[14] M. Sareen, D. K. Punia, and L. Chanana, "Exploring factors affecting use of mobile government services in India," 2013.

[15] A. Agarwal, S. Vanka, and K. Sriram, "Critical Issues in e-Governance," Transforming Government, p. 51.

[16] L. Antovski and M. Gusev, "M-government framework," Proceedings EURO mGov, pp. 10-12.07, 2005.

[17] A. E. Napoleon and M. S. H. Bhuiyan, "Contemporary research on mobile government," in Scandinavian workshop on e-Government (SVEG), 2010, p. 61.

[18] M. Ntaliani, C. Costopoulou, and S. Karetsos, "Mobile government: A challenge for agriculture," Government Information Quarterly, vol. 25, no. 4, pp. 699-716, 2008.

★★★