Mobile Technology bridges the Digital Divide: Case of Kosovo

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Abstract

The digital divide is a global problem with which the population is able to access and use the information and communication technology, when the access is somehow available. This "divide", in terms of access to ICT, can be found among developed and developing countries, within a country among rural and urban areas, rich and poor, educated and non-educated and white and non-white.
The Republic of Kosovo is also affected by this phenomenon and harmful effects of the digital divide due to the very low level of territorial coverage with fixed telephony and internet services. In developing countries, mobile technologies are seen as a possibility for overcoming the digital divide by delivering services in those areas where the infrastructure required for internet or wire telephony services is not a viable option.
This study analyzes the mobile opportunities in the Republic of Kosovo. Findings show that the penetration of mobile telephony and mobile internet is satisfactory and comparable to the developed countries.
Increasing penetration of mobile broadband as opposed to fixed broadband in the Republic of Kosovo will be an incentive for the Government to take a new direction towards mobile government services accessible through mobile devices, thus enabling a fast and ubiquitous Government.

Keywords: Mobile Technology, Digital Divide, ICT, mobile Government.

Introduction

Although the revolution in Information and Communication Technology (ICT) had inspired optimistic expectations and fantasies for: a transparent government, universal approach to information, rationality of markets, creation of new international community, availability of life and health-enhancing information to ordinary people throughout the world, many people from many countries of the world remained unaffected by this revolution. This phenomenon known as the "digital divide" was popularized in 1999 when Surveys revealed massive differences between access to ICT in countries with developed economies (like the United States and Australia) , the difference between rich and poor, educated and non-educated and white and non-white (Keniston, 2003, 2-3).
Organisation for Economic Co-Operation and Development (OECD) defines "the digital divide" as the gap between different individuals, households, businesses and geographical areas at different social-economic levels with regard to their opportunities to access ICTs and to their use of the Internet (OECD, 2001, 5).

United Nations Department of Economic and Social Affairs (DESA) in United Nations E-Government Survey 2016 " E-Government in Support of Sustainable Development" identifies three commonly used approaches to the digital divide (DESA, 2016, 96), such as:

- Access Divide- focuses on the division between individuals and groups that do or do not have access to technologies, divide existing only as technological problem.
- Multi-dimensional Digital divide – focuses on digital divide existing not only because of the access, but more about other social, economic, educational and political issues, and
- Multi perspective Digital Divide- focuses on the interrelationships of technology with race, gender and culture. This division is built on Multi-dimensional Digital divide.

Pimenidis, Sideridis and Antonopoulou (2009) identify a number of factors that define and characterize the digital divide, such as: availability of technology, connectivity, literacy and ability to use information systems. They see the poor world as very affected by the digital divide due to the lack of connectivity to the Internet. According to them, this divide, in terms of access to information technology, in particular to the Internet, can be found among rich and poor countries and among different sections of society in the same country, and between rural and urban areas. Despite the considerable investments made in land line infrastructure in many parts of the world, mainly in the poor world, the possibility to access the landlines is not available to everybody. The rural areas are exempt from this privilege of access due to the lack of infrastructure because of the high cost of implementation and maintenance of this infrastructure, soil morphology that hinders its implementation, the financial situation of the citizens and the country's political situation.

The citizens of the Republic of Kosovo also face the lack of infrastructure and the harmful effects of the digital divide. Until 2004, the sole liberalized telecommunications services were the fixed telephony services which had very low level of coverage of the Kosovo territory.

The fixed telephony is concentrated mainly in the urban area, especially big cities, leaving the rural areas digitally marginalized because of the digital divide (RAEPC, 2012, 14). The lack of infrastructure to access the Internet exempted this part of the population from the possibility to receive electronic services provided by the Government of Kosovo, implemented in the framework of e-Government program initiated in 2008.

The countries affected by the digital divide consider the use of mobile devices and networks as a hope for overcoming the digital divide and mobile telephony connections are expanding significantly in relation to land lines. This offers the possibility to widely access e-services, including the population deprived of access (Pimenidis, Sideridis and Antonopoulou, 2009, 3).

However, what is the potential of Mobile Technology in the Republic of Kosovo to provide information and public services in areas where the required infrastructure for internet or wire telephony service is not a viable option?

This study analyzes the mobile possibilities in the Republic of Kosovo as innovative way of delivering public information and government services, making them accessible to the population in order to help in reducing the digital divide in different sections of society and in urban and rural areas. This reduction of the digital divide between the people of Kosovo will contribute in reducing the digital gap between our country and countries with developed economy

Mobile technology, hope for overcoming the digital divide

Nowadays, citizens worldwide are using mobile technology as their primary source of, information, communication, entertainment, and use of public and private services.

These innovative technologies enable communication and proper access to a wide range of information and public and private services even in remote areas where infrastructure for Internet and telephony wire service is poor or non-existent,

The level of access to mobile technology is increasing more and more in comparison with the level of access to fixed broadband, notably in developing countries, this occurs due to the high cost of the Broadband technology and required infrastructure, in comparison with mobile technology and due to other benefits delivered by these technologies, such as: mobility and security to owners, their use require basic literacy and can be afforded by the low-income population (Karume, 2016, 1).

According to the International Telecommunication Union (ITU, 2016), over two-thirds of the population live within an area covered by a mobile broadband network, thus reaching 84% of the global population, but only 67% of the rural population (ITU, 2016, 1). Data from ITU indicated a growing trend for number of mobile-broadband subscriptions, while Fixed-broadband subscriptions continued to decline. In developing countries this increase is made at double digit rates, reaching a penetration rate of close to 41% and at the end of 2016 the total number of mobile-broadband subscriptions is estimated to reach 3.6 billion (ITU, 2016, 4).

By 2018, the number of mobile subscription is expected to reach the number of global population, with mobile penetration of 96 %.

Rapid penetration of mobile technology provides an excellent opportunity to government institutions in developing countries to provide more responsive and inclusive public services, exploiting mobile applications and solutions, thus affecting the social and economic development (Karume, 2016, 1).

This raises the hope that Mobile devices and services will improve the quality of life of the population digitally exempted and offer opportunities for a better and comprehensive access to public information and services, thus overcoming the digital divide.

The mobile opportunity in Republic of Kosovo

According to the assessment of Kosovo Agency of Statistics (KAS), the Republic of Kosovo has an area of 10,908 km² and the total number of resident population is 1.804.944 (estimated for 2014), where the average age is 30.2 years. 61% of Kosovo

population lives in rural areas (KAS, 2015, 29-31). Though, the high percentage of the population lives in rural areas, penetration of mobile telephony and mobile internet is satisfactory and comparable to the developed countries

Until 2004, the sole liberalized telecommunications services in the Republic of Kosovo were the fixed telephony services. These services mainly covered the urban areas and big cities and had very low expansion because it required huge investments and because of the complexity of work for the implementation of these services.
The low level of coverage of the territory of Kosovo with fixed telephony services left Kosovo with very low rate of penetration of fixed telephony per capita under 5%, comparing it with the region countries in which the penetration ranges from 10% to about 40 % (RAEPC, 2012, 14). See Figure No.1

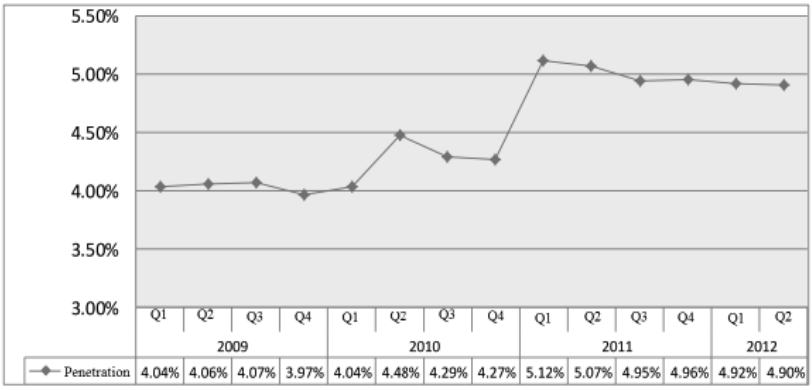

Figure No.1: Penetration of fixed telephony during the period Q1 2009 - Q2 2012(RAEPC, 2012, page 14)

Two technologies were implemented for the provision of fixed telephony services: network technology Next Generation Network (NGN) by PTK and VOIP technology by IPKO, in addition to voice services they also provide internet and TV services, but a high percentage of the population living in rural areas had no access to these services.
With the introduction of mobile telephony in the Republic of Kosovo (2004), the fixed telephony not only significantly slowed the pace of development and but it started to replace with the mobile telephony. The Mobile Internet also penetrated to the highest degree in Kosovo families.
Data presented in the Table No.1 and Figure No.2 are taken from the Review of Electronic Communications Market 2010-2016, published by RAEPC.

Year	**Number of mobile telephony users**	**Number of fixed telephony users**
2007	85,8831	82,349
2008	96,8546	81,607
2009	1,359,170	82,084

2010	1,451,747	88,372
2011	1,478,944	86,014
2012	1,663,844	81,603
2013	1,643,429	78,639
2014	1,731,291	64,297
2015	1,768,207	58,992
2016	1,875,548	54,983

Table No. 1. Number of mobile telephony users vs number of fixed telephony users (RAEPC 2010-2016)

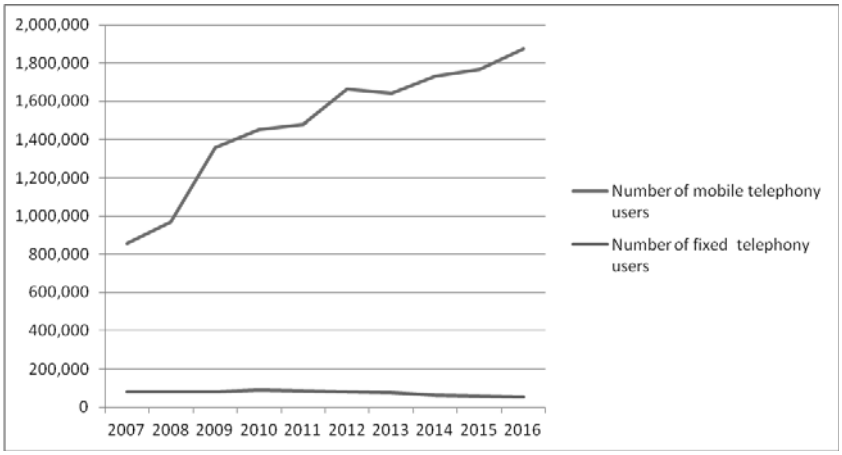

Figure No. 2. Number of mobile telephony users vs number of fixed telephony users (RAEPC 2010-2016)

But, what caused such a penetration of mobile telephony and the internet?

According to the research "The penetration and the use of internet in Kosovo" implemented by the Kosovo Association on Information and Communication Technology (STIKK) in 2013: main reason for such penetration is a very young population in Kosovo desiring to follow global trends and Kosovo population living abroad that continues to keep contacts with their families and friends in Kosovo (STIKK, 2013, 4).
December 2013 offered new opportunity for mobile telephony users: access to the Internet through 3G mobile network. This was an additional reason for the citizens of Kosovo to buy smart phones. According to the same research "The penetration and the use of internet in Kosovo" by STIK, 55.48% of the citizens of the Republic of Kosovo access internet services through their smart phones (STIKK, 2013, 7).
A year later (December 2014) Kosovo experiences a transition to a new generation of mobile network - 4G, thus providing access to mobile Internet users through one of the fastest mobile networks in the world.

According to the Review of the Electronic Communications Market 2013 – 2016 conducted by RAEPC, the number of Internet users through 3G and 4G mobile networks continues to increase in high percentage. At the end of 2016, the number of users increased by 57.8% compared to 2015, and compared to 2014, the number of users increased by 151%. See Figure No.3.

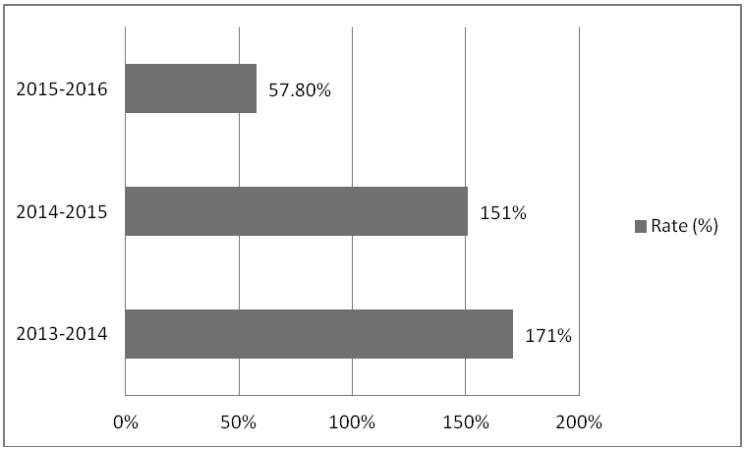

Figure No.3. The growth rate of the number of Internet users through 3G and 4G mobile networks. (RAEPC, 20013-2016)

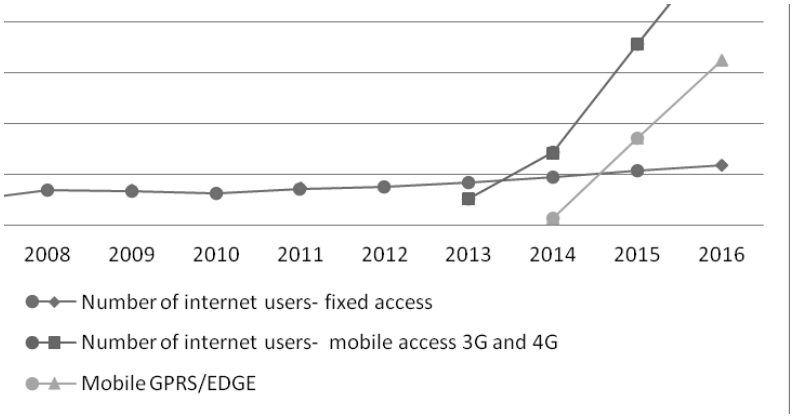

Figure No.4. Internet users- fixed and mobile access and Mobile GPRS/EDGE (RAEPC, 2010-2016)

With regard to the governmental institutions, according to the data of the Directorate for Network and Telecommunication within the Agency for Information Society of the Republic of Kosovo, all central and municipal institutions are connected to the government network.
Central level institutions such as: the Office of the Prime Minister, the Assembly of Kosovo, Ministries, Agencies, the State Prosecution, Courts, Kosovo University Clinical Centre are connected to government network through the optical network

with a capacity of 1 Gbps (institutions located in government buildings) and through microwave links with a capacity of 2 Mbps, 7Mbps, 14 Mbps and 100Mbps (institutions temporarily located in private buildings).
Whereas, the local level institutions in all municipalities of the Republic of Kosovo, including institutions within municipalities, such as: vehicle registration centers, civil registration centers, courts, social work offices, hospitals, family health centers, detention centers, etc., are connected to the government network using two transmission mediums: 1. Optical Fiber with 1 Gbps capacity as the primary network and 2. the microwave network used as backup with 2 Mbps, 4Mbps, 8Mbps, 14Mbps, 45 Mbps, 45Mbps and 80MBps capacity.

Conclusions

Penetration of mobile telephony and mobile internet in the Republic of Kosovo has been done very rapidly, by substantially exceeding the fixed telephony, and continues to expand very fast. By the end of 2016, the mobile telephony users reached a number over 1,875,548 and the level of penetration of mobile telephony is 103.3%, the number of mobile internet services users (Mobile Broadband) is over 1,122,799 with a penetration of 61.84%. These technologies have provided opportunities for the population in living areas with no internet infrastructur e to access the internet and electronic services.
This potential of mobile technology is an incentive for the Government of Kosovo to move towards the e-services and e nable access to information and public services through mobile devices, thus becoming an ubiquitous government.

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