Exploring the Push and Pull Drivers in M-Government Framework that Influence Acceptance of Services on Mobile Devices

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Summary
Information Technology has become an integral part in our everyday life. With the increasing trend of technology the use of hand held devices have become more common in a society. The extensive use of mobile devices has forced government to providing government services on such devices. Governments are striving to provide efficient and effective services using the wireless applications and infrastructure developed by private companies. Since many people in Saudi Arabia live in remote areas where facilities of IT infrastructure either non-existent or limited there is a need of such services in those areas. This study presents various factors in a framework that may help governments identifying necessary elements of m-government that help providing efficient services to citizens. In this study the author presents public requirements for the government services in Saudi Arabia and assesses the factors that may help the government to provide effective services.

Key words:
M-government, m-government drivers, m-government framework, e-government, mobile devices.

1. Introduction

A trend around the globe is increasing day by day to provide efficient and effective services through the handheld devices to general public. Governments also have realized the efficacy of mobile devices and initiated providing the services to such devices. The e-government services have caused to change the way of work, culture and whole public sector structure [1]. E-government is about government affair that are based on different types of information and communication technologies [2]. The government of Saudi Arabia launched an e-government program in 2005 in order to provide government services online to its residents so that the residents and citizens could benefit online governmental services [2]. The ministries and government organizations have developed websites to providing services, but still there are needs to improve the websites and in a recent study [3] it has been stated that the contents in the websites either incomplete or unavailable and more importantly they are not W3C compliant. Although the Saudi government has initiated the program and efforts are underway to providing online services to everyone everywhere, still uncertainty exists due to improper Information Communication Technology infrastructure [4]. The rate of internet growth has increased significantly in Saudi Arabia and consequently the use of internet is almost doubled in just four years time (i.e. 38.1% from 19.5%) [5]. A recent study shows 55% of world population is in Asia and China, India and Japan are respectively top three countries in which use of internet increased drastically [13]. Thus growing awareness of internet, e-government and increasing use of mobile devices among citizens knock the door of m-government.

The increasing development in technology and mobile telecommunication induced the penetration of mobile devices with 3G services and wireless networks. Nowadays mobile devices are being used in our daily life even for running a business effectively. In Sweden more than 95% people are using mobile devices and large number of government services is available throughout the country [6]. People around the world use short messaging service (SMS) more frequently, but the need of more advanced mobile applications to support multimedia messaging service (MMS) is growing. For faster rate of data transmission General Packet Radio Service (GPRS) is being used. In order to access web on mobile gadgets Wireless Application Protocol (WAP) has been developed. Mobile network providers strive to develop infrastructure in order to optimize performance and even 4G technologies are used for reliable transfer of data, new technology Long Term Evolution (LTE) is being adopted in advanced countries. These new technologies are to support future mobile applications that need high rate of data transfer.
With the continuous development in mobile telecommunication the reason for popularity of different mobile gadgets like smart phones, mobile phones, tablets and e-book readers is the convenience. Mobile communication networks have made possible to use mobile devices almost anywhere especially in remote areas where internet services either not accessible or limited. As in Saudi Arabia small towns and cities are situated at long distances difficulties arise when one needs to contact a government office or ministry for getting work done. If the

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governmental services are available on mobile devices the residents of Saudi Arabia living in any part can benefit with the services without travelling long distances. Since the mobile devices such as smart phones and mobile gadgets are handy and communication is possible anytime from anywhere, citizens can access governmental services at their convenience. By using mobile technologies governments provide updated information to their citizens who can benefit from the government services with ease and comfort.

2. M-Government Framework

As the telecommunication industry is rapidly growing and mobile devices have become essential in everyday life mobile communication services are also becoming more frequent and accessible to common people. In view of increasing development of mobile technologies governments are also taking measures to provide effective government services on mobile gadgets. M-government not only provides convenience but also opens a new channel in addition to the existing fixed phones, web portal, kiosk etc.

There are many m-government frameworks that facilitate analysis of frameworks influence in a society. A framework developed by [14] in which different influencing forces were discussed with specially emphasis was on meeting the needs of both service providers and service receivers. The framework in Figure 1 has been adapted and in the modified framework it is stated that m-government services are likely to be successful provided an appropriate social environment exists. The social environment consists of prevailing culture, literacy, political influence, legality and privacy in a society.

2.1 Push and Pull Drivers

In the framework push and pull drivers have been mentioned on the left and right sides of the M-Government respectively. A first push driver 'capabilities of technologies' may push people to m-government provided lucrative features and characteristics in terms of hardware, software, network infrastructure and security are delivered effectively. In a recent study it is found that 67% of population in Saudi Arabia is above 16 years and use smart phones [15]. This study shows mobile devices are becoming very common in daily life and m-technologies are being accepted widely; therefore, 'acceptance of m-technologies' is a push driver towards m-government. Another driver is 'Governments' that must provide the required services wherever and whenever in a cost effective and efficient manner [16]. 'Vendors' include mobile applications developers and hardware manufacturers which are essentials for m-government. Similarly 'Telecoms' are the telecommunication service

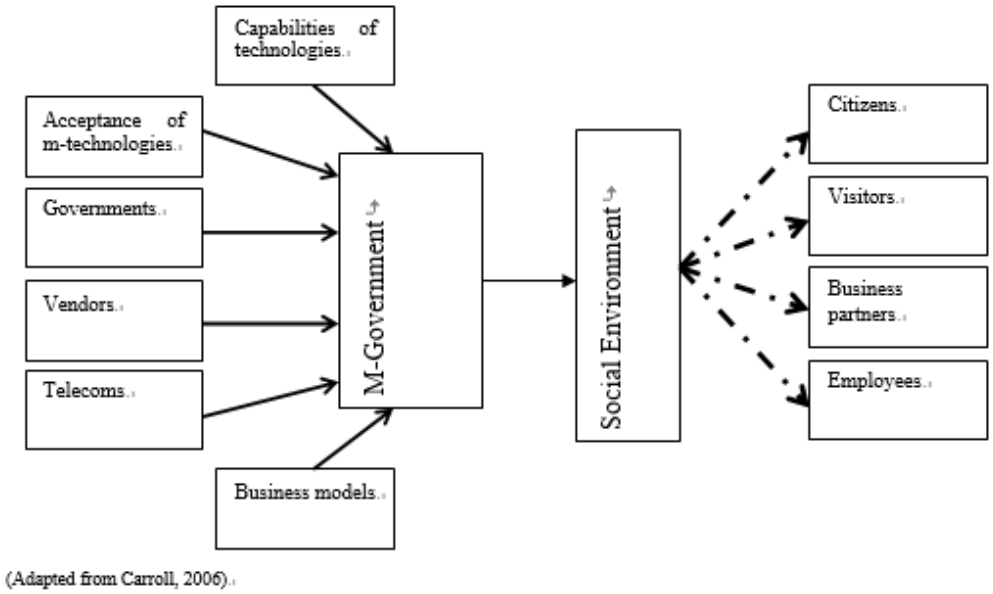

Fig 1. M-Government framework

providers which provide network services for m-government. The last push driver is 'Business models' that are developed in such a way they provide values to companies.

On the other side pull drivers make m-government a success and include citizens, visitors, business partners and employees. However, the effectiveness of these drivers depends on the social environment in which they live.

Social environment varies country to country and mainly consists of culture, political influence, literacy, legality an privacy. Some societies do not have culture of using interactive systems either due to lack of literacy or privacy. In such an environment m-government may not be successful and therefore social environment is an important aspect of successful m-government. 'Citizens' pull driver is the main driver to which government services are offered. In some societies 'Visitors' may not be able to use m-government services such as in Saudi Arabia visitors or pilgrims are not able to use online government services as the systems require resident identity number before services can be used. Nevertheless some services to disseminate information are available to visitors without login into the systems. The 'Business partners' pull driver is to interact with other organizations in order to get information for business purpose. 'Employees' pull driver uses the government services and ensure the mobile devices get the services properly.

2.2 Challenges for Implementation

Increasing use of mobile devices and rapid technological developments has helped in identifying challenges that the implementation of m-government may have. For example, m-government is based on wireless communication that may subject to security threat by intruders. The services should be accessible to all in Saudi Arabia including the impaired users. Implementation of voice extensible markup language protocol [8] can aid m-government services in order to facilitate disabled users. We consider bureaucratic barriers as the challenges exist in implementation of m-government as lack of coordination among different departments and interoperability cause to halt providing services.

A few studies conducted to assess and evaluate services of m-government in Saudi Arabia and a study conducted by Abnumay et al. [9] shows that few years back Ministry of Education in Saudi Arabia started SMS service with Saudi Telecom (STC) for high schools that aimed at providing exam schedule and results on mobiles. However, the service fount to have a flaw that anyone who knows student number could get complete information of anyone. Similarly, some hospitals started making appointments with physicians using mobile phones. In 2002, the Saudi weather forecasting authority started service with STC to providing weather updates, but the service was discouraged by people saying why they should pay for a known stable weather conditions. It is a matter of significance that if the mobile services are provided free of charge, people would be participating and enjoying the facility rather paying unwillingly.

Another challenge Saudi organizations face is the weak information and communication technology (ICT) infrastructure. Many organizations are not capable to provide e-government services (i.e. the base of m-government). A 62.5% of people believe that government organizations have weak ICT infrastructure [10].

People in Saudi Arabia need the mobile government services with easy-to-use applications that are efficient and effective. The Table 1 shows some of the applications that can be useful for government organizations.

Table 1: M-Government Applications

Application	***Description***
Health Information	- Access to health information - Physicians, blood banks, labs and pharmacies database - Direct prescription to pharmacies
Policing System	- Parking and ticketing - Access to criminal records - Violence prevention
Transportation System	- Flight, rail, bus reservation and ticketing - Transportation information (schedule etc.)
Education System	-Universities/colleges/schools information - Admission/exams/results - Teacher-parent communication
Banking System	- Transfer amount in accounts - Payment of bills / receiving bank statement

Although m-government trend is growing throughout the world, there is a need to improve the infrastructure of the services. As stated earlier in Saudi Arabia the ICT infrastructure is weak and it needs to be improved for providing effective services to citizens. The mobile devices that equip with Wireless Application Protocol (WAP) access applications written in WML, therefore, applications should be written in WML.

3. Conclusion and Future Work

This paper has presented the necessary influencing drivers in an m-government framework that induces in adoption of m-government especially in Saudi Arabia. Also, it has presented an overview of various challenges that Saudi organizations may encounter and signified the applications needed for m-government. It is important that m-government applications have accessibility and interoperability features. As wireless technology is developing swiftly it is anticipated that the existing technical problems in implementation of m-government would be removed. The Fourth Generation (4G) technology is at the door that offers increased bandwidth and better accessibility.

As a work future the author intends to conduct a study in order to determine the effectiveness of existing m-

government applications in various organizations and a framework will be developed for effective m-government

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