M-Government in Jordan: Today and the Future

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ABSTRACT

The pervasive use of mobile technology is changing how governments can provide information and services to citizens, businesses and internal government entities. Mobile government (M-Government) is a subset of electronic government (E-Government) comprising an alternative channel for governments in providing information and services. Jordan, like many other countries, is trying to adopt this emergent concept in an efficient way that will provide an excellent level of service as desired by its citizens. In this paper we explore this concept from the literature and review the steps that the Jordanian government pursued in utilizing mobile government (m-government). The paper will discuss mobile government concept, its definition, the common services provided by governments via mobile environments in the world and especially in Jordan. Conclusions and future work are laid at the end of the paper.

Keywords: E-government, M-government, Jordan, Mobile government applications.

1. Introduction

The Information and Communication Technology (ICT) sector is the fastest growing sector in Jordan and a major contributor to the Jordanian economy. The ICT sector contribution is 10% while (e.g.) the contribution of agriculture is only 4% in the Jordanian economy. On the other hand, the penetration of mobile technology in the Jordanian market has increased from 8.1% in 2000 to 57% in 2005 with 3.14 million accounts distributed between four service providers [1]. This paper tries to define E-government, its stages, define M-government as a subset of E-government, identifies its benefits, stages, challenges and Jordan's position compared with other countries in their M-government usage.

2. Literature review

E-government is defined as "the use of information and communication technologies as a tool to achieve better government" [2]. According to Halchin (2004), E-government is the government use of Web-based Internet applications and other information technologies, combined with processes that implement these technologies. He concluded that the purpose of implementing e-government is to enhance access to and delivery of government information and services to the public, agencies, and government entities; and to bring about improvements in government operations that may include effectiveness, efficiency, service quality, or transformation. Research has not agreed on a widely accepted definition of E-government as the topic resides among more than one area of research which may include computer science, information systems, public administration and political sciences [3]. Yildiz [4] tried to explain the vagueness of e-government concept as he claimed that there is an oversimplification in the models proposed for building e-government projects.

The most widely used model of e-government argues that e-government projects evolve through four stages of development as their integration, technological and organizational complexity increase [5]. The first stage is cataloguing, where government provide information by creating government agency Web sites. At this stage, only one-way communication between the government and the governed is possible. The second stage is transaction, where agencies can provide online transactions with government agencies. This makes two-way communications possible. The cataloguing and transaction stages focus on creating an electronic interface for government information and services. The third stage is the integration of government operations within functional areas in government. Agencies working in the same functional area integrate their online operations. The final stage is the horizontal integration, where different functional areas are integrated within the same electronic system and put to use through a central portal. The last two stages focus on the integration of the provision of e-government activities within the existing government structure.

The United Nations Development Programs (UNDP) proposed another model that is also comprising four stages; however in this model more emphasis is focused on Arab countries. The model includes: posting information, two-way communication, exchange of value, and the integrated services stage [6].

2.1 E-government readiness in Jordan

E-readiness is defined as the degree of preparation of a nation or community to participate in and benefit from ICT development [7]. The Jordanian government started to invest heavily in the ICT sector in general and the E-government project specifically. As a result in 2008 Jordan moved from the 90^{th} position to the 15^{th} position in using its e-government portal (was 90 in the year 2005) which is the biggest leap ever

happened for a small and developing country with limited resources like Jordan [8]. The United Nation report indicated that Jordan's leaping in E-participation shows a strong intention from the government to take the citizens input into consideration. According to the report, the e-participation depends on three aspects: E-information, E-consultation and E-decision.

E-information evaluates the national website and portal, which includes online publishing, listing of opportunities and electronic notification to clients. Jordan's website was evaluated with 20 points for E-information measure with the highest score given to the USA with 93.33 points. E-consultation depicts the interactive methods employed to attract clients' feedback and opinion. Jordan got 61.11 points compared to 100 point given to the USA with the highest rank in the list. E-decision making is the extent to which the government takes into account the clients inputs when making decisions. Jordan was awarded 62.5 points compared to 75 for the USA [8].

The Jordanian government apart from its E-government project started to provide some services via mobile channels for citizens trying to make such services easy to use and fast to deliver. The following section will explore mobile government initiatives and issues and concentrate on the Jordanian case.

2.2 M-government

M-government is defined as the use of mobile and wireless communication technology in providing government services [9]. Research indicated that M-government refers to "the use of mobile and wireless communication technology within the government administration and in its delivery of services and information to citizens and firms" [10]. Using mobile technology to deliver services for the customer is still in its early stages, but according the highest rates of mobile penetration in the world it is expected to be widely used in the future. Kushchu and Kuscu [11] concluded that the use of mobile government is enviable because of many reasons including technology advances in the area of wireless networks and the Internet. Also, the benefits gained from these developments and the citizens' expectations for better services are part of the reason M-government might gain support in the future [11].
The utilization of mobile channel is stimulating new ways of conducting business by governments and thus opening new opportunities for citizens, businesses and even government to benefit from public services. To conduct M-government, one needs devices for data entry, access to the Internet, applications, and other equipments. The boom in using mobile devices, including Internet-ready mobile phones, smart phones, and Personal Digital Assistants (PDAs), is pushing governments toward the deployment of mobile government [12].

The use of M-government provides flexible and easy to use services for all clients and especially citizens in the rural and remote areas, who find it difficult to deliver the services in traditional ways. Using mobile technology in delivering information and services will provide convenience to citizens and decrease the bureaucracy [13].

Ntaliani, Costopoulou, and Karetsos [14] claimed that the use of mobile government can provide support and solutions for conducting government services in different ways especially in the agricultural sector:

1. Mobility and ubiquity: it is a major advantage of mobile government that the government can provide its services and can be reached by citizens anywhere and anytime. This way of receiving services is very efficient for people who are working in the agriculture sector due to the nature of their work, where they spend most of their times in the fields and at selling points.

2. Provision of location-based government services: where the user can access the service based on his physical location, such as in the agriculture sector the citizen can benefit from knowing the demand services, potential buyers and information about the market based on certain region.
3. Time saving: the use of mobile government can save time and money due to decreasing the levels of bureaucracy.
4. On-time information delivery: M-government provides real time connection and fast access to the desired information.
5. Ease of use: based upon the customization and personalization of services the users can access the information more efficiently.
6. Improving emergency management: mobile government can be used to increase the efficiency of accessing certain information and gives more and better opportunities to know in advance, (e.g. in case of crises happening).

The number of M-commerce users in the world was 94.9 million where it is expected to be 1.67 billion by the year 2008 [15]. Such numbers encourage the authorities around the world to benefit from these high rates of penetration to provide their services via the mobile channel. These efforts could be managed with the collaboration between the authorities and the MNOs (Mobile Network Operators) where both can gain benefits and profit. Governments will use the already established networks and may not spend too much on educating the users about new ways, authorities also will gain profit from the users. On the other hand, the MNO will gain also huge profit from the new channels by billing customers on the data exchanged [16].

2.3 The development of M-government

Similar to the E-government evolutionary models explored in this paper, mobile government follows a path of stages of development: The first stage is the *information stage*, which includes sending information via SMS (Short Message Service) about government's activities such as information related to public offices opening hours, consulting hours and deadlines [17]. This stage is comparable to the broadcasting mode in e-government, which is based on the web presence of governments [18].

The second stage is the *Interaction stage* in M-government where a real response to a request via SMS is provided [17]. In e-government, exchanging information with citizens via email is similar to this stage [18]. The third stage is the *transaction stage*, when using m-government as a vehicle to go in numerous steps of work flow and payment through mobile devices [17]. E-government third stage includes higher levels of processing including payment for services using the website of the government [18]. The final stage is the *transformation stage* in M-government where the back offices are re-structured (re-engineered) for electronic and mobile administration to the full integration of services [17]. This stage is comparable with the full integration and centralization of services and information in traditional e-government [18].

2.4 Mobile government applications

Different services provided by the government using mobile technologies include many areas. Table 1 shows some of the common uses of mobile activities in the public sector.

3. Mobile government in Arab countries

Arab countries are now investing in the M-government due to the escalation rates of mobile penetration in those countries. Dubai government started to provide its services via mobile phones in the year 2003 by using SMS, where they provide information and services to clients. Dubai government also used the RFID (Radio Frequency Identification) technology in

implementing a project called SALIK which aims to reduce the traffic jams and problems.

Table 1: Common mobile services and applications

Area	Description	Ref.
Agriculture	SMS notification to the farmers in the field about weather information	[14]
Governmental work	- Law enforcement: To support the activities of state officials who are on the move - Reduce bureaucracy: Reduced processes and steps in governmental work in Bejing, China - Tax administration: In Hungary where the authorities pre calculate the income tax and send it as SMS to the citizen - Emergency management: Government send SMS messages notifications if any emergent situation will occur	[11] [13] [17]
Healthcare	Using handheld wireless applications that enable doctors, nurses and others to gain access to the right information at the right time (In Saudi Arabia they have started to send appointment notifications to the patients)	[11] [19]
Learning and education	- Using mobile devices to frequently update parents about their children academic performance - High school exam results notifications: Implemented in countries like Jordan and Saudi Arabia where customer send the student number to get their result	[11]
Tourism	Using hand held devices to receive information about the nearest places to visit which is applicable in the project of CRUMPET system	[20]
Weather notification	Customer sends his request and get the weather forecasts this is very efficient especially in the areas where the weather is not stable.*	

- *According to author's knowledge*

The citizens can register by opening new accounts and buying a special card called SALIK. After the registration process the customer receives a message on his mobile with the new account number. Also, the personal pin code and some guidelines telling the customer how to benefit from using this card while driving under SALIK gates in the less traffic roads is provided [21]. This project put Dubai as a leader in the region in utilizing mobile services. Dubai was the first Arab country which started to provide the intelligent roads services.

The services are provided to customers as an SMS and provide either a pull service or a push service.

The departments that provide pull services are Dubai civil aviation, Dubai Police and Dubai economic department where citizens send SMS with their request to a specific number receive the answers. Push services are implemented when the department itself sends messages to users and members without a request from them. In Dubai, almost all the government departments provide this type of service.

3.1 Mobile government in Jordan

Mobile penetration in Jordan is considered to be one of the highest in the region, reaching 64% in 2006 [22], 86% of the Jordanian families are using mobile phones and some users may have more than one line. Comparing this with only 16% of Jordanian families who have Internet in there homes [23], the Internet penetration in Jordan is still behind the desired level and needs to be alleviated substantially.

The higher rates of mobile penetration in Jordan and the existing infrastructure for M-government, encourages the Jordanian government to start providing some of its services via mobile phones. Providing such service via mobiles has started in 2008. The project name was SMS gateway and aims to increase the

effectiveness of communication channels between government and citizens. The services are provided through SMS which is considered to be an effective way for reaching all the citizens and communicate with them.

Providing the services is done through two distinct environments:

1. Pull messages: These services are requested by the citizen when sending a message requesting for a piece of information or service, the citizen may subscribe to always receive these information or services.
2. Push messages: These services are sent to the citizen without a request from him, to provide information about the governmental departments and services.

Pull services are accessed by sending an empty message to the number 94444, and the customer will receive a message with the available services. The citizen then sends back the number of his request in another message to the same number. The citizen only will pay JD0.03 when receiving the final message which has the service or the information that he asks for. The pull message services that are provided in Jordan through the government's website are described in Table 2.

3.3 Limitations of mobile government:

The services provided by the government via mobile and wireless devices have been hindered by many limitations. The limitations of mobile devices themselves are crucial as devices used might be of low memory and size. Also, there are no widely accepted standard for wireless applications as developing software for wireless devices is challenging. The mobile technology itself still evolves to improve the services without disconnections. Finally, cooperation between the government and local mobile network operators could raise problems due to security restrictions for sensitive information.

In Jordan specifically, citizens can have multiple mobile lines (i.e. one or more from Orange, Umniah and Zain). The user of the line may not be the same as the one who registered and furthermore large numbers of youngsters use mobile phones where the lines are not registered in their names.

Table 2: Pull services provided by the Jordanian government

Service	Description
Vehicle licenses	The service provider is Vehicle License Department by sending the number of this service and the car information the customer will receive the approximated value of the car's custom.
Competitive ranking	Provided by Civil Service Bureau by sending the number of the service and the Social Security Number of the citizen and he will get his ranking
Vehicle traffic complaints	Provided by the Greater Amman Municipality by sending the number of the service with his compliant.
Custom services	Provided by Jordanian Customs, citizens can get car tax-calculation, customs deposit status, temporary admission for goods, transit guarantees.
Tax Services	Tax balance for individuals and corporate provided by Income and Sales Tax Department.
Housing Services	Advertising provided by Housing and Urban Development Corporation about their products and services
Utility services	Water bills provided by Meyahona (exclusively in Amman).
Weather services	Weather forecasting provided by Jordan Meteorological Department

The cost for the final message to get the service may not be feasible for Jordanian citizens, since the cost of the message is JD0.09, which gives the citizen 9 minutes of calling, so from citizens' perspective it

may be more feasible not to use it. Also, when you request the M-government services through 94444, the menu sent is in Arabic, so if you are not Arabian then you can't understand the message. Some services provided are exclusive in Amman due to the pilot project conducted in M-government, so if you are not in Amman you can't be served. Finally, the process to get your information or service is tedious and boring in some cases.

3.4 Personalized government: the intelligent M-government

Today M-government has become the center of a wide range of activities in many countries so governments started to shift toward the stage of service transformation. Governments proactively anticipate the nature of the service citizens need and then provide them with the appropriate service in a timely manner instead of simply waiting for requests and then reacting to them. According to Jorstad and Thanh [24], *"personalization is the process where services are adapted to fit each individual user's requirements (needs and preferences)"*. Personalization satisfies M-government's vision. To provide easier and faster access to governmental information and services anytime and anywhere in order to improve citizens' quality of lives [25].

Jorstad and Thanh also provide a framework for the process of personalization that entails. The Collection of information about the user to build services preference profiles. These preferences could be gathered by a subscription process or a user-rating mechanism, storing and keeping regular updates for this information and finally, recommendation of personalized services to a targeted user. Based on the literature, the existing personalization techniques can be classified into the following categories: First, *Collaborative Filtering (CF) personalization*: basically it uses pattern matching techniques to produce personal recommendations based on correlations among users' choices. Second, *User profile based personalization*: which uses registration process to collect personal information such as name, gender and content preferences to build a profile for the citizen. [26]

Governments that take advantage of using such methods of personalization to meet citizen's expectations gain added value

4. Conclusions and future work

In this study we tried to explore different facets of mobile government. Research indicated that the adaptation of mobile government services was a result of pressure on the government for adapting technological changes and enhancing the way of providing services for customers in an easy and convenient way. Mobile government implementation in Jordan faces crucial challenges and limitations, but offers inspiring rewards. This study explored the limitations facing the Jordanian initiatives and demonstrated the applications that are already in place.

Jordan is embarking on an era of utilizing mobile technology to facilitate the processes and services provided by mobile government, and thus trying to overcome the obstacles facing it. Implementing e-government and M-government in Jordan is a courageous step since Jordan, like any other developing country, lacks many resources needed for such initiatives.

Future work implies the creation of comprehensive framework for M-government development in Jordan, the study of which agencies have the highest demand for this concept and its implementation. Also, more research is required regarding a feasibility study of implementing location-based government in Jordan and its future implication.

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