M-Government

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Abstract. **M-government is defined as the 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. The main effort of m-government is to become a complement to e-government. The 3P Value Model for m-government application has three dimensions of evaluations: prime value, pleasure value and post value. There are four major factors concerning citizens and the use m-government applications: awareness, ease of use, real added-value/benefit and price.**

Keywords. **E-government, democracy, transactions, mobility**

I. INTRODUCTION

Many governments have engaged in the process of developing a wide range of electronic (e-government) services by using information technologies, particularly, web-based internet applications. Nonetheless, as governments increase the use of information and communications technologies, demands by the public for more effective services increase. In response, governments are aiming to meet the rising expectations of citizens for better, more comprehensive services using innovative information technologies and various service delivery channels in addition to the web.

E-government efforts aim to benefit from the use of most innovative forms of information technologies, particularly web-based Internet applications, in improving governments' fundamental functions. These functions are now spreading the use of mobile and wireless technologies and creating a new direction: mobile government (m-government). M-government is defined as the 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 [Kushchu, 2003].

M-government seems to have a substantial influence on the generation of set of complex strategies and tools for e-government efforts and on their roles and functions. M-government is inevitable. The number of people having access to mobile phones and mobile internet connection is increasing rapidly. The mobile access is becoming a natural part of daily life, and the governments will have to transform their activities according to this demand of convenience and efficiency of interactions for all parties.

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Information delivery to public is a key task of government and often not an easy job. It is the responsibility of the government to keep their citizens informed of what is happening around them. Citizens need this information and sometimes are critical for them in making decisions and forming any opinions. Timely information delivery to public promotes democracy in the country and creates accountability. Mobile technologies prove to be a critical channel for governments to provide timely information for citizens [Zalesak, 2003].

II.E-GOVERNMENT MOBILITY

Even considered segregate, e-government and m-government are not two separate entities. E-Government encompasses usage of all technologies to deliver services to citizens and improve the activities of government and streamline their processes. On the other hand, m-government is an add on to the e-government confined to use of mobile technologies such as mobile phones, PDAs (Personal Digital Assistant), Wi-Fi enabled devices, Bluetooth, wireless networks in delivering services. In addition, m-government is a better option compared to e-Government in delivering services and public information to citizens due to its nature of being available anywhere, anytime and from any internet enabled device [Lallana, 2004].

The main effort of m-government is not to provide a replacement for e-government but to become a complement to e-government. While the mobile devices provide a faster and timely way of delivering information to citizens, it has some limitations. Mobile phone is considered as the most common medium or enabler of m-government but lacks the ability to transfer large volume of information, especially complex information. In addition they lack several features that the normal internet enabled personal computer has. Examples of this limitation are the Short Message Service (SMS) which can transmit up to 160 characters only while email can transmit large amount of information and the mobile internet channels throughput while the implemented fix line internet protocols already provide gigabit transfers [Ghyasi, 2003]. These limitations limit m-government services to simple but most critical applications. In case of developing countries, delivering critical information to citizens is one of the most beneficial applications of m-government.

The service quality will follow the technological evolution of the Internet, and the future development of e-government applications will be evaluated based on mobility, interactivity and intelligence. Among these three dimensions, mobility is expected to gain more attention than the other two.

- *Increased expectations:* Often, people want services to be more readily available with a high standard. When people are aware that some new service is available in the commercial sector, they will expect for more in governmental services. This in turn requires more efficient civil servants who need

more accurate and timely information readily available regardless of where they are working. This contributes to the forces driving mobile government applications.

- *Emergence of mobile internet:* With the development of 3G mobile network services, the capability of providing services through mobile devices are greatly improved. This development makes the provision of mobile government applications possible and more accessible than using the wired Internet.
- *Improvement on e-government effort:* Mobile government is not a replacement to e-government but complementary to it. People can access the applications from a new platform in case they do not have access to the wired internet.

Extending from the definition, mobile government applications may be considered as different from e-government applications in terms of the followings [Arazyan, 2002]:

- *Personalized information:* Computer can be shared among different users, but mobile devices are designed to be used by a single user. This means that personalized information can reach the same user at any time through that one specific device.
- *Always on:* Different from personal computers, most mobile devices are always switched on. Usually, these devices stay at an inactive state, but applications can "wake up" the device. This is very different from e-government applications.
- *Mobility:* As mobile devices are always carried around by the user, applications can be designed to provide instant information to the users. An example is to send out warnings during emergencies. The development of mobile government applications can simply be migrating e-government applications to a new platform, or to develop new applications according to the characteristics of mobile devices. There is no definite answer to which approach is better, and that depends wholly on the provisions of particular applications.

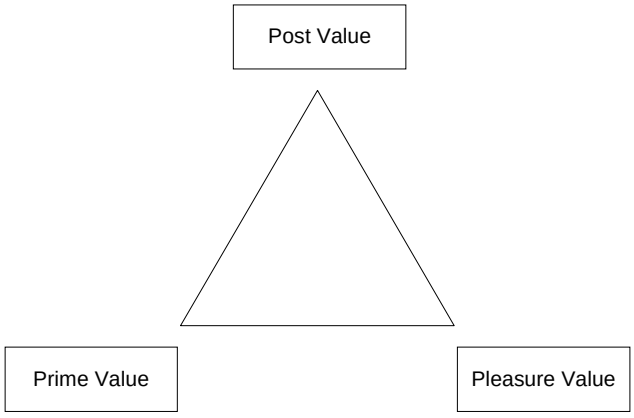

Figure 1. 3P Model for m-government applications

In terms of technology involved, currently many mobile government applications make use of SMS (short messaging service). Other technology includes WAP, MMS and mobile internet. It is expected that mobile internet will play a much more significant role in near future due to the development of 3G technologies and the capabilities to process more information faster.

III. M-Government Application's Value

Analyzing other researcher's studies, reports and news from different countries, we have agreed on using the Yu model to evaluate the value of the emerging m-government applications. According to [Yu, 2004], the 3P Value Model for m-government application (Fig. 1) has three dimensions of evaluations: prime value, pleasure value and post value.

We will use 3P Model to identify the key elements of what is valuable in some emerging m-government applications. This analysis aims to improve our understanding of m-government applications and services and to help application developers and government officials to identify applications that are worthwhile to invest in.

Table 1

Prime Value

A. Instant information release		
Service	**Place**	**Description**
SMS for people with hearing disabilities	Great Britain	Citizens with hearing problems can be contacted by the police with SMS
Special notification cases	California, USA	SMS are sent to citizens in case of energy black-outs
SMS floods warning systems	Malaysia	When the water level rises to certain level, the control centre sends a message to all the affecting citizens
B. Mobile warning		
Fight against mobile phone theft	Holland	SMS messages are sent to the mobile number of stolen phone every 3 minutes. Application can still work even when original SIM card is removed
Prevention of false phone calls on emergency lines	Denmark	When false calls are initiated through mobile phones, SMS messages will be sent to that mobile number to interfere the phone
C. Quick Information Collection		
Fire fighting	Germany	Firemen receive critical information on their way to the site using mobile devices
Search for missing citizens and criminals	Germany	When police are searching for missing person or criminals, SMS message will be sent to registered bus and taxi drivers.

Prime value means satisfying a real need for the users. Satisfying the real need does not simply imply providing users with what they want, but to solve a particular problem they are facing. For m-government applications, prime value is concerned with providing a solution to problems that could not be solved easily by the wired technologies. The prime value emerges in the cases of:

- Instant information release
- Mobile warning
- Quick information collection

Mobile devices are often carried by users and are always turned on. This characteristic enables mobile devices to serve as a warning or reminder to users with quick and specific information release. The Table 1 A presents several examples concerning the instant information release.

The instant information release model targets a wide range of users and is suitable in mass crisis situations that affect everyone in a specific community.

Another way of using messaging service is to target at particular persons and give them specific warnings. Refer to Table 1 B for specific cases.

TABLE 2
PLEASURE VALUE

A. MOBILE TRANSACTIONS		
Service	**Place**	**Description**
Mobile automobile parking	Serbia, Belgrade	Driver can log in and log out a parking space using a mobile phone. Fee is automatically charged to the driver's account. Receipt is sent via SMS
Tax declaration	Norway	Citizens via SMS message with specific code can complete the entire tax declaration procedure.
B. FASTER INFORMATION EXCHANGE		
Mobile hospital staff	Sweden	Mobile technology enables hospital staff to have faster information flow
Mobile care workers	Norway	Ability to access data from service site allows care workers to spend more time on their job rather than traveling around for information
Fight against higher rate of employment	Australia	Allows job seekers to reach information in a timely manner
C. FIGHT AGAINST CRIME		
Reporting crime	Philippines	Can report suspicious activities via SMS
Criminals Identification	Italy	Couple of thieves are caught after photos of criminal act were taken by others and sent as MMS to the police

The possibility of retrieving information while on the move is one of the major characteristics of mobile government applications. This allows civil servants to collect necessary information to provide more efficient and effective service to the public (Table 1 C).

The pleasure dimension of 3P model represents provision of better services to make citizen-government interaction more enjoyable. This dimension may come about in different forms, such as ease of getting service, or clarity of information. The possibility of receiving service through mobile phone is an improvement in experience already. The pleasure dimension is mainly identified in:

- Mobile transactions
- Faster information exchange
- Fighting against crime

Transaction is a very important part in doing business and how to improve that experience for customers can be an interesting issue. Currently, many companies are exploring the possibility of mobile commerce and some governmental organizations have already taken the initiative to utilize this opportunity (Table 2 A).

In case the speed of information exchange is important but not critical, applications are defined as enhancing the pleasure value for users (Table 2 B).

To fight against crime, law enforces need citizens' corporation to provide information. The reports from citizens can increase the chance for police to arrest, find missing people and better investigate cases. Table 2 C presents some examples.

Value is a comparative relationship between benefits and costs; clearly the issue of costs can have a significant impact on the users' perception of value. Besides the cost in terms of money, other costs may include potential privacy issues and possible danger in security. Post value, the third dimension deals with these issues. This value is the perception of users towards government services and how users feel after they use the services. This serves as a foundation to the 3P model and differentiates applications that are welcomed and easily adopted by citizens. Applications that provide this value should make users feel that their privacy or security issues are handled properly. The post value is identified in:

- Location Identification
- M-Voting

GPS can be a very powerful tool to identify users' location. The proper use of it can allow users to be located and shortens the time to find services at a particular location (Table 3 A).

TABLE 3
POST VALUE

A. LOCATION IDENTIFICATION		
Service	**Place**	**Description**
Police GPS	USA	All police are equipped with GPS enabled mobile devices
Emergency black box in Car	Europe	Cars are equipped with on demand black box that identifies the cars location in case of accident
B. M-VOTING		
Local elections	Czech Republic	lack of confidence in mobile technology has greatly affected the post value
Eurovision contest voting	Europe	Voting for singer, minor privacy issues arise

Mobile voting via SMS has been used in some local government elections, but is especially popular for private commercial use in conducting polls and receiving customer comments, often for entertainment events (Table 3 B).

Several issues arise from the pilot experiences that influence on its negative popularity. The system is fully appropriate for commercial use, considering the lack of privacy issues in entertainment opinion research. On the contrary, the use of the m-voting system in political elections arises the question of undisputable personal identification over the mobile phone's number, more clearly presenting the users political belief that is by law considered only as an intimate matter.

IV. USERS' READINESS

Readiness refers to the situation in which people are able to access and use Information Communication Technologies and Internet regularly. While the readiness is high in many developed countries, the situation is different in developing and under developed countries. People in many developing and under developed countries are unable to access ICT with sufficient regularity and use and in some places people are unable to access it at all [Gashghai, 2002].

M-government brings lots of opportunities which e-government couldn't succeed. Mobile government applications are accessed using mobile devices such as mobile phones and PDA's. The cost of owning these mobile devices are low. In addition, use of these devices is fairly simple thus making it easy for any common person to use it to access information. Governments can use this opportunity to better reach out to their citizens. Considering the lack of readiness for e-government and increasing use of mobile phones in developing countries and factors such as wide availability of mobile phones, ease of use, low cost of ownership and use, m-government seems to be a better way to reach citizens and interact with them.

V. MACEDONIAN CASE

In order to present a clear picture about the user's readiness to adopt the m-government channels, we realized an electronic survey about the citizen's opinion in the Macedonian society.

TABLE 4
SURVEY-BENEFITS FORM M-GOVERNMENT

Benefit	% participants
Better Information	41%
Save time	33%
Better communication	29%
Freedom	23%
Mobility	21%
Democracy	21%
Transparency	16%

The electronic survey was anonymous. The survey was intended mainly for the employees and the student at the Institute of Informatics in Skopje.

101 participants answered the questions in the survey, 63% males and 37% females. The participants were mainly young people, in the age group 20-35 years old with strong IT knowledge.

According to the results, the major part of the participants were not informed about e-government (66%) and even more 68% did not have a clear picture what is m-government. From the rest, 55% saw m-government as an addition to e-government and 45% considered them completely diverse.

The participants numbered several issues as benefits form implementing m-government services in Macedonia. The mostly addressed issues are presented in Table 4.

When it comes to the State's strategy about implementing m-government services, the participants clearly identified that it should involve pilot projects, implementation of balanced services with democracy/cost and services that are profitable in nature.

At the end, the participants pointed out that the issues as: lack of knowledge in the government, lack of technical infrastructure, lack of initiative and inexistence of ministry of information technology should be considered as major obstacles when implementing m-government services in Macedonia.

VII. RECOMMENDATIONS AND CONCLUSION

There are four major factors concerning citizens and the use m-government applications: awareness, ease of use, real added-value/benefit and price.

As the survey showed, the users should be carefully educated in order to feel comfortable with m-government. It involves public campaign and benefits that the citizens can clearly see and understand.

When implementing new technologies, governments should not force citizens to upgrade their current devices, but rather start small with applications using current technologies and current bandwidth for data transfers or services.

Starting small, but thinking big – basic m-government applications should be cornerstones of wireless strategies for governments worldwide.

On the other hand, such systems should be open to handle new technologies and the strategy should have a clear, long-term vision for the provision of the service and information relating to it.

Governments should prepare a complex strategy document in close cooperation with the public and private sectors. Governments should not see businesses as just business partners, but as true team players with a common goal – serving citizens in the best possible way.

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