Author(s): Shareef, Shareef M.; Arreymbi, Johnnes; Jahankhani, Hamid; Pimenidis, Elias
Title: Multi-channel delivery of services – initial pace towards M-Government: the case of Kurdistan region of Iraq
Year of publication: 2010
Citation: Shareef, S., Arreymbi, J., Jahankhani, H. and Pimenidis, E. (2010) 'Multi-channel delivery of services – initial pace towards M-Government: the case of Kurdistan region of Iraq', Proceedings of Advances in Computing and Technology, (AC&T) The School of Computing and Technology 5th Annual Conference, University of East London, pp.54-63.

MULTI-CHANNEL DELIVERY OF SERVICES – INITIAL PACE TOWARDS M-GOVERNMENT: THE CASE OF KURDISTAN REGION OF IRAQ

S. Shareef[1], J. Arreymbi[2], H. Jahankhani[3], E. Pimenidis[4,]
School of Computing, IT and Engineering, University of East London
U0857289@uel.ac.uk, J.Arreymbi@uel.ac.uk, Hamid.jahankhani@uel.ac.uk, e.pimenidis@uel.ac.uk,

Abstract: This paper investigates mobile government or (m-Government) developments within the wider context of e-Government but mainly those efforts in Kurdistan Regional Government (KRG). The paper analyses other m-Government implementations from a wider perspective. The precise attempts made by developed countries in utilizing the latest technologies and applications for enhancing electronic government or (e-Government) will be explored. Two main challenges have been identified; firstly we explore the multi-channel delivery of e-government for enhancing information and service delivery to citizen. Secondly we propose an architectural design for m-government applications, through utilizing the mobile GPS (Global Positioning System) use in traffic police information system to identify and establish the identities of drivers and vehicles in real time.

Keywords: e- Government, m- Government, System Architecture, Multi-channel service delivery, Kurdistan Regional Government (KRG)

1. Introduction

Electronic government (e-government) could be expressed as the use of Information and Communications Technology (ICT) to transform government by making it more accessible, effective, efficient, and accountable. Government is responsible to deliver services to its citizens efficiently and effectively including being cost effective as possible and managing any risk associated with this service provision. Many definitions and approaches of e-government exist, (Holzer M., Tae Kim S., 2005) for instance identified both digital government and digital democracy that provides services to citizens and the contribution of citizens in government respectively**.** An extensive definition of e-government covers the use of ICT by public sector organizations as it consists on a variety of potential delivery channel services (Heeks 2006).

The spread of the Internet as a service channel guided many people to believe that the internet would replace all other service channels such as telephone, letter writing, face-to-face etc., or render them obsolete, but Pieterson and Dijk, (2002) believes that **a**ll other channels still exist and the use of internet in many cases has not lead to obstacle in the usage of other service channels.

Galal-Edeen et al. (2008) explained the use of multi-channel for service provision, and argues about a gap between the governments preferred channel of communication and the channels that the citizens prefer, also discussed the criteria for evaluation of multi-channels from the citizens perspective to improve the citizen's participation with government.

1.1 Channels Categorisation

The evaluation is based on different types of channels which the users preferred and influenced by the circumstances. For example, the nature of the services required, or is required for direct interaction, or person to person interaction. Research shows that, the channels can be classified into three categories: directness, accessibility, and the modality of channels. In our opinion many more channels exist and can be classed into six categories, such as directness, accessibility, speed, security and privacy, availability, and the modality. The first category directness of channel, is that in which requirement is determines, whether the user wants an interaction or not. The interaction happens in two ways:

1. One way communication, in which an individual or organization sends out information, and,
2. Two way communication, is when a citizen or an organization sends out information and get a response to the information,

The second category is accessibility of channel. In this class the requirement verifies the services can be accessed through at least one channel (i.e. mobile phone, PC, and others). The third category depends on the time that the user spends to get the service in other words; the citizen selects an appropriate channel based on how fast the service is delivered. The fourth category is based on how the channel is secured and protects the citizen's or organization's information, such as transferring money which required stringent security and protection. The fifth category is based on the opening hours of the channel, for example if the channel service is face to face interaction, the opening hours would be the same as usual opening hours of the regular offices, but channels such as web-based service or interactive voice response system that do not involve face to face interaction may have 24/7 service. The last channel service is the modalities of channel, where the citizens are allow accessing the channel online anytime, anywhere and anyhow.

Government can provide and implement multi-channel delivery of services in order to reduce the cost and increase the efficiency and effectiveness of the services. A multi-channel strategy, can deal with two main issues faced by the public bodies in today's environment. The first aim is improving the services offered to the citizens and the second is to reduce the costs of offering these services. Citizen required services to be reliable, flexible, accessible, complete, perfect, easy and secure, that vary from one person to another, for example the disable person need specific requirements (EC 2004). Governmental organizations are faced to provide more citizen-oriented services; citizens can be served through multi-channels, such as physical offices, web-based, call centres, and others (Janssen and Wagenaar 2002). One of the main aims of the local government is to provide services to its citizens; these services should be in a very high level of efficiency, usability, friendliness, accessibility, and effectively, unfortunately these requirements are not often fulfilled. Problems such as busy phone lines, long queues, continuous redirections to other departments, all show the functioning of traditional communication channels, telephone, mail, visit to the office, giving overview to over all quality of services (Bassara, at el. 2005).

The type of multi-channels with their benefits to citizens and providers are depicted in table 1 (EC 2004).

Table 1 type of the channels with their benefits to citizen and provider (EC 2004).

Channels	Citizen benefits	Provider benefits
Call centre	-Provide services on a 24/7 basis -Provides various services -Services can be accessed from home or the office	-Cheaper than the traditional channel
E-mail, automated responses	-Provide services on a 24/7 bases -Services can be accessed from home or the office	-Required no personal contact, less expensive -can be send one-to-many
E-mail, manual response	-Provides services from home or the office	-Inexpensive than 'in person' contact
Digital TV	-Provide services 24/7 on a bases -Services can be accessed from home or the office	-High possible diffusion -can elevate e-inclusion - can be provided one-to-many
Voice Response System	-Provide services 24/7 on a bases -Accessed from home or the office for the services	-Less expensive -elevated diffusion of access equipments
Mobile devices	-Provides services regardless of the location -Provides varies channels service, SMS, e-mail, and access to internet,	- promote and increase e- inclusion
SMS	-Provide services 24/7 on a bases -Accessed from home or the office for the services	-Announcing services -Less expensive -Required no personal Contact
Telephone	- Accessed from home or the office for the services	-Very large Diffusion Use
Web Site	-Provide services 24/7 on a bases - Accessed from home or the office for the services	-Involve huge amount of Information -Obtaining services through internet and Less expensive

Recently, novel development of ICT together with the growth of wireless/mobile communication allows the concerned sector to meet their challenges by reengineering their front-end and back-end office. The new ways have been developed through different type of channels allowing citizens to access to their services anywhere, anytime, and anyhow. In other words the citizen can get services or information whenever they want it.

Furthermore, citizens required services with less cost and efficient service delivery, information and communication technology (ICT), and wireless/mobile technology decreases the transaction cost by allowing direct transaction, anywhere , anytime, for example visit physically to the offices has more transaction cost than the use of internet or web-enabled facilities. In this situation mobile/wireless communication does an important role as omnipresent technology.

1.2 M-government issues

Today's challenge is to move towards mobile government, because in several countries the ICT infrastructure is not sufficient and wired phone service is not a viable option, in other words the fixt internet

line is few and mobile penetration has increased tremendously, also m-government does not require expensive media and office space. One of the main points in favour of m-government is that the mobile phone penetration is reaching 83% exceeding fixed telephony users in Europe (IDABC 2006).

Kushchu and Kuscu (2003) consider m-government as a strategy, and to be implemented should utilise all kinds of wireless and mobile technology. The services, applications, and technology are provided to enhance benefits to all users of e-government, such as business, citizens, and governments' institutions. Sandberg, (2009); Cilingir, D., Kushchu, I., (2004) suggest that wireless/mobile technology services could be considered an add-on to other e-government services, a supplement instead of being a substitute. However, m-government is not only a supplementary channel to e-government but it is the major component or channel in e-government, as depicted in figure 1.

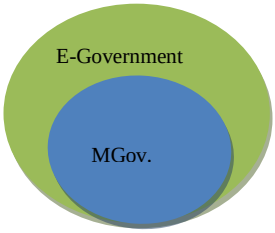

Figure 1 the scope of e-government

M-government for those countries who have already initiated e-government, and highly developed in ICT infrastructure is inevitable, thus will emerge as one of the extra value-added characteristic for the integrated and flexible data communication exchange mechanism among government organizations. However, countries who have not initiated e-government or at the early stage of the implementation process, and which have their ICT infrastructure not as developed requirement, (Kushchu, I. and Kuscu, H 2003); these countries may have benefit more depending on the type of the concerns that faced by the governments. In the developing countries m-government application may become a vital means of reaching the peoples and encouraging communications particularly when used in isolated area. In countries where mobile penetration is high therefore, the ability to get to the isolated area may be considered as a vital feature of m-government. Kurdistan region of Iraq for example, exhibits some attractive feature; overall attempts to implement e-government are still at the early stages, meanwhile, the mobile infrastructure is at a more advance stage.

2. Aims and Objectives

This paper aims to establish the level and ability of government institutions readiness for e-government uptake, and how the government plans to develop any proposed system.

The objectives focus on the following:

1. To investigate how services are provided in the present government situation.
2. Identify the features and drawbacks, and then propose measures to curb the shortfalls.
3. To research into the relevant frameworks by carrying out a comparative analysis of cases from different developed and developing countries.
4. To review the needs of Kurdistan's citizens in the context of government services.
5. To propose a practical framework of traffic police information system.

3. Methodology

This research involves an initial pilot survey of the facilities provided in the city of Erbil (capital of Kurdistan). Some data and information were collated using primary and secondary sources (government archives, interviews etc) to determine ICT services and usage levels. The approach will determine the feasibility of implementing m-government in the environment.

4. E-readiness in Iraq

According to UN e-government report (2008), Iraq lags behind in e-government and the survey puts the e-readiness rank as 151, shown in table 2.

Table 2 E-government readiness for Iraqi neighbouring countries and others (UN 2008)

Country	E-government readiness Index 2008	Ranking 2008
United Arab Emirates	0.6301	32
Jordan	0.5480	50
Qatar	0.5314	53
Kuwait	0.5202	57
Saudi Arabia	0.49.35	70
Turkey	0.4834	76
Iran	0.4067	108
Syria	0.3614	119
Iraq	0.2690	151

Furthermore, the ministry of planning and development cooperation (MOPDC) of Iraq carried out a household socio-economic survey in 2007. It was carried out within the framework of a Bank project financed by the Iraq Trust Fund (ITF). This shows that in Kurdistan, the technological background particularly, internet and overall necessity for e-government is satisfactory in comparison to Iraq (IHSES 2007), which is illustrated in table 3.

5. Role of ICT in Kurdistan Regional Government area

Table 3 Use of internet users in Iraq in % (IHSES 2007)

	Kurdistan region	Baghdad	Other governorates
% of Internet users overall	4.3	2.1	2.6
At home	49.5	33.4	37.5
Internet cafe	22.1	27.8	40.6
School/Uni.	10.0	12.9	9.8
At work	16.8	24.1	9.4
Other	1.6	1.8	2.7
Total	100.0	100.0	100.0
Average hour/week	7.6	10.5	8.8

Currently, KRG provides services traditionally to its citizens, in other words citizens are physically going to the government agencies to satisfy their needs. Based on the initial pilot survey (July, 2009), 95% of citizens do not receive services electronically, the rest 5% are mostly employees using different channels such as mobile phone, letters, e-mails, and others to communicate with other employees in different agencies to receive or provide services, as depicted in figure 2.

Most of the ministries in KRG have very basic website used to present the ministerial activities,

and news, but without having any form of interaction with citizens. Therefore, we can clearly say that e-government in the region is at the first stage (information stage).

KRG aspires to contribute to the formation of information society and tries to take more proactive role in adopting the newest

technology, thereby, establishing a functional IT department in KRG, to initiate e-government system and to raise the employee's ability in various field such as management, ICT skills, administration, security and others.

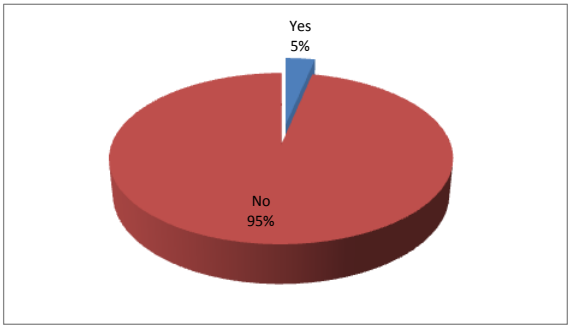

Figure 2 services received from government electronically (Initial pilot survey 2009)

In 2007 the IT department managed to establish a major project to provide high security government employee identity cards and data base solutions, known as (smart ID card), as an initial step towards e-government (Gulfnet 2007). The project was carried out by GulfNet Security Systems (GNSS) in partnership with Emirates Computers. Various companies were also involved in this project such as; Microsoft, FARGO, Dell, Cisco and Labcal. According to the initial pilot survey (July, 2009) found that the IT department had an agreement with Price Water House Cooper UK (PWCUK) with responsibilities to create the IT strategy for the KRG that will help to identify the drawbacks of the current system and to put in place concrete strategy to start with effective and efficient e-government system, this is presumed to be the key element for success of the system.

5.1. ICT Infrastructure in Kurdistan Region of Iraq

Kurdistan Region of Iraq currently is consists of three cities namely; Erbil (capital of Kurdistan), Sulaymani, and Duhok
The Kurdistan Region in general, lagged behind in information and communication technology (ICT) prior to 1991, in terms of telecommunication infrastructures and the growth of the wired telephone networks throughout Iraq. In particular, the Kurdistan communication system was very far behind, with telephone landline in big cities such as Erbil totalling only 10,000 interior lines and the connection between Erbil and other cities were non functional after the withdraw of Iraqi government's institutions from Kurdistan. There was no mobile communication network, and no computers were available at the government institutions.
However, after the citizens uprising in 1991developing communication system became very difficult, because of the UN embargo and blockade from the Iraqi regime, now a day during new cabinet of Kurdistan Region, the latest type of communication exchanger had been launched. The government has built different type of transit exchanger 1000E1 and 600E for Erbil and Duhok respectively, and have also connected Kurdistan cities through microwave network in type SDHSTM-1 (MOC 2009). KRG was formally established in 2003 and recognised by Iraqi constitution. The regional government has always focused on the role of the government in the re-construction of the Kurdish society, infrastructure, services, increased political freedom and tangible improvements in the people's daily lives.
Since then, wireless technology, particularly mobile telephony has penetrated the Kurdistan market more rapidly than any

other technology or product has ever made. Mobile phone became an inseparable part of the daily life. Based on a report (MOC 2009) found that there are many telecommunication companies existing in Kurdistan Region of Iraq.

Table 4 Wired and wireless communication companies in Kurdistan region (MOC 2009)

company	Location	Technique	Services	User
Korek Telecom	Erbil & Duhok	GSM, GPRS	Voice call, internet	2 M
Asia Cell	Kurdistan & Iraq	GSM, GPRS	Voice call, internet	1.5 M
Mobi Tel	Erbil & Duhok	3G, 3.5G	Voice call, internet	3000-4500
Sana Tel	Sulaymani	GSM	Voice call, internet	300-400

Mobile telecommunication in region has been mainly dominated by both Korek telecom and Asia-cell. Asia cell is one of the oldest GSM (Global System for Mobile Communication) operators in Iraq. It has been established in 1999 under the security of "no-fly- zone" time, it covers most of the Iraqi cities, and has 1.5 million users. Korek telecom launched in 2000 was the first provider in the city of Erbil, and Duhok and was licensed by KRG of Iraq. The company have 2.5million subscribers. Sana Tel is also one of the main operators in Sulaymani area. However, it has approximately 4500 subscriber is much smaller than its regional adversary. Mobi-Tel is the first mobile 3G and 3.5G service provider in Iraq, and was licensed by KRG of Iraq to service in Iraq, Mobi-tel launched in 2007, currently covers the area of Erbil and Duhok, and planning to cover Sulaymani city, and has around 3000-4500 users. Some of the details of the telecommunication companies are illustrated in the table 4 and 5.

Table 5 Mobile Communication Companies in Kurdistan region (MOC 2009)

Company	Location	Technique	Services
1-Newroz Telecom	Erbil and Duhok	CDMA, ADSL, Dial up	Voice call, Internet
a- Aria phone (wireless)	Erbil and Duhok	Dial up (WLL)	Voice call,
b-Reber (Wireless)	Erbil and Duhok	CDMA, Dial up	Internet
c-Aria net (wireless)	Erbil and Duhok	EDVO (Broadband W/Internet)	Voice call, Internet Internet
2- Media Tel. (wireless)	Sulaymani	Dial up WLL	Voice call
3- Fanoos Tel.(wireless)	Sulaymani	Dial up WLL	Voice call, Internet
4- Kurd Tel (wired)	Sulaymani	PSTN	Land Line
5-Tarinet (wireless)	Erbil	Wi-Fi	Internet
6- Nawand (wireless)	Erbil	WiMAX	Internet
7- Kurdistan net (wired)	Erbil	Dial up, ADSL	Internet

Initial exploratory research shows that most of the communications company are wireless, which means the infrastructure of the land lines are still very weak. And very interestingly, the ministries and government agencies are all connected via fibre optic cables, and also linked to Turkey. Currently, the KRG is in a discussion with Iran to connect Kurdistan region with Iran via fibre optic cable.

5.2. Proposed Mobile government application

Wireless/Mobile technology usage is rapidly increasing amongst the people in Kurdistan. As a result of the rapid growing uses of mobile phones, m-government applications

are essential to alert citizen about the availabilities and advantages of m-government implementations. According to the initial pilot survey (July, 2009) found that 99% of citizens in Kurdistan use mobile phones, and performed various functions and services as illustrated in figure 3.

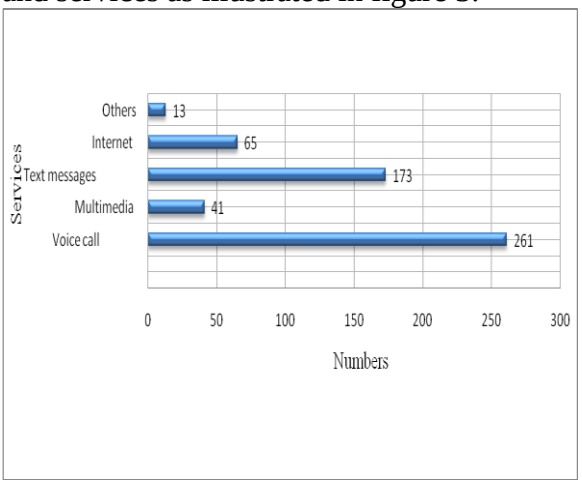

Figure 3 Type of services performed by mobile phone
(Initial pilot survey 2009)

Therefore, emergence of wireless/mobile technology makes a novel opportunity for governments to bridge the digital divide, (the gap between people who has effective of use of ICT and those with limited use or not at all) and provide service to both citizens and employees anytime, anywhere, through wireless devices (Townsend, 2002; Foley, 2003; Hosny and Arreymbi 2007).

The proposed application is to improve information access and provide up-to-date real time data that could be shared with security forces to protect general public, and help improve the traffic information system. Therefore, it will improve and increase the use, efficiency and effectiveness of the traffic police system in information gathering and dissemination, used to identify and recognize any suspicious vehicle or terrorist threats entering the region. This will protect and save citizens life, also making government more transparent and accountable. The infrastructure is designed for wireless communication the wireless/mobile devices used will be equipped with latest 3G, web-enabled technologies, such as PDAs, Blackberry, iPhones, and Tablet PCs with GPS and GPRS internet access. The idea is the information concerning vehicles and drivers identities enters the system through the Data Recording System (DRS). This information will be stored on a designated server. The Central Control Unit (CCU) monitors and processes the information on request. The traffic police or the police patrol can access the CCU using one of the mobile devices we mentioned. This process can be achieved using various identifiers or parameters such as vehicle registration number or the drivers licence number. The CCU will communicate with mobile device, to recognize its location of the patrol and report any urgent action. This communication takes place via GPRS internet access. With this application police officer can identify all the details about the driver and the vehicle in real time such as, driving license, MOT, vehicle registration, driver's identification, traffic penalties and etc. The benefit of this identification system in real time will decrease the time waiting, energy and also reduced associated paper work increase or reduce report of suspicious events. This system is vital for today's Iraq especially from the security point of view. The architectural design of the system is shown in figure 4.

6. Conclusions

The study has attempted to outline and develop m-government by carrying out some initial investigations on the present state of affairs in KRG. We have proposed a design and development model for the implementation of such a system for

provision of services to citizens by government. Through comprehensive reviews, we found that the internet will not replace the other channels; however, all or various channels are used according to the citizen's requirements. We deduced that m-government is not only a supplement to e-government, but even a major component of e-government. Additionally, it founds that m-government initiative in Kurdistan Region is essentially parallel to e-government. Meanwhile, the penetration of mobile communication exceeds the landline communication.

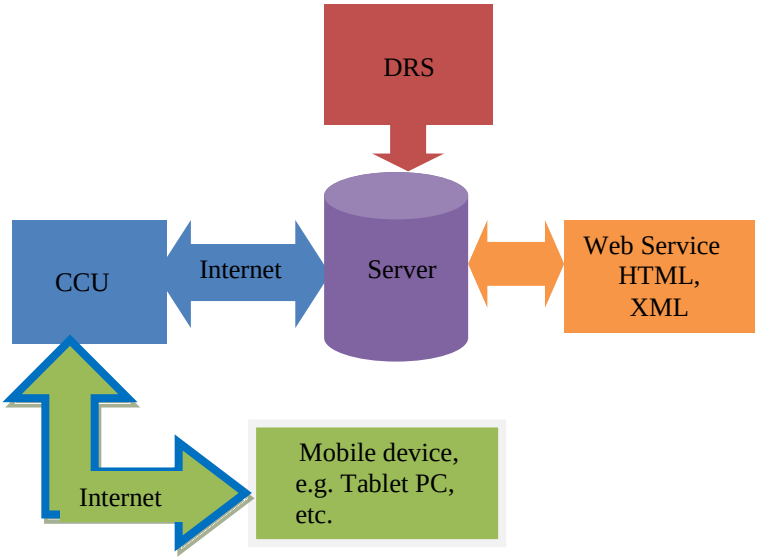

Figure 4 A conceptual view of the system architecture.

The proposed study identified m-government application for traffic police and patrol police use for identifying vehicles and driver's details. Applications that provide this value added services, should make users feel that their privacy or security issues are handled properly, therefore the security and privacy are some of the main issues that concern the m-government organizations and influence their performance in accepting or refusing its implementation. The security means the secure of network, software application, and devices (Chang & Kannan 2002). This is an ongoing study which in future deals with the security issues of the proposed application and will be making some comparative studies with other m-government systems.

7. References

Bassara A., Wiśniewski M. & Żebrowski P., (2005) 'USE-ME.GOV – A requirements-driven approach for MGov services provisioning', *Business Information Systems*

Chang A.M., & Kannan P.K., (2002) 'Preparing for Wireless and Mobile Technologies in Government', *IBM Endowment for the Business of government* available at: *http://www.businessofgovernment.org/pdfs/Chang_ report.pdf*.(Accessed on 10/06/2009)

Cilingir D., Kushchu I., (2004) 'E-Government an m Government: Concurrent Leaps by Turkey', Available at: www.mgovernment.org/resurces/mgovlab_dcik.pdf (Accessed on 15/07/2009)

European Commission, (2004) 'Multi-channel delivery of e-Government services', *Interchange of Data between Administrations Programme, Enterprise DG.*

Foley P., (2004) 'Does the Internet help to overcome social exclusion?' *Electronic Journal of e-Government*, vol. 2, no. 2, pp. 139-46

Galal-Edeen G. H. and Abdel-Fattah AK., M., (2008) 'An Evaluation Approach for Multi-Channel e Government Services', *Proceedings of the 8th European Conference on e-Government*, pp241-250

Gulfnet (2007) 'Gulfnet security systems and Emirates computers win major deal', online publication, available at http://www.ameinfo.com/139949.html (Accessed in 05/06/2009)

Heeks R., (2006) 'Understanding and measuring e-Government: International Benchmarking Studies', Development Informatics Group IDPM, University of Manchester, UK , *UNDESA workshop. E-Participation and E-Government: Understanding the Present and Creating the Future*, Budapest, Hungary, 27-28 July 2006

Holzer M., Tae Kim S., (2005) 'Digital Governance in Municipalities Worldwide, A Longitudinal Assessment of Municipal Websites throughout the World'. T*he E-Governance Institute National Centre for Public Productivity. Rutgers, The State University* of New Jersey, Campus at Newark, pp1-111

Hosny W., Arreymbi J., (2007) 'Adapting Mobile Technologies for Education and Learning-m-Learning', proceeding of *International Conference on Internet Computing*, pp 404-410

IDABC (2006) 'e-Government in the EU member states, e-Government Observatory', *IDABC Report*, April 2006, 4th edition

IHSES (2007) 'Iraq Household Socio-Economic Survey', *The World Bank*, p 27, available online at:www.worldbank.org (Accessed 20/7/2009)

Shareef M. Shareef (2009) 'Initial pilot survey of Government service provision in Kurdistan Region of Iraq - *Erbil city'*, July 2009 (Not published data)

Janssen M., and Wagenaar R., (2002) 'Towards a flexible ICT-architecture for Multi-channel E-Government service provisioning', *the 36th Hawaii International Conference on System Sciences IEEE*

Kushchu I., and Kuscu H., (2003) 'From E-Government to M-Government: Facing the Inevitable', *in the proceedings of European Conference on E-Government (ECEG 2003)*, Trinity College, Dublin

Ministry of Communication (MOC) of KRG (2009) General information and Interviews, Courtesy of the General Director', Ministry of Communication, *Kurdistan Regional Government*. Available online at http://www.moc-krg.com/ (Accessed on 21/08/2009)

Pieterson W., & Dijk J. V., (2002) 'Governmental service channel positioning: History and strategies for the future, *Analysis and Design of eServices'*, University of Twente, The Netherlands, pp53 - 60.

Sandberg W. K., Sundberg P. H., (2009) 'MOBILE CITIZEN-FRIENDLY SERVICES – TWO CASE STUDIES IN RURAL AREAS', *IADIS Proceedings of International Conference e-Society*, London, 2009.

Townsend, A. (2002) 'Mobile and Wireless Technologies: Emerging Opportunities for Digital Government*', Proceedings of the National Conference on Digital Government Research*, Los Angeles

United Nations (2008), 'e-Government Survey, from e-Government to Connected Governance', *Department of Economic and Social Affairs Division for Public Administration and Development Management*, pp1-225