

# Towards Understanding Success Factors in Interactive Mobile Government

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**Abstract:** *Over the past decade governments all over the world have been moving to providing services to their citizens via the web with varying degrees of success. These e-government initiatives have been the subject of extensive research. Our research is concerned with the transitioning from electronic government to mobile government. Mobile government implementation is still in its very early stages – indeed a perfect m-government has not been created yet. Transitioning from e-government to m-government requires researching the integration process between e-government and m-government. It also requires investigation of all the pressures that could affect the transition process. Such pressures differ between nations, such as a nation's technological and information infrastructure, mobile device penetration and acceptance, public and social pressures, and security. This paper reports on the preliminary results from an online survey of global experts on the success factors of mobile government.*

**Keywords:** mobile, government, success factors

## 1. Introduction

Many governments have been moving towards electronic government (e-government) in the last decade. Some of these governments have noted the high penetration of mobile devices which have surpassed personal computer (PC) adoption in many countries and have started moving naturally towards mobile government as a next step to improve their interaction with constituents. Thus, these governments are moving to improve their services by adding mobile government (m-government) as a new delivery channel utilising the available wireless infrastructure installed by private mobile operators. Canada, Malta, and the states of Virginia and California in the US have realised the promise of m-government, which includes reaching a larger number of citizens and sending real-time information for real-time decisions. In order to successfully implement new technologies in the public sector, governments normally learn from history and other governments' expertise (Working Group on e-Gov, 2005). However, m-government is still in its infancy and very few governments have implemented full mobile government services. In fact, most examples are basic Short Message Services (SMS). For example, Hossan et al. (2005) define four major life saving uses of m-government applications in Bangladesh such as disseminating pre-disaster and post-disaster warning SMS, exchanging SMS with citizens to enable them request relief needs, and government-citizens interaction to exchange information about health hazards. Malta is a key proponent of mobile government and one Maltese service enables citizens to receive notifications via SMS of court sitting deferments to clients and their legal representatives.

This paper represents the next stage of our ongoing investigation into transitioning to mobile government (Al-khamayseh & Lawrence, 2005; 2006). It reports on the preliminary results of an online survey of global experts on the success factors of mobile government. The next section outlines the methodology behind the survey whilst Section 3 discusses the identification of seven core success factors, and also outlines some of the shortcomings identified by the respondents. The conclusion and future research directions are set out in Sections 4 and 5.

## 2. Methodology

The study draws on the expertise of persons involved in mobile and electronic government projects as well as academics with expertise in the above mentioned research arena. Researchers were seen as an important source of knowledge as their work requires familiarity with all the developments in the field (Zmijewska & Lawrence, 2005). An extensive review of literature was conducted, focusing on the most relevant conferences, including Euro mGov, DEXA, and IADIS e-Government conferences, to identify leading m-government and e-government researchers. Access to references was gained by using ACM Digital Library, IEEE Explore, Proquest and other academic databases. The selection criterion for researchers was at least one peer reviewed journal or conference publication regarding mobile and electronic government. Industry experts, on the other hand, were sourced from communication companies, mobile phone suppliers, Internet Service Providers, application developers and consultants. Such stakeholders, due to their first-hand experience, were likely to know exactly what helps and hinders successful diffusion of mobile government (Zmijewska & Lawrence, 2005). The companies were identified using personal commercial contacts, search engines and relevant portals, as well as personal meetings at conferences such as the eGovernment Forum in Sydney in May 2006.

The second stage of the research involved the setting up of a web based survey to which the experts were invited to respond. The aim of interviewing experts is to check for the validity of our previous research findings. Since such experts are disseminated all around the world, and because of the high cost of travel to interview all of them, the authors decided to use virtual interviews through inviting experts to participate in an online survey. These experts could either answer anonymously or provide their contacts for further elaboration. This survey is ongoing and currently 31 usable surveys have been received and are the subject of this paper.

### 2.1 *The Survey Instrument*

The online survey instrument was UTS Survey Manager and originally 120 emails containing the link to the anonymous survey were sent out during the months of March and April 2006. The survey started with a series of demographic questions concerning age, gender, job role and country (reported in Section 3.1). Next the respondents read that *Fully Interactive M-Government includes transactional functionality with the advancement of offering secure mobile wireless transactions such as secure payments and secure access to critical data*, and were asked to check any of the 14 success factor they believed necessary to achieve Fully Interactive M-Government. The answers to this question are discussed in Section 3.2. The following qualitative, open ended question followed: *Please add any comment(s) regarding the above question. Advice on adding and/or removing any success factor is what the researchers are looking for.* The above question aimed to elicit more advice from the experts on the success factors for mobile government and will be discussed in Section 3.3.

### 2.2 *Sampling Technique*

This research was based on stratified purposive sampling, which means that cases were selected from previously identified subgroups (Gorman & Clayton, 2005; Zmijewska & Lawrence, 2005). This sampling does not need to be statistically representative, since it is not going to be used to generalize to the large population. This technique, however, not only makes it possible to gather a variety of perspectives on the research problem, but it also enhances the credibility of the data that can be confirmed by several sources. Purposive sampling aims to create rich, in-depth information (Liamputtong, 2005; Zmijewska & Lawrence, 2005). The thirty one (31) respondents who completed the web survey included e-government project managers, government consultants, government officials, telecommunication managers, researcher directors at national research centers, professors of Management Information Systems and Strategies, and PhD

students. Thus far, the respondents included 25 from European countries, 3 from Asia, 2 from North America and one from New Zealand (See Figure 2).

In terms of the sample size, in such research the number of participants is less important than the richness of data. Purposive sampling should be used to the point of redundancy (Liamputtong, 2005; Zmijewska & Lawrence, 2005). The sampling should be concluded when no new information is forthcoming from new units. Accordingly, redundancy is our primary criterion that will determine when the sampling in this study should terminate; presently, our survey is still continuing.

In this paper, when discussing our results, we follow a strategy suggested by Johnson (1997) to promote validity of qualitative research such as one in our open-ended question (discussed in Section 3.3). Low inference descriptors are description phrased very close to the participants' accounts and researchers' field notes (Johnson, 1997; Zmijewska & Lawrence, 2005). Verbatims (direct quotes) are a commonly used type of low inference descriptors, and therefore this paper utilizes direct quotes from the subjects to improve validity of the research. Such examples of data not only validate the conclusions, but also provide rich illustrations of the topic.

### 3. Survey Results

The authors have targeted researchers and experts in the field of both e-government and m-government service delivery. Thus far the authors have received 31 useful responses from a preliminary email to 120 persons and we intend to target more in the next few months. The second survey will take into account any advice received so far as well as extra information from the respondents who are willing to be contacted.

#### 3.1 Demographic Data

The statistics depicted in Figure 1 show 14% female respondents to 86% male respondents. This could reflect the general trend in technology sectors where females are traditionally under-represented. It is also not always possible to identify gender from names, especially if the experts had first names that were not easily identified as male or female or if only initials were used on papers or on web sites. The participants' roles varied from academic researchers, e-government managers, research directors from the telecommunication industry and m-government managers.

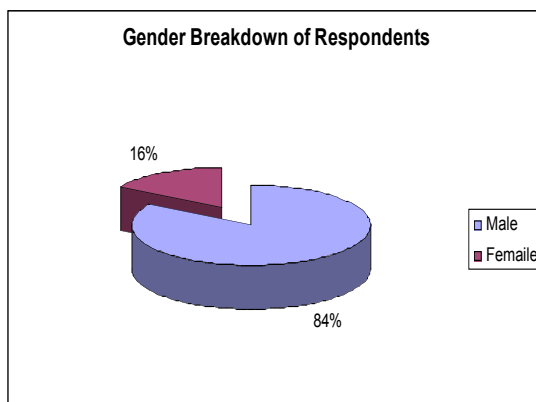


Fig 1: Gender breakdown of respondents

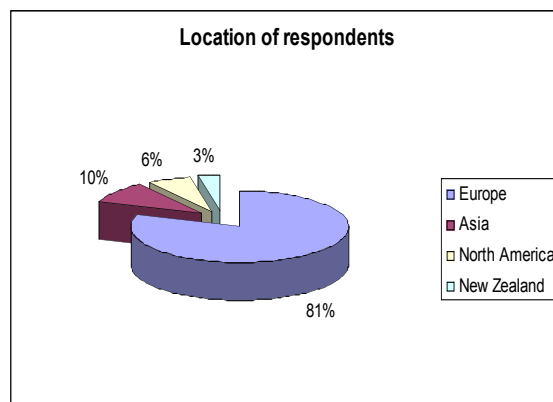
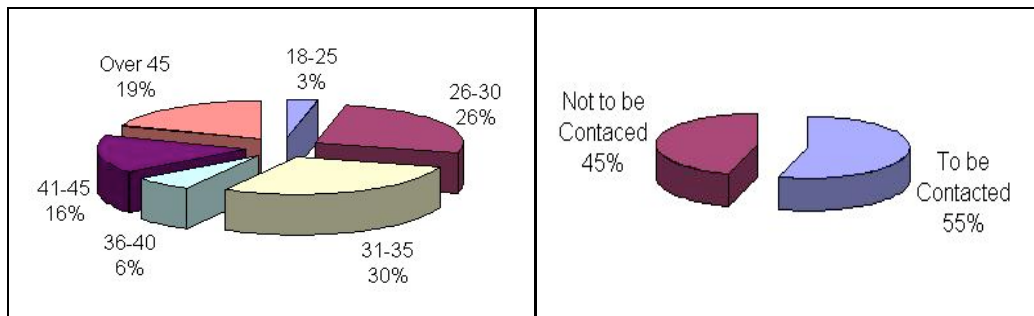


Fig 2: Location of respondents

Figure 2 shows the location of the 31 respondents and it is noted that the largest sample come from Europe. This is understandable as the bulk of cutting research and implementation of mobile government is occurring in Europe according to our extensive literature review. The survey results found that 3% of

respondents were in the 18-25 age range, 26% were in the 26-30, 30% 31-35, 6% 36-40, 16% 41-45 and 19% over 45 years old (Figure 3). This percentage reflects the young generation interest in the new mobile technologies and services.



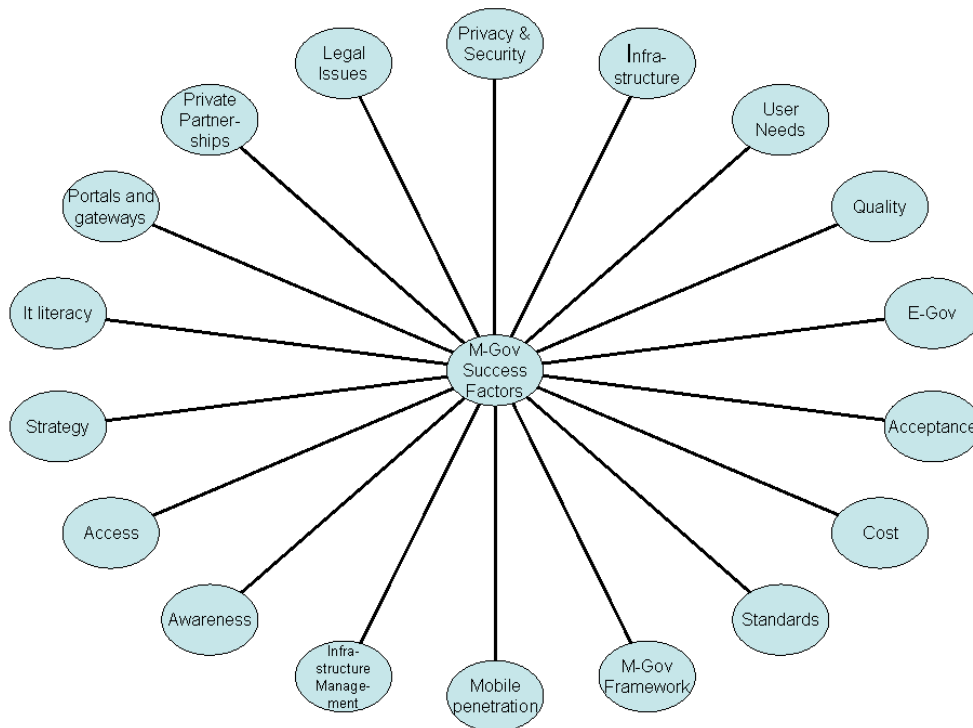
**Fig 3: Age breakdown of respondents**

**Fig 4: Respondents' contactability**

It was particularly gratifying to the authors that more than half of the respondents (55%) noted that they were willing to be contacted further and they supplied their contact details (Figure 4). Such a high percentage of returns indicates the high level of commitment to these targeted experts and confirms our selection criteria as valid.

### 3.2 Discussion of M-government Success Factors Identified as Core

As a result of an extensive literature review of journal articles, web sites, conference papers and contacts with government officials both in Australia and overseas, the authors (Al-khamayseh & Lawrence, 2006) identified fourteen Fully Interactive M-Government success factors which are depicted in Figure 5.



**Fig 5: M-Government Success Factors - source: (Al-khamayseh & Lawrence, 2006)**

To validate these findings the authors of the survey asked for the experts' feedback on the required success factors for a Fully Interactive Mobile Government. The percentage of responses to each factor is shown in Table 1. The success factors are ordered according to percentage of respondents who chose that factor. The first success factor in the table is seen as the most important as it has the highest percentage of responses and the last factor had the lowest. Accordingly, we have initially classified the factors with a percentage greater than or equal to 48 % as core success factors. The initial survey did not set out the nominated success factors in any particular order on the web survey. The authors of the paper will follow up with the experts who are willing to be contacted to further clarify these issues and this will form the next part of our ongoing research.

<b>65%</b>	<b>- Privacy and Security</b>
<b>55%</b>	<b>- Infrastructure</b>
<b>52%</b>	<b>- User needs and preferences</b>
<b>48%</b>	<b>- Quality and user friendly applications</b>
<b>48%</b>	<b>- E-government</b>
<b>48%</b>	<b>- Acceptance</b>
<b>48%</b>	<b>- Cost</b>
45%	- Standards and data exchange protocols
42%	- Coherent m-government framework
42%	- High mobile penetration
39%	- Infrastructure management
35%	- M-government awareness
32%	- Access
29%	- Strategy
26%	- IT literacy
26%	- M-government portal and exclusive gateway
13%	- Partnership with private sector
10%	- Legal issues: liberalisation of telecommunication sector

**Table 1: Responses showing percentages of checked boxes**

Using our cut-off point, *'Privacy and Security'* at 65% is the first core success factor chosen by the experts (and it appeared as number six on the list of success factors on the survey). This confirms our literature review findings that secure m-government applications are considered the hallmark of successful m-government. Goldstuck (2003) recommends following the fundamental standards of wireless network security as the solution to strictly ensure controlled and managed access to services. These include Wireless Equivalent Privacy (WEP), Cisco Lightweight Extensible Authentication Protocol (LEAP) and 802.1x protocols.

Well behind *'Privacy and Security'* is *'Infrastructure'* at 55%. Mobile government requires a specific infrastructure that is available nowadays in most countries of the world. According to Foghlu (2005), m-government infrastructure is made up of wireless networks and mobile access devices (e.g. mobile phones, laptops, PDAs) accessing software services. Researchers refer to infrastructure in many ways; the report compiled by Goldstuck (2003) uses the term 'connectivity' to refer to infrastructure and categorizes it as the cornerstone of m-government applications.

Unsurprisingly *'User needs and preferences'* attracted a high percentage of responses (52%). According to Goldstuck (2003) applications should be driven by needs, that is, the needs of the potential m-government

constituents who will access the services. Determining constituents' needs requires surveying them in order to find out their needs and prioritize them.

The four factors that attracted 48% included '*Quality and user friendly applications*'. Developing quality applications comes after defining useful applications. Quality applications mean simple, user friendly and robust applications. Goldstuck (2003) considers quality and user friendly applications as a key to retrieve quality information from the back-office systems and thus provide quality m-government. Carroll (2005) argues that a convenient m-government application is a key success factor (e.g. using SMS results in faster and easier responses than email). Sandy & McMillan (2005) state that a consistent user interface guarantees better constituents' access.

'*E-government*' also attracted 48% of responses and this corresponds closely to the authors' extensive review of mobile government success factors. The respondents of this survey were also asked to answer the following question: '*How do you rate E-Government's significance in achieving M-Government?*', according to a Likert scale of 1 - 4 where 1 indicated *No significance*, 2 *Low significance*, 3 represented *Significance*, and 4 represented *High significance*. Eighty nine percent of the 31 respondents selected *High significance* or *Significance*. Most researchers believe that electronic government (e-government) is the cornerstone for m-government (Abanumy & Mayhew, 2005; Antovski & Gusev, 2005; Chang & Kannan, 2002; Goldstuck, 2003; Kim et al., 2004; Scholl, 2005). Therefore, many developing countries' governments are focusing on computerizing their backend processes to achieve e-government. The authors of this paper however consider that this first step could slow their adoption of m-government services (Public Sector Technology & Management - IT-enabled Government in Asia, 2005). Malta considers m-government as a new e-government delivery channel and categorizes m-government "as an integral part of e-government" (e-Government, 2005).

'*Acceptance*' and '*Cost*' were equal at 48% and our previous research showed that both The Working Group on E-Government in the Developing World (2002) and Chang & Kannan (2002) agree that the first step to create acceptance is to train and educate staff starting with superiors who influence staff down through the bureaucracy. Chang & Kannan (2002) also suggest that training technology receptive employees will result in staff who will play a key role in supporting their peers. Cost correlates to acceptance. From the perspective of m-government constituents the cost of owning the access devices should be affordable (Ghyasi & Kushchu 2004), and cost of accessing services should be low. The survey analysis conduct by Carroll (2005) shows a participants' bias towards SMS rather than voice calls because of lower cost.

### ***3.3 Discussion of Other Factors***

One interesting feature of the survey was the low percentage (13%) of responses for '*Partnership with the private sector*' considering mobile networks are often privately owned. Our previous research (Al-khamayseh & Lawrence, 2005) and Sandy & McMillan (2005) had shown that partnership with private sector is one of the important steps towards implementing m-government.

*[...] By definition, a Public-Private Partnership (PPP) is a contractual agreement between a government entity (public sector) and a for-profit corporation (private sector). Together, these entities agree to provide services to the public by combining their assets and skills and share the risks and rewards. (Snabe, 2005)*

Partnership with the private sector such as mobile service providers will help sharing risk and rewards (Snabe, 2005) such as Return On Investment (ROI). It will allow all parties to broaden their reach - such as government partnership with the right private mobile provider's network to reach constituents anywhere in or out of the country- and accomplish better results (United Nations Foundation, 2003). Goldstuck (2003)

points out that partnership with private sector contributes to lessening the burden of the initial cost related to infrastructure provision.

'Legal issues' also did not rate highly on the survey attracting only 10% of the total checks. This was surprising given the close tie in with telecommunications legislation that is considered important by Abanumy & Mayhew (2005), Goldstuck (2003), Kim et al. (2004) and Sandy & McMillan (2005).

### **3.4 Discussion of Qualitative Answers**

Thirteen respondents added comments to the qualitative question:

*Please add any comment(s) regarding to this question. Advice on adding and/or removing any success factor is what the researchers are looking for.*

The first interesting result from this question was the fact that not one success factor was nominated for removal. One respondent felt that “*developing Mobile Architecture to integrate computation, networking and communication*” was necessary whilst another recommended adding “*multichannel strategies and architecture*”. The authors of this paper propose extending the identified ‘Infrastructure’ success factor to include Mobile architecture and Multichannel Strategies and will seek further clarification from the experts who recommended the above. Another responded stated that the “*identification of the business case is crucial. Who really needs mobile services and what services?*” This correlates with the importance which the experts allocated to the users’ needs. Three respondents felt the need to add more about the user. One stated that “*citizen centric services*” were required and this point ties in with the two success factors namely: ‘*User needs and preferences*’ and ‘*Quality and user friendly applications*’. Another stated “*what is useful for citizens*” emphasizing the importance of user-centric mobile applications.

We also received some criticism of the structure of the survey question regarding the success factors. One respondent suggested that s/he would not agree with the factors if they were to be used as a ranking. We have identified the factors as Core according to the percentage of persons who checked them and as such chose an arbitrary cutoff of 48% to identify seven of the 14 factors as Core in this preliminary survey. Another respondent stated that people should have been asked “*to choose a certain number only (say five) in order to prevent people from choosing them all*”. Yet another expert commented:

*“All of these factors are important to achieve successful fully interactive M-Government but a respondent may have difficulty understanding what "fully interactive M-Government" is -- a definition at the start of the question would be helpful. Successful diffusion of innovation requires paying attention to Context, Content, and Process issues. I would guess that most respondents would check most if not all of the boxes above.”*

The authors did provide a short definition of “Fully Interactive M-Government” in the preceding question but should have repeated it. The next iteration of the online survey plus follow up queries to the respondents who are willing to comment further will allow the authors to further refine the success factors.

## **4. Conclusion**

This paper has outlined and discussed the preliminary results from an online survey of global experts on the success factors of mobile government. The survey replies confirmed that many of the success factors for mobile government which had been previously identified by the authors were indeed consistent with expert opinion. From this preliminary survey the authors have identified seven as core success factors (see the factors in bold in Table 1) but further work must be done to consolidate the findings from this survey. The

second iteration of the survey will take into account the suggestions made by these experts. The authors of the paper will also liaise with those experts who are willing to be contacted to further refine the layout and setup of a second survey.

## 5. Future Work and Acknowledgements

The authors thank the reviewers for their excellent feedback and will incorporate some of these ideas in their future investigations. Suggestions included the grouping of success factors to avoid potential overlaps; looking at success factors from respective views and quantitative ways of measuring success

### References:

- Abanumy, A. & Mayhew, P. (2005): M-government Implications For E-Government In Developing Countries: The Case Of Saudi Arabia', *EURO mGOV 2005*, Brighton, UK, pp. 1-6
- Al-khamayseh, S. & Lawrence, E. (2005): Mobile Government – Converging Technologies And Transition Strategies, *DEXA 2005*, Copenhagen, Denmark, pp. 358-365
- Al-khamayseh, S. & Lawrence, E. (2006): Towards Citizen Centric Mobile Government Services: A Roadmap. *CollecterEurope*, June 9-11, 2006 Basel, Switzerland
- Antovski, L. & Gusev, M. (2005): M-Government Framework, *EURO mGOV 2005*, Brighton, UK, pp. 36-44
- Carroll, J. (2005): Risky Business: Will Citizens Accept M-government in the Long Term? *EURO mGOV 2005*, Brighton, UK, pp. 77-87
- Chang, A.-M. & Kannan, P.K. (2002): Preparing for Wireless and Mobile Technologies in Government. *IBM: The Business of Government*. Available online at [http://www.businessofgovernment.org/pdfs/Chang\\_report.pdf](http://www.businessofgovernment.org/pdfs/Chang_report.pdf), accessed 10. May 2006
- e-Government (2005): *e-Government*. Available online at <http://www.gov.mt/text/egovernment.asp?p=106&l=1>, accessed 10. May 2006
- Gorman, G.E. & Clayton, P. (2005): *Qualitative Research for the Information Professional: A Practical Handbook*. 2nd ed. London: Facet
- Ghyasi, A.F. & Kushchu, I. (2004): Uses of Mobile Government in Developing Countries, unpublished, *Mobile Government Lab*
- Foghlú, M.Ó. (2005): Infrastructures for Mobile Government Services, *EURO Mgov 2005*, Brighton, UK, pp. 192-199
- Goldstuck, A. (2003): Government Unplugged - Mobile and Wireless Technologies in the Public Sector, *Centre of Public Service Innovation*, Tshwane, South Africa
- Hossan, G.C., Chowdhury, M. & Kushchu, I. (2005): Prospects of Using m-Technologies for Disaster Information Management in Bangladesh and other LDCs, *EURO mGOV 2005*, Brighton, UK, pp. 243-253.
- Johnson, R. B. (1997): Examining the Validity Structure of Qualitative Research. *Education*, 118(2): p. 282-290
- Kim, Y., Yoon, J., Park, S. & Han, J. (2004): *Architecture for Implementing the Mobile Government Services in Korea*, pp. 601-612
- Liamputtong, P. (2005): *Qualitative Research Methods*, 2nd ed. Oxford University Press

- Public Sector Technology & Management - IT-enabled Government in Asia (2005): *Why Asian Governments are Going Mobile*. Available online at <http://www.pstm.net/article/index.php?articleid=626>, accessed 10. May 2006
- Sandy, G.A. & McMillan, S. (2005): A Success Factors Model For M-Government, *EURO mGOV 2005*, Brighton, UK, pp. 349-358
- Scholl, H.J.J. (2005): The Mobility Paradigm in Government Theory and Practice: A Strategic Framework, *EURO mGOV 2005*, Brighton, UK, pp. 377-385
- Snabe, J.H. (2005): Public Private Partnerships, *The Bimonthly Magazine on E-Governance*, pp. 6-8
- The Working Group on E-Government in the Developing World (2002): *Roadmap For E-Government In The Developing World*
- United Nations Foundation (2003): *Understanding Public-Private Partnerships*
- Zmijewska, A. & Lawrence, E. (2005): Reshaping the Framework for Analysing Success of Mobile Payment Solutions, *IADIS International Conference on E-Commerce*, Porto, Portugal