

Emerging Mobile Government Services: Strategies for Success

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Abstract:

Effective management is considered a crucial factor for determining the success or failure of any mService project. This paper is a further step into a research project that aims to measure the effectiveness of mGovernment services. As a preparatory step to developing a users' opinion survey, the authors analyse suggestions to overcome barriers to the success of mGovernment service projects from the perspective of mobile government and mobile technology experts from nineteen countries around the world. Despite the fact that these experts identified four types of barriers in their answers to the survey, they only provided suggestions for overcoming three. These suggestions are compared to the findings from an extensive literature review, resulting in a very close correspondence between, and addition to, the literature review and providing a sound path to the development of a real-world end-users' survey.

Keywords: mGovernment, barriers, evaluation, mobile, mServices.

1 Introduction

In the 21st Century mobility has become one of the most important technology and communication trends, affecting all facets of modern life including mobile information systems, mobile payments, mobile commerce, mobile television and mobile government. Mobile government refers to electronic government services capable of being delivered via mobile user interfaces, or in some instances, special mobile services such as location-based services, provided by the government (Suomi, 2006). Government services may also be offered electronically or traditionally in person by different government departments or agencies. Field workers, customs inspectors, immigration agents, local council officers, medical and law enforcement and military personnel can all benefit from access to current data to make better, faster, decisions (AFIRM, 2002). In order for those services to be successful, their initiating projects have to be established on facts about the validity of the

mobile service itself. Not every government service can be rendered using mobile technologies, for example, services that require the downloading of large amounts of data to mobile phones which have limited storage capability and small screen real estate. Hence, the investigation of both the government services that can be offered by mobile technologies and the barriers to success of such service projects must be undertaken when initiating a mobile service project.

The authors' ongoing research aims to define and analyse "barriers", which are also known as "challenges" and even "goals" to be achieved, from different perspectives namely end-users', government officials' and mobile technology experts' viewpoints. This paper represents another link in our research into the success and failure factors of mGovernment service projects initiated by a devised generic mGovernment framework (Tarek El-Kiki, Lawrence, & Steele, 2005). Here the authors analyse the suggestions for overcoming the barriers that experts and academics in mobile technologies from 19 different countries have put forward in a survey. The objectives of such expert surveys are to precisely develop hypotheses, or extend interpretation of certain social events and processes (Potabenko, 2002). Part 2 of the paper provides a background overview of government ICT projects barriers and Part 3 outlines the methodology of the paper. Part 4 describes the findings of the survey, while the conclusion and future directions are contained in Part 5.

2 Background

There have been numerous attempts to define barriers to success of eGovernment projects and, by implication, to mobile government projects (CIBS & CCICMT, 2003; Gasco, 2005; OECD, 2003; TWGEDW, 2002). Researchers such as Heeks (2003) conducted many studies which verified the implementation of eGovernment projects. He suggests that there is always a gap between design and reality, and in order to minimize this gap, he divides factors of success and failure of eGovernment projects into two categories: drivers and enablers. Other researchers viewed barriers to government electronically-rendered services from different aspects. For example, in England, potential voters, who usually use SMS to send messages to friends, were not willing to use it when voting despite the very low cost, only because they could not surmount that psychological barrier of using an unofficial messaging method to fulfil an official task (Arazyan, 2002). Others (ETSI, 2005) consider negative experiences and failures as a barrier against using a service again. A recent report by the Australian Government (DCITA, 2005) revealed that lack of trust in online transactions also represents a barrier to using an online service. Carroll's (2005) research, as set out in Table 1 below, revealed the following about mobile acceptance that has informed and assisted us in the preparation of the survey which is discussed in this paper.

Factor	Explanations
Availability of mobile technologies	access to mobile technologies does not mean that they are used for a wide range of activities
Amount of Effort	participants were unwilling to invest effort into using mobile devices for complex or lengthy tasks
Convenience	reported as being important for users
Input and Output Features	physical limitations of mobile technologies including clumsy input and output mechanisms and inadequate screen size influenced usage
Privacy and	continuing concerns about privacy and security and vividness of

Security Issues	'urban myths' around mobile technologies have led to continuing distrust of electronic transactions.
Lack of public sector services	little access to public sector services; the chief service accessed was transport information.

Table 1: Factors Impacting Mobile Acceptance (Source: Carroll, 2005)

However, governments are recognising that mobile devices are vital tools for emergency and law enforcement management as they promise to enhance efficiency, effectiveness, responsiveness and accountability at federal, state and local levels (Moon, 2004). The recent major emergencies caused by the Asian Tsunami in December 2004 and Hurricane Katrina in August 2005 provide graphic examples of the failure of government agencies to communicate quickly and effectively with their threatened populations.

Our research reveals a large diversity of opinions about barriers depending on the type of barrier and the perspective from which researchers view it. Suggestions to overcome these barriers are aligned to the results of an intensive literature study for verification purposes and are discussed in Section 5 of this paper.

3 Methodology

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 in order to list most of the opinions about barriers (as mentioned in the background section), and to identify leading mGovernment and eGovernment researchers. The selection criterion for researchers and academics was at least one peer-reviewed journal or conference publication regarding mobile and electronic government. References were accessed through the use of different academic databases such as Proquest, ACM Digital Library and IEEE Explore. Industry experts were sourced from different areas such as communication companies, mobile phone suppliers, application developers and consultants. The researchers also attended eGovernment and mGovernment conferences and trade shows to source likely experts. As Zmijewska & Lawrence (2005) stated, such stakeholders, due to their first-hand experience, are likely to know exactly what helps and hinders successful diffusion of mobile government.

The research involved the deployment of a web based survey to experts who were invited to participate anonymously and/or by providing their contacts for further elaboration. This survey tool was chosen as the most efficient, and economic, method to collect global experts' opinions. This survey is still in progress and currently 35 usable responses have been received and are the subject of this paper.

3.1 The Survey Instrument

UTS Survey Manager was the survey instrument. During three months (June – August, 2006), 116 invitations were sent with the link to the study's anonymous survey. The web-based survey consisted of two sections; the first part elicited demographic information whilst the second part included two open questions about the main barriers to success in mobile service projects and suggestions to overcome them. In this paper, analysis of these suggestions is handled building on another study that detailed the main barriers (El-Kiki, Lawrence, & Culjak, 2007).

3.2 Sampling Technique

This study was based upon stratified purposive sampling, which means that cases were selected from previously identified subgroups (Gorman & Clayton, 2005). This sampling technique enables gathering of a variety of opinions and perspectives, in addition to enhancing the credibility of data collected from several sources. Accordingly, because it is not used to generalize to the large population, this sampling technique does not need to be statistically representative. Stratified purposive sampling aims to create rich, in-depth information (Liamputtong, 2005; Zmijewska & Lawrence, 2005). The thirty five (35) respondents who completed the web survey are grouped as: university professors and teachers (13), eGovernment officials and consultants (8), mobile telecommunication manager (1), wireless software analysts & architects (2) and wireless and mobile researchers (8). The participants included (21) from European countries, (4) from Asia, (5) from North America, (1) from South America, (1) from Africa, and (3) from Australia (See Figure 2).

As purposive sampling is used to the point of redundancy (Liamputtong, 2005), the sample size, which is the number of participants, is less important than the richness of data. Accordingly, redundancy is the primary criterion that will determine when the sampling in this study should terminate; currently the survey is still up and continuing.

Johnson (1997) suggested a strategy to promote the validity of qualitative research such as our open ended questions (further discussed in part 5). Qualitative research aims to “probe for deeper understanding rather than examining surface features” (S. D. Johnson, 1995, Spring). 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 (Zmijewska & Lawrence, 2005).

4 Survey Results

The authors targeted researchers and experts in the field of both eGovernment and mGovernment service delivery. The authors received 35 usable responses from a preliminary email to 116 persons (30% response rate). Our 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 again for follow-up email, telephone, and/or online conference interviews (number = 16).

4.1 Demographic Data

The statistics depicted in Figure 1 show 20% female respondents to 80% male respondents. This could reflect the general trend in technology sectors where females are traditionally under-represented.

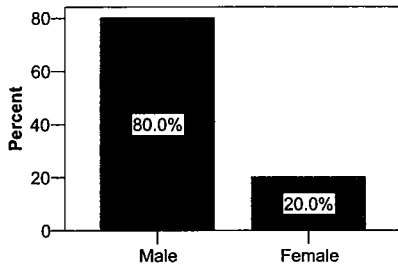


Figure 1: Respondents' gender ratio

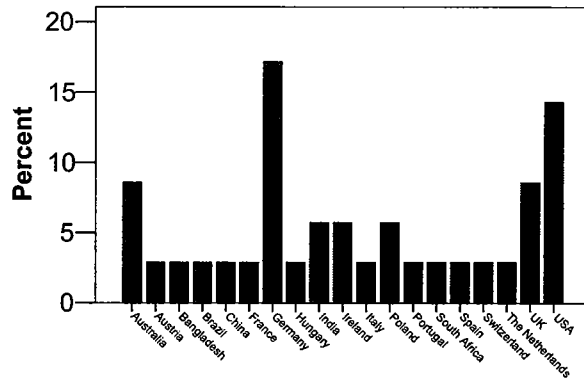


Figure 2: Respondents' participation per country

Participants' roles varied from university professors and teachers to wireless and mobile researchers. The respondents' largest sample comes from Europe, as per Figure 2, where most mGovernment service implementations and research are occurring.

In Figure 3, the survey results revealed that 34% of respondents were in the 20-35, 43% were in the 36-50 and 23% in the 51-65 age ranges. This percentage reflects that new mobile technologies and services are gaining the interest of experts aged 20 - 50.

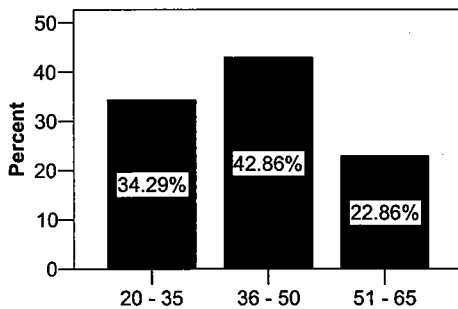


Figure 3: Respondents' participation by age

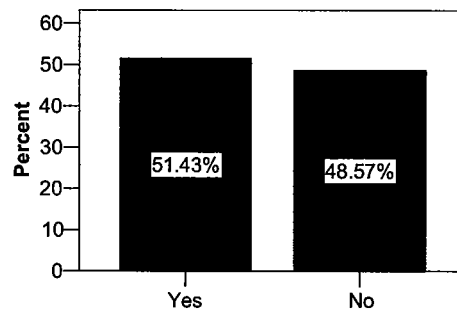


Figure 4: Respondents' previous involvement in a government mobile service project

It was particularly significant to the authors that over half of the respondents (51%) have been involved in developing a mobile government service (Figure 4). Such a percentage of returns indicates the high level of commitment to these targeted experts and confirms our selection criteria as valid.

The cumulative percentage of success for developed mobile services was 68% as per Figure 5, which is a very encouraging and significant indicator about the expertise of participants.

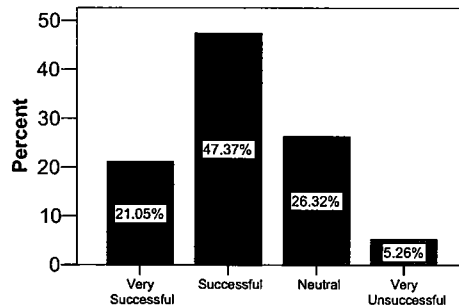


Figure 5: Government mobile service projects success rates

5 Discussion of the Study

A web-based survey was conducted to extract opinions from both expert practitioners, and academics, with research expertise, in mobile and electronic government fields. An open question about suggestions to overcome the main barriers to success in mobile service projects was answered by 83% of participants. Analysis of responses identified three major areas of suggestions: Organisational, Technical and Social, which are illustrated in Figure 6. The suggestions are compared to the findings from the literature survey and are discussed below.

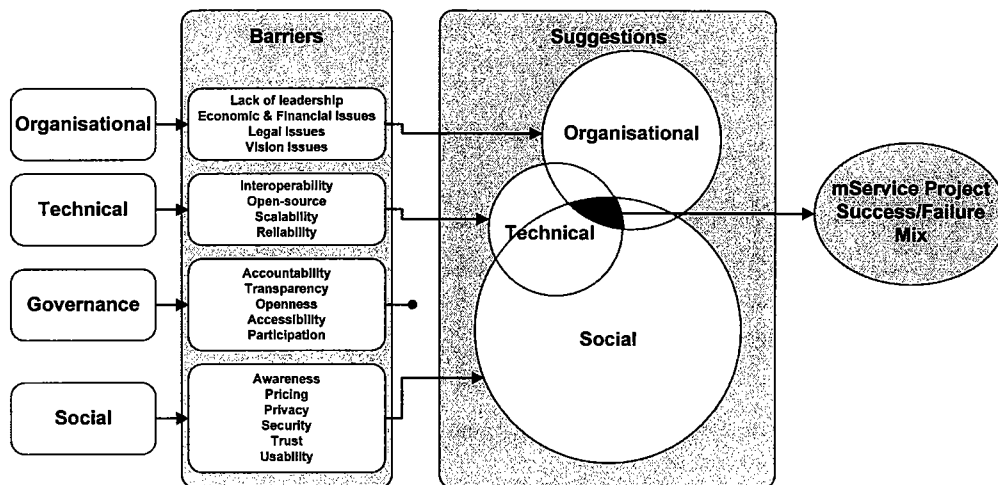


Figure 6: Mobile service project success/failure mix

5.1 Social Suggestions

Social suggestions are placed into three categories: mobile service price; privacy and security; and training and education as follows:

5.1.1 Mobile Service Price:

As defined by VentureLine (2005) value for money is in the perception of the buyer or receiver of goods and/or services. Proof of good value for money is in believing or concluding that the goods/services received were worth the price paid. Earlier Zálešák (2002) posited that low price is not the only factor that affects a mobile service usage as psychological factors play a role as well. Supporting his opinion, Zálešák mentioned that, despite the low price of an SMS message, British citizens could not overcome the psychological barrier to use SMS to fulfil an official task such as voting because they used it to send messages to friends. A year later, Zálešák (2003) stated that price is one of three major factors that influence citizens to use mGovernment applications. Rieger et al. (2003) considered mobile service pricing as a sensitive area, as wrong pricing could lead to refusal of the new service. To ensure the acceptance of a higher price for mobile services compared to regular services, the advantages for the user must be clarified and promoted. When entering the market with newly developed services, providers must ensure that the value is obvious to users in order to create acceptance for premium prices. As most mobile services are not free, a certain quality of service (QoS) must be ensured; otherwise the users become frustrated, paying for services that do not meet their expectations. Both Tozsa and Budai (2005) consider that higher accessibility to mGovernment services is linked to the lower cost of the service.

Our respondents viewed mobile call charges as a necessary ingredient in making a mobile service usable. However they made the following suggestions for overcoming opposition to charges for mGovernment services. One reported 'all charges need to be uniform', whilst another noted that 'if selecting numerical options additional charges must be avoided'. Another expert stated that government should 'reduce access charges to the rate of fixed line'. One respondent believed that, 'a new service must start with one unified and affordable price which enables all classes of a society to utilize that service'.

5.1.2 Mobile Service Privacy and Security:

Privacy is defined (Legnini, 2006) as "the right to be left alone and to control the conditions under which information pertaining to you is collected, used and disseminated". If users' privacy is not protected when using a mobile service, they simply will not use it again, making it very difficult to achieve critical mass. Users are becoming more aware of privacy issues and are comparing the privacy policies of government sites with those of the private sector. As outlined by Ng-Krue et al. (2002) a serious concern for the concept of "location/context awareness" is the confidentiality of information concerning a person's position. Indeed "Misuse could lead to increased intrusion on privacy by exposing an individual's real-time movements with possible negative implications." Citizens would normally react badly to such surveillance of their movements by a government although it is enabled so that emergency services can locate mobile phone users. Nonetheless, security is protection from intended and unintended breaches that would result in the loss or dissemination of data (NECCC, 2001). Goldstuck (2003) confirms that 'if a wireless access point is not sufficiently secure, it can compromise data, which in turn can result in loss, damage and severe public relations fallout'. Security is not just about installing the latest security devices and deploying the most modern security technologies. Information security is a combination of business, management and technical measures on an ongoing basis. In a

2005 study by Quocirca, two thirds of IT professionals rated data falling into the wrong hands by theft or loss of a device as the most important mobile security issue (Bamworth, 2006). If the material contained mobile voting records, the effect could be catastrophic for governments.

One expert stated that there must be a 'clear privacy policy of governmental organisations', where another highlighted the importance of 'assurance [assuring] that encryption makes transactions secure'. Another expert explains that 'the measures that need to be taken depend on the level of trust needed by the citizen to make him/her feel comfortable in using the service. Payment of parking fees through mobile services does not require the same amount of confidence as a mobile voting solution'. 'Nothing will harm a government service more than bad news about threats regardless of whether the service was implemented by traditional means or with latest technology as for mobile government' reported another respondent.

5.1.3 Mobile Service Training and Education:

The ultimate goal of training and education is increasing awareness. Awareness is the first step in the users' experience, as they need to know that the service is in existence, what it does and how it is relevant to them. They then need to know in which ways they can contact and access the service. Community awareness and training programs are often key success factors for successful introduction and acceptance of new services (AOEMA, 2004). For an mGovernment service, such as mobile voting, awareness of the service is critical. Training extends to all government officials and employees enabling them to understand more about their roles at the back office to deliver mobile services to end users (Prisma Project Team, 2003).

Training and education for both working staff and citizens were commented on by five experts, as one highlighted 'education of the service-seeker as to the benefits of mobile services', and this was supported by another expert who viewed 'more information about m-gov solutions (best practices)' as vital. Another respondent cited that 'technical training on mobile technologies can reduce the usage barrier', whilst the fourth suggested 'more IT knowledge among the clerks, officials'. From a different perspective, another expert considered that 'motivational counselling could help change the mind-set to a large extent, provided we are able to show improvements in performance and productivity'.

5.2 Organisational Suggestions

Adopting mobile technologies to deliver traditional or electronic services necessitates a change. Hirst & Norton (1998) think that the change, from the perspective of the government, can be seen as internal, external or relational. Millard et al (2004) view these changes as organisational changes, a shift in mindsets, modernisation of regulation, different consumer behaviour, and political decisions.

Our respondents provided a diversity of organisational suggestions. Authors intertwined a coherent set of opinions starting with one expert who suggested that 'the key thing is to

create a framework that would allow various organizations/administrations to participate in mobile e-gov services'. Another expert suggested that 'in order to make mobile government services successful, organizational aspects must be carefully considered. Questions like "How do we ensure confidence?", "How do we prevent threat not only from the outside world but especially from within the government?", "What kind of threat is possible - again from outside and internally?", "What organizational changes need be implemented for this mobile government service?" etc. sharing mechanisms across local, state and federal agencies'. Another respondent urged governments to 'involve workers in planning, decision-making regarding the tradeoffs, and implementation'. Cautiously, Tozsa & Budai (2005) stated that mGovernment necessitates the interaction of the employees of different departments, thus the instinctive concern for organisational integrity may generate resistance to the introduction of mGovernment services.

Taking the respondents' recommendations a further step towards end users, one expert stated that 'governments must start any service not just the mobile, with going down deep to the citizens needs, motives, fears, hopes and abilities to use that service. User-centric policy has to be implemented BEFORE taking any action or project. Policy makers need to look at how their decisions affect the citizen-user in every day use, and how interaction with the system fits into the citizen-user's busy and complex lives, their goals and priorities, NOT what is the most convenient solution from the administration's point of view. There is a tendency to "push down" responsibilities and work onto the citizen (e.g. make them fill in forms online), without giving them any help or assistance'.

This reflects the literature findings from a Deloitte Consulting and Deloitte & Touche (2000) report which suggested that customer (citizen) relationship management (CRM) allows governments to effectively share information across organisational boundaries and ensure consistent and reliable customer service, regardless of the channel. The report presents eGovernment (and, by implication, mGovernment) as transforming today's conventional organisational designs into hyper-efficient service models. Berntzen (2007) takes CRM into a deeper level by letting individuals and voluntary organizations provide innovative digital services to the public in collaboration with the government authorities in Norway which possess and provide necessary infrastructure, application software and basic content.

This is confirmed by another respondent who cited that 'adopting a user-centred design process, emphasising the significance of user feedback at each step' is crucial to the success of any mobile service project. Giving more details, one expert advised 'developing compelling services as perpetual beta services and enhance them step by step'. Compelling services are described as 'niche services' which have 'real added value from the user point of view' by two other respondents. Regarding introducing a new mobile service, one expert suggested 'not [to] communicate mobile as something special, just talk about new features in this "version" (i.e. mobile) of a government service' which is indeed significant especially when there is a need for quick test results.

One respondent highlighted the need for 'more money for development'; whilst another viewed that 'some legal regulations also must be changed'. Although mobile government is considered by many experts as an extension of eGovernment, it should be able, in many

cases, to use the legal precedents set up for eGovernment in addition to specific laws that relate to the unique aspects of mobile government services, such as location based services.

5.3 Technical Suggestions

“Design for all” is what Clarke (2003) explained as the dissemination of the enormous variety of the human being's characteristics and offered suggestions to standardisation in order that the technical efforts satisfy the greatest number of users possible by becoming aware of and respecting their requirements. Another opinion (DESA, 2003; OECD, 2003) sees that designing the system should be a response to technical problems.

Expert responses contained the least number of technical suggestions, and this may be reflect the weight of the technical aspect in a new mobile service project compared to other aspects e.g. the social side. Whilst we find one respondent vaguely noted that ‘the technical measures need to be evaluated and implemented carefully’, we notice that pure technical responses were very few. One respondent suggested ‘implement[ing] ‘krytochips’ in cell phones’, whilst another recommended the ‘use of code baked with promotional program to promote the codes, providing contextual information, etc’. Krytochips/krytochips are microcircuits that implement hardware cryptography, which means performing encryption and decryption algorithms at the circuit level, providing a speed of 1500 Mbits/sec or more. They were firstly used for encrypting commercial TV programs as well as information transmitted from video security cameras and other security devices. They are used now in mobile telephony smart cards, trusted platform modules, digital tachographs and PIN entry devices. Such security measures would go a long way towards satisfying the social suggestions of the need for security and privacy in mobile government services.

Two other experts gave their suggestions which can be classified as socio-technical. One suggested that ‘menus must be simple and easy to navigate. Initially there should be a help option so that users can access an actual person for assistance’. The other succinctly stated that a ‘single point/ single window data entry’ should be implemented.

6 Conclusions & Future directions

This paper analyses and defines suggestions and opinions to overcome the barriers to the success of mGovernment service projects from the perspective of mobile technology experts in nineteen countries around the world. The outcome is a mix of three ingredients: social, organisational and technical. No suggestions that relate to the governance axis were provided although these same experts highlighted barriers relating to governance when initiating a mobile service project. This may reflect governance as one of the benefits or outcomes of implementing mobile technologies in government. Our next step involves conducting a real-world survey which will investigate mobile government service barriers from the end users’ perspective.

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