

Regional City Council mGovernment Case Study: Success Factors for Acceptance and Trust

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Abstract— This paper is the second of a series of investigations into the key success factors for mobile government services (mGovernment) in Australia, Jordan and the United Arab Republic. The case study in this paper concerns a large regional city council in Queensland, Australia. It provides valuable insights into the adoption of mobile government services and applications over the council’s wired and wireless network. Here, we report on a major achievement of the study namely, the identification of success factors for mobile government.

Keywords-mobile; government, success factors; case study

I INTRODUCTION

This case study outlines the mobile government systems implemented at a regional city council in the State of Queensland, Australia. The rationale behind the selection of local government is the high number of community issues with which local governments must deal compared with other government levels (i.e., state and federal). These community issues form a pressure on the local governments to improve their services through adopting the latest mobile and wireless technologies. The analysis of the case study generated a number of success factors that should be considered when planning for, and while implementing, the mobile government systems and services. This paper is part of our study of mobile government services [1] [2]. Here we report on one major case study from an analysis of eight (8) other case studies from Australia, the United Arab Emirates and Jordan. Section 2 provides the background to the case study and Section 3 outlines the methodology. Section 4 reports on the case study and the conclusions are found in Section 5. A table of success factors is set out in Appendix A.

II. BACKGROUND

For ethical reasons the information is de-identified. Thus, the paper refers to this regional local government city council as Queensland Regional City Council2 (QLDCC2) in Australia. The team manager of technical services was interviewed for this case study. The goals of this study include an exploration of the (a) success factors and (b) economic aspects of the acquisition of wireless and mobile

technologies in the public sector. The objectives deriving from those goals are:

TABLE 1. OBJECTIVES & QUESTIONS

OBJECTIVES	QUESTIONS
An assessment of the categories of mobile and wireless technologies use in public sector.	<i>What patterns of acquisition emerge from the current wireless and mobile technologies and the perceived needs for mobile government?</i>
The establishment of a basis for understanding the current and future success aspects of mobile government.	<i>What characteristics of the categories of mobile government services contribute to the patterns of acquisition?</i>
An evaluation of the mobile government adoption issues, including managerial issues and the centralization and/or decentralization of decision making.	<i>What issues arise from the rapid acquisition of mobile and wireless technologies and how important have those technologies become to the organization?</i>
The establishment of a basis for understanding the current and future economic aspects of mobile government.	<i>How will the organization balance the need for technological changes with the need to continue the accomplishment of routine tasks?</i>

These questions were used for all eight case studies and the answers were recorded and transcribed and later analyzed using nVivo, a qualitative data analysis software package.

III. METHODOLOGY

The above questions along with the main research question: “*What are the factors that contribute to successful mobile government? How? Why?*” reinforce the exploratory nature for this research [3]. The author [4] defines the methodology as “*the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes*”. According to [5] “*Case*

study can be seen to satisfy the three tenets of the qualitative method: describing, understanding, and explaining". This forms the rationale behind selecting case studies as the research strategy. The research question type also led to choosing the case study methodology. The core research question includes three categories of the enquiry questions series: 'What', 'How', and 'Why' [3]. The 'What' part here aims to develop propositions for further inquiry. The 'How' and 'Why' parts "are more explanatory and likely to lead to the use of case studies" [3]. In [6], a case study is defined as:

an in-depth investigation of a discrete entity (which may be a single setting, subject, collection or event) on the assumption that it is possible to derive knowledge of the wider phenomenon from intensive investigation of a specific instance or case.

Tellis [5] acknowledges that case study methodology has been used extensively in many fields such as: "law, medicine, government and in evaluative situations". He points out that "The government studies were carried out to determine whether particular programs were efficient..." [5]. In this case study, QLDCC2 is a regional council that serves an area of 3,127 km² and a population of 300,000. The council has approximately '1300 employees' and 'has hundreds of different types of services ..., from libraries to cemeteries, to water operations, inspectors, building inspectors, so there's a whole raft of different business groups out there, ... and ... different business needs'. The council utilizes '40 Blackberry handsets' as it 'needed to provide some secure service for managers so they could get access to emails and their calendar, while they were out in the field'. The council also uses the NextG wireless network so that the mobile workforce can communicate with the council's systems from outside the council offices. Furthermore, the technical manager explained that 'it's actually not just our mobile users that use NextG; we have about 5 or 6 locations, where we use NextG. One of them is the cemetery up the road; they use NextG, because they are out of the range for ADSL - they can't get the high speed ADSL, so we can provide high speed connectivity back into the network through the wireless NextG'.

QLDCC2 has also implemented Wi-Fi hotspots in their libraries. The manager noted that in their 'main libraries we provide free Internet access'. Recognizing its diverse community, the council arrived at its 'Mobile Libraries' initiative - 'basically it's a bus, a mobile library bus that drives around various sites'. At first, the mobile library used to 'go to fixed stops, where there was a phone line into which they could plug'. Then, the council realized the benefit of the available wireless technologies, so 'now that we've extended it to be fully mobile, it uses the Telstra NextG service'. The manager explained that 'it's cheaper doing that than it was previously having a fixed line at those 25 sites, for which we were paying rentals, and you know

you go from providing a 64k service through to a 7.2 megabit service, so a huge increase in actual performance'.

The mobile library 'visits areas like, outside retirement villages, schools, sort of locations where there ... isn't easy access to the fixed library'. The mobile library houses items covering a wide range of formats, including books, magazines, DVDs, music CDs, toys, large print and audio books - something for all ages. The manager explained that the mobile library 'provides Internet access for the public when the library turns up and also it provides some online services for the library staff that work in that library, so they can check out books, record books that get loaned out and come back in, and it also provides several Personal Computers in the bus, for the public to come and do online catalogue queries, and surf the Internet'. In terms of the benefits achieved, the manager explained that 'now in words of ability, it can now go to anywhere within our region and it's got full network coverage through Telstra, and we can provide the service to the public for Internet, online catalogue searching and also to our staff that actually man that library'. Figure 1 depicts the mobile library.



Figure 1. Regional Mobile Library QLDCC2 2008, (Source: Welcome to QLDCC2 libraries, viewed 23/10/ 2008 <http://library.QLDCC2.qld.gov.au/sitePage.cfm?code=mobilelibraries>).

IV THE CASE STUDY

The manager explained that the main driver behind implementing the mobile government system was the fact that 'the technologies are out there', but this did not mean that all business units within a regional city council should utilize the technology. Investing in technology should bring benefits and/or profits to the business unit to justify the need to invest - 'we don't necessarily implement technology just for the sake of implementing it'.

The business case perspective was highlighted as an important factor by the manager from QLDCC2. Investing in technology should bring benefits and/or profits to the business unit and possibly to the organization as a whole. It is not necessary that the business unit is aware of, or understands, the new technologies, as it is the IT division's responsibility to 'liaise a lot with the business to find out what their requirements are and make them aware of these technology changes'. The manager stated 'we [IT division] work with the business to ascertain what their requirements

are and what benefits they'll get if we implement the technology'. This highlights the importance of the liaison among the IT division and all business units. He also cautioned that *'there are costs and overheads, as we implement the technology, you are going to need more staff to maintain your system, there's a cost to implement it, so it's done on a case by case basis'*. Determining the costs of implementing mobile government systems is a joint effort where the IT division provides its experience too. For example, the manager acknowledged that *'security costs were a big one'* and these costs are determined by the IT division.

To enhance cooperation, the manager emphasized the importance of having a *'good relationship with the business'* through maintaining open communication channels between the IT division and all business groups, so if *'they require new technology solutions, they might come to us... and we work with them to find a solution'*. To sum up, the case study showed that implementing mobile government systems through investing in mobile and wireless technologies is based on business case proposals which require:

- IT liaison with the business units to understand their requirements;
- IT liaison with the business units to make them aware of the available technologies that meet their requirements;
- A valid and justified business case that supports the decision to invest in the technology.

Forty (40) Blackberry handsets were introduced *'about 3 to 4 years ago'*. To do so, the council *'looked at a few different technologies, and found Blackberry was ... the most advanced at that time. Blackberries provided a good comprehensive solution, that was secure and you could also manage the devices that you had from the central system'*. The council has been utilizing different mobile devices distributed to many different users, such as the *'standard normal size laptops used by the water operations'*, *'Blackberries used by the councillors and managers'* and *'touch screen tablets for those who need more organizer devices'*. The manager justified utilizing the different devices due to the fact that *'the different business areas are defining requirements that they need'*. This highlights that the requirements play a role in mobile device selection. For example, a business unit might need *'access to either online data when they're actually in the field doing GPS measurements or whatever ... so they can sign off jobs, out in the field'* and *'for others it might be to just record static information as they are moving around, now those guys ... don't have live connections to the network because they don't need it'*.

Although some business units do not have a business need that requires live connection in the field, they still use the mobile technologies (i.e. mobile devices) to collect static data such as *'GPS locations'* of any asset *'that needs fixing'*, and *'when they [the users] come back to the office they just*

download the information, it goes straight into the system'. The manager illustrated that utilizing the wireless technologies through adding the live connection depends on *'what the requirements were and how they actually work'*. The council has to consider *'weighing up the costs to provide that service to the benefits'* gained. The manager reported that the *'live connectivity'* facility used by the *'plumbing inspectors'* and *'operations'* staff costs the council about a hundred dollars per staff member per month, but resulted in many *'tangible benefits'* such as saving *'a lot more down the track'*. The manager demonstrated this through the following example:

A good example is the plumbers, ..., going out collecting data, but they'd spend several hours, and they'd come back to the office, updating all the systems typing it all in, so they benefited in a big deal by ... simply having a laptop, NextG connected out in the car and record the information as they do their job, and saves them travelling, gets synchronized straight away, it's instantaneous, so it's live on the system, it saves them having to spend several hours in the morning or afternoon coming back in the office, to get Internet information etc.

Another factor that plays a role in achieving a successful solution is the access devices. In this case, the selection of Blackberries was partly based on their ability to house new applications for any future emerging business need. The manager illustrated that *'the primary use, initially for the Blackberries was to provide email and calendar access for councillors and managers'*, but *'the Blackberry platform we chose because you can actually have applications written, so you can interface with the systems [corporate systems]'*, so *'if the business need was there, to actually provide some functionality [i.e. to access the corporate systems] that way, then we could deliver it that way'*.

The implementation of the mobile government systems in the council resulted in utilizing *'over a hundred laptops, which are now configured for that service and they've taken that up in about the last year, so there's been a real explosive growth and that goes through from directors, to managers and to field operation staff'*. The manager also highlighted the speed of data transfer over the network as an important success factor for the mobile government system. He acknowledged *'certainly the speed that we can get through that system just makes the whole thing much more usable'*.

Finally, the manager outlined the features of the mobile government system the council aims to achieve. He explained that: *'we're trying to implement a system that doesn't add a large overhead in the back office systems, and a system that doesn't need specialized tailoring for every application to make it sort of, device dependent, in that we're trying to ... implement a system that can operate generically on a range of devices, and that we can support cost effectively'*.

Mobile government has four main constituents (Government (G), Employees (E), Citizens (C) and

Business (B). In this case study, the council provides a number of G2C m-Government services or applications. The manager explained that in order to develop such projects it is important to *'have the figures'* as they demonstrate that *'there's another service that could be done'*. For example, such figures could show *'how pervasive ... 3G web surfing technology is with the public'* which supports decision making on whether to provide it. The manager also highlighted that for a mobile project to succeed, it should mimic the real process as much as possible. For example, the mobile library solution: *'it's a free service to the public'* and the council has *'extended it now so they can provide Internet access'* because in the *'main libraries we provide free Internet access, to the public and this mobile library is now doing the same service'*.

Although a high mobile and wireless technology penetration amongst citizens results in more success for G2C m-Government services, the manager noted that it *'is not the local council's role'* to market the mobile and wireless technologies to them, because the *'the council doesn't control the wireless market'*. According to the manager, such G2C m-Government services *'could probably be provided quite easily'*, but deciding to develop them *'comes down to the penetration of the market'*. This highlights the importance of knowing the penetration figures and discovering citizens' needs according to these figures. To sum up, the manager has recommended the following success factors for G2C m-Government services:

- Broadband availability
- Attain representative figures of mobile usage
- Broadband coverage over the network
- Easiness and readability of services on mobile devices
- Mimic the real process which people know and understand

The manager focused on the G2E m-Government services, saying that the *'operations guy, who are in vans, have laptops to get back into the council's systems. Now all those particular users are provided with a laptop with a NextG card, which is configured with a corporate service, so it comes corporately back into our network'*. The manager illustrated that the implementation of mobile government systems, especially the G2E m-Government services, has not affected jobs in terms of loss or growth. It has only resulted in benefits, such as increased productivity of the workforce. In order to successfully implement the system, it is important to understand the users' skills, especially as some users (e.g., plumbers) *'never used the computer before'* and after implementing the mobile government system, they will suddenly be dealing with a mobile device that might well be connected to the corporate systems. Managing the transition from the old style of writing on paper to the most up-to-date technologies creates a challenge to the success of the system. The manager acknowledged the challenge and recommended that one

should *'go through a training issue with the staff, they have to be trained to get the benefit from it'*.

The manager emphasized that *'there is a great deal of learning in there'*, and concluded that it is essential to make changes to how things work. The manager also highlighted *'getting that acceptance and trust'* as critical to achieving a successful mobile government system. He suggested that *'some of them [mobile workforce] are even thinking, 'oh well now they can track us with this gear and know what we're doing'*. To gain that trust is *'mainly just working through that issue with the people'*, to make them aware of the reason behind implementing the system, and its benefits. The manager recommended addressing their concerns and answering *'no we're not doing it so we can keep track of you; it's been done so you can be more effective'*, and make them aware that *'it's not because we want to watch exactly what you're doing from a time management thing, it's more from a resource management of where to deploy the resources'*. Thus, gaining acceptance and trust is *'something they have got to manage really carefully'*.

To sum up, achieving a G2E service depends on the following success factors:

- G2E m-Government solutions must be configured with a corporate service
- Staff trust
- Staff acceptance
- Training
- Change management.

An important issue that the manager raised was the selection of providers. The chosen network plays a role in ensuring the security of the systems. The council has chosen Telstra's NextG network for their mobile services, such as the mobile library. Telstra was chosen for many reasons, but one reason was the *'GWIP [Government Wideband Internet Protocol]'* which is *'part of the Telstra Next Generation IP platform'*. The manager explained that equipping the *'operations guys'* with *'laptops with NextG cards'* started *'in 2007 as Telstra rolled out their NextG service'*. The manager explained that *'prior to that we did tests with their [Telstra's] old CDMA network and GPS - GSV network, but the speeds weren't really there'*. Here, the manager highlighted the speed factor as important *'to effectively deliver a corporate application out in the field; now from NextG, we can get good speeds'*. This highlights the importance of the available speeds offered by the provider's network.

The manager emphasized that the provider's infrastructure is a core selection criterion as it plays a role in the security of the systems. The manager justified his department's decision to go on with NextG from Telstra rather than 3G from other providers as *'going on with Next G ... [from] Telstra, we can have that secure VPN that goes directly into our network, and it removes access through the Internet.'*

In summary, it is essential to enter a long term partnership with a reliable provider to achieve a successful

mobile government system. It is necessary to understand the following providers' success factors to help in selecting the right provider:

- Ability to secure an access path to council systems
- Data transfer Speed
- Provider's infrastructure and its compatibility with council systems
- Provider's network speed
- Provider's future plans.

The manager highlighted that catering for mobility might require updating current systems to ensure security. The council has *'spent the last, about two years in going through planning for a network upgrade that can cater for mobility ... in a secure way'*.

In addition to the careful planning required to update the department's current network, the manager discussed the importance of identifying and understanding the risks, threats and vulnerabilities that mobile government systems are subject to, such as *'viruses', 'spyware', 'Trojan Horses'* and *'worms'* that could find their way to the system when users access the Internet using council's mobile devices (i.e. PDAs and laptops). As operational countermeasures, the council does not *'allow connection on Internet to those unless it goes through our firewalls, and our Internet servers, so I can't take my laptop home, plug it into my Internet service provider at home, it doesn't work, we block it off, it's a security halt, because once that goes in, then you know, viruses and spyware and all that stuff can get on the machine'*.

The manager stated that the major security issues arise when *'going back into the council network'*. For this, the mobile library solution incorporates *'two servers'*. To ensure security, *'staff PCs and the router, that's got a corporate card off, so that basically goes into the Telstra cloud and securely goes into a VPN [Virtual Private Network], that pumps it directly back into our corporate network and it's coded so you can only do it with that particular SIM [Subscriber Identity Module]. You need a SIM code as well to put through and there is authentication all the way through [this means the user must already be logged into 'Windows' to actually get connected to the network], so it's fairly secure'*. The coding and authentication procedures ensure security of the data in case of device loss or theft.

In this case, the solution ensures security by providing separate paths for corporate data and Internet traffic. The public get direct access to the Internet, but staff can seamlessly interact and quickly transmit vital data through a dedicated path so that *'it doesn't go on the public Internet at all, it simply goes and hits the VPN gateway in the Telstra network and pumps directly back into our network. Now, for it to come in on this side we've got a Government Wideband Internet Protocol (GWIP) 20 meg service, and that takes in all those NextG cards and also some of our smaller remote sites that use GWIP'*.

One of the main threats is the loss or theft of the access devices. The manager demonstrated using the following example:

If the device gets stolen that might have a NextG card connected to it, simply turning it on wouldn't get them connection into the network. Every time the user turns on the laptop, they've got to logon as a local user on the laptop to start with, after they get through that security level, there is then a 4 digit PIN code which they must enter every time that the NextG device connects up to the network, ,, they then have to logon to the CITRIX desktop, and that's the normal desktop or network logon, which they then have to enter, so there's like three levels they go through. Also, the actual service is keyed to that SIM card, so if they didn't have that SIM card they couldn't connect into the network.

To sum up, to achieve a successful mobile government system, it is crucial to consider the following success factors:

- Update the current networking solutions for securely catering for mobility
- Awareness of all the risks, threats, and vulnerabilities to mobile government systems
- Use as many security levels as possible to ensure the ultimate security of the access devices and the systems
- Follow password selection best practice to generate passwords
- No sensitive information to be kept on an access device.

The manager commented that the state government so far has not pushed local councils to implement mobile government systems, but he highlighted that the government has a crucial role to play in helping them succeed in implementing the system. There are many *'ways they could help'*; one way is *'to bring the cost down and to bring the saturation even further'*. The manager argued that *'as the market gets saturated more and more uptake comes, and then you get more competitors, such as Optus rolling out their wireless networks, as that gets rolled out, that raises competition'*. This competition has already resulted in a drop in prices; for example, *'we pay a certain amount with Telstra now, for provision of the service, a couple of years ago it was more expensive, but now it's getting cheaper'*. The government could also negotiate with service providers to get the best deals for its departments. The manager acknowledged the importance of such negotiation; one result was that *'we use the state government contract for mobile phone contracts'*. The government negotiations with providers resulted in the creation of the *'Telstra Next IP Network, and it's basically made up of a couple of products like NextG, GWIP, Ethernet Campus, and it's all about providing ... faster data services and remotely integrated data services on a big platform'*.

V CONCLUSION

This case study highlighted a number of the potential benefits of implementing mobile government. According to the manager, *'there's a number of benefits'* for the mobile work force such as *'the exact recording of information'*, and *'they can actually work quicker out there, it becomes a time saver for them'*. The manager also identified a number of benefits in using the wireless network to connect some of the fixed locations into the council's network. This is usually needed when high speed ADSL is not available in the location, and the benefit is in *'providing high speed connectivity back into the network'*. The council found earned benefits in *'converting it [locations] from a fixed line, or a fixed ADSL or a fixed ISDN line that goes to the site, to a mobile NextG connection'*, and the benefit was that *'we've actually saved a lot of money ... you change your cost from maybe three to five hundred dollars a month, down to a hundred dollars a month, so you get a doubling in speed or tripling in speed'*. Implementing G2E m-Government services has benefited the council in many ways, such as *'saving overtime costs'* as a result of no longer *'entering in information manually, which now they can enter out in the field'*. The manager affirmed that it *'increases productivity, they [mobile workforce] can actually get more work done or provide more services to the public, or respond quicker to the public, because they can get information online out there, like job dispatching. The guys have laptops always on out there, so when the jobs come through, they can see the details straight away when they're out there in the field'*. This shows that the return on investment not only benefits the government council, but all its constituents, such as the employees and citizens. To sum up, to implement mobile government in any council it is important to understand the potential benefits to be gained from such a system in order to justify the costs and to assist in the decision making process.

The analysis of the QLDC2 case study has revealed a number of mobile government success factors. Table 1 in Appendix A summarizes the different success categories and their success factors.

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APPENDIX A

Success Factor(s)	QLDCC2 Case Study
Drivers	<ul style="list-style-type: none"> The availability of technology
Solutions	<ul style="list-style-type: none"> Easy management Up-to-date Selecting of access device Data transfer speed One platform Device independent solution Low overhead on the back office systems
Constituents (Citizens)	<ul style="list-style-type: none"> Broadband availability Mobile penetration and usage Easiness and readability of (G2C) services (G2C) services to mimic the real life process
Constituents (Employee)	<ul style="list-style-type: none"> Staff trust Staff acceptance Training Change management
Providers	<ul style="list-style-type: none"> Security Data transfer speeds Infrastructure Compatibility with the department systems Future plans
Business Case	<ul style="list-style-type: none"> IT liaison with business groups Understanding business requirements Awareness of available technologies Justifying the needs and costs Reflect on benefits
Security	<ul style="list-style-type: none"> Update department's network Awareness of all the risk, threats and vulnerabilities Implement as many security levels as required Best password selection procedures No information to be kept on devices
Government Help	<ul style="list-style-type: none"> Negotiation with providers
Benefits	<ul style="list-style-type: none"> Understanding the benefits