

Transcending e-Government: a Case of Mobile Government in Beijing

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Abstract: *The convergence of mobile communication and mobile computing technologies opens up new horizon for mobile interaction and mobile working. The use of mobile technology in government sector not only provides an alternative channel of communication and public service delivery, but more importantly, it can address the mobility of government itself and in this way transcend the traditional e-government service delivery model by bring personalized, localized and context aware services close to its mobile citizens. A number of mobile government initiatives have been proposed globally to take advantage of this opportunity for better public service delivery. In this paper an example of such a mobile government initiative in a district of Beijing is presented. Based on the study this paper argues for a further paradigm shift from e-government to mobile government. With the challenges and opportunities provided by mobile ICT, government should be aware of the potential of mobile government to transcend the traditional e-government models, which pay undue attention to online Internet portals.*

Keywords: mobile government, e-government, mobility, organizational change, Beijing

1. Introduction

The rapid diffusion of mobile ICT such as laptops computers, mobile phones, PDAs (Personal Digital Assistants) has, along with email, instant messaging and other networking services, offered many new possibilities for the mobilization of interaction (Sørensen, 2003). There is a rapidly growing interest in the concept of mobility and the various issues that arise in 'being mobile', both for the individual and the organization (Kakihara, 2003). The challenges that this poses for governments is considerable; for example, how are government activities reshaped in an "always-on" society, and how can government exploit the possibility of a more connected, responsive and fluid workforce (Maio, 2002)? While the conventional e-government efforts have focused on providing access to services through internet portals, it has so far not addressed the mobility of the government itself, or the mobile society at large.

This paper first briefly reviews the literature on mobility, e-government, and mobile government and then goes on to answer some of these questions through an analysis of the case of a mobile government initiative in one of Beijing's central districts. The case is analyzed drawing on theories of mobility and e-government studies, and the meaning of being mobile and the significance of mobile technology application in the government sector are explored. From the perspective of duality of mobility, a distinct fluidity with strong potential for organizational change is identified in mobile government practice. Finally by drawing from Mol and Law's three social topologies of mobility, the paper proposes a paradigm shift from conventional e-government, with its focus on Internet portals, to mobile government or m-government. This paper also calls for future research in this direction.

2. Towards a Mobile Society

With the rapid diffusion of mobile ICT, we now see a rapid increase in mobile interactions between people and also in mobile work supported by technology. (Kakihara and Sørensen, 2002a). The body of research on mobility is expanding rapidly with increased attention given to the rapid diffusion of mobile technologies such as GSM telephones, PDAs, microwave Local Area Networks (for example Bluetooth), and Wireless Application Protocol (WAP). The number of mobile users is increasing and in

many countries, through wide spread use of advanced mobile phones, has already surpassed the number of households with internet access. (Roggenkamp, 2004) Research on mobility in the sense of human movement combined with technologies that are portable and hence mobile themselves, leads to functional characterizations of mobile technology use (Kristoffersen and Ljungberg, 2000). Kristoffersen et al. (1998) talked about local, regional and global mobility, and Kristofferson and Ljungberg (2000) classified mobility in three modality of travelling, visiting and wandering; while Kakihara and Sørensen (2002a) discussed spatial, temporal, and contextual aspects of mobility to illustrate the relationship between mobility and human interaction. Spatial mobility means shift from rigidly confined to moving freely. Temporal mobility means change from linear clock time to social time. Contextual mobility means a shift from locally conditioned to flexibly coordinated interaction.

These technologies can be described as 'socially profound technologies' (Smith, 2000) because they bring the power and connectivity of computer networks into the gap between humans as they interact in physical space. These are tools that can help people organize and coordinate their interactions and exchanges both 'just in time' and 'just in place' (Smith, 2000). Thus, when exploring the driving forces of mobility and mobile technology, Kristoffersen & Ljungberg (2000) suggest that it will lead to a society which evolves more cooperative work practices in place of bureaucracy, and organizations that are more responsive and service oriented.

Mol and Law (1994) proposed three distinct metaphors of social topologies, namely, region, network and fluid. The region is a distinct topology in which objects are clustered together and boundaries are drawn around each region cluster. Therefore, region is characterized by boundary. The network is a topology whereby relative distance is a function of the relationship between components which constitute the network. Complex connection of nodes creates the whole network structure. This topology can be characterized by relationship. Fluid is a topology whereby "neither boundaries nor relations mark the difference between one place and another. Instead, sometimes boundaries come and go, allow leakage or disappear altogether, while relations transform themselves without fracture. Sometimes, then, social space behaves like a fluid." A fluid world is a work of mixtures and variation without boundaries and transformation without discontinuity. Kakihara and Sørensen (2002a) suggest and discuss further the adoption of the fluid metaphor of mobility, while Pica and Kakihara (2003) theorize mobility as a duality of stable interaction and fluid organization.

3. E-Government and M-Government

Governments have long recognised the potential of ICT to bring about fundamental changes, not only in the way they function but also in their relations with other organisations, societal groups and individuals. Both in their relationship with the citizen, inter-organisational arrangements, and in intra-organisational activities, ICT and Internet technology in particular, has seemed to promise enormous opportunities to reinvent government, to increase efficiency and effectiveness in public sector (Al-Kibsi et al, 2001; Layne and Lee, 2001) .

Heeks (2000) suggests three main factors which have contributed to this phenomenon. The first factor is the perception of unsustainable levels of public expenditure that do not produce efficient public services, due to waste, delays, mismanagement, corruption or poor organizational and management skills. The second factor is the resurgence of neo-liberalism which emphasizes the efficiency of market competition and the need to make government more business-like. The third factor is the rapid development of IT and the increasing awareness of its potential. Chadwick and May (2003) examine the origins of the recent shift towards e-government in three cases: the United States, Britain, and the European Union and set out three models of interaction between states and citizens that might underpin the practice of e-government, namely the "managerial" model, the "consultative" model and "participatory" model.

In the e-government literatures, there are many articles and studies talking about the use of Internet technology to provide effective and efficient services to the public, to reinvent government and to transform the government (Heeks, 2000; Al-Kibsi, 2001; Prins, 2001; Silcock, 2001; Fountain, 2001; Ho, 2002; Gant and Gant, 2002; Mellor and Parr, 2002; Moon, 2002). Many academics and practitioners put great importance on E-government initiatives focused on Internet portals. As Fountain (2001) argues, Internet technology does not mean all for government. Due to limited Internet penetration, there is also concern that e-government may exacerbate digital divide and raise the issue of inequalities among citizens (West, 2000). The rapid development of mobile technologies such as internet enabled mobile phones, PDA, Wi-Fi and wireless networks, has spurred the development of m-commerce and m-business models, which are perhaps equally relevant to government (Sadeh, 2002). In this way a new channel is provided through which to deliver government services to citizens in more effective and perhaps cheaper ways. Such use of wireless technologies to deliver government services is usually called mobile government or simply m-government (Ghyasi and Kushchu, 2004).

While e-government is the conventional government services made available for citizens through electronic means such as internet connected computers and other devices. M-government is defined as the strategy and its implementation involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits for citizens, business and all government units. (Kushchu and Kuscu, 2003). Mobile computing in local government tends to mean delivering services in the field – in the streets, in people’s homes or other convenient locations. It is usually understood as meaning taking services to the customer or to the relevant location, rather than the customer having to visit council offices to access services. (Goldstuck, 2003)

4. A Mobile Government Initiative in a Beijing District

4.1. Local Governance

There are three level of government in Beijing: the municipal level headed by the mayor, the district level, and the neighborhood level. Below the neighborhood level, there are residents committees usually functioning as autonomous organizations for the residents. Dongcheng District is a central urban district of Beijing with a registered population of 625,000, covers an area of 25.38 square kilometers. This district boasts its world famous cultural and historical heritage and Tian’anmen Square, where the national ceremonies are usually held, is just in this district.

With its fast economic development China has experienced a rapid urbanization during the last two decades. The cities are changing fast with a large amount of construction, while the relatively much weaker management of the city is a common problem of most Chinese cities. The fragmentation of responsibility among dozens of government departments, the lack of proper maintenance of the municipal infrastructure and street scene is widely recognized. Problems are usually solved in three ways. The first is by campaigns regularly launched by local government before some special occasions such as national congress session or on the eve of national holidays. The second is by inspection carried out by the relevant government department, utility company or other entities that provide public services. The third is by reports from the residents when they encounter problems such as water supply, or damage of infrastructure, or fly-tipping.

For information from the residents to reach the top of the district, it usually passes through the bureaucracy of the residents committee, neighborhood committee, representatives from specialized departments at neighborhood committees, specialized department of the district, municipal administration of the district, deputy head of the district, and the head of the district. Not to mention the bureaucracy in each of these departments.

Orders from the top also need to go through the bureaucracy in reverse. The specialized department, or relevant government at the lower level, may dispatch a task to a relevant party to go to check and solve a problem. Though there are already Internet connections among the government departments, they only serve as an alternative communication tool alongside telephone and fax. Employees usually stay at their office, wait for the dispatch of tasks and then to go the site to work. During the work they usually make some notes, which are keyed in afterwards back at the office. This process is highly inefficient. Responsibility intersections among the specialized departments exacerbate the situation. Many times, when one department dispatches staffs to investigate the situation, they found it is not their responsibility and it is re-reported to the hierarchy for reassignment to another department.

4.2. ICT Development at a Glance

According to statistics from CNNIC (2005), there are 9.4 millions Internet users in mainland China in December 2004 with penetration rate of 7.16%. There is already some discussion about the extent to which big e-government investment will deepen the digital divide in China as the majority of citizens can't benefit directly from e-government projects based on Internet access. Comparatively, the number of mobile phone users has reached 33.5 million (MII, 2005) with a penetration rate of 25.5%. Big cities have a much higher Internet and Mobile penetration.

Beijing is the capital city of China with a population of 14 million. By the end of December 2004, Internet user arrives 4.02 million with a penetration rate of 27.6% (CNNIC, 2005), the mobile phone use achieved 13.359 million with a penetration rate of 90.6% (BMBS, 2005) in Beijing. The high penetration of mobile phones attracted many government departments to try to take advantage of it to deliver a better service. These services mainly focus on use of short messaging service (SMS) to deliver information to citizens, such as taxation department use of SMS to deliver information about tax collection, police authority to delivery information about emergencies, education department to release result of exams. In contrast, the case this paper focuses on the case of one central district in Beijing and shows the use of mobile technology to deal with the mobility of government itself.

4.3. Mobile Government Initiative and its Implementation

As the fragmented, highly bureaucratic and inefficient city management problem is widely acknowledged, the leadership of the Dongcheng District decided to take advantage of ICT to reinvent the municipal administration. Here we refer by municipal administration to the management of urban infrastructure (street lighting, drainage, water supply facility, all kinds of underground pipelines etc.), housing, gardens, construction, environment protection, and city appearance. Under the leadership of the head of the district, this project started from the beginning of 2004 and is now in operation. The district uses grid technology, dividing the area of 25.38 square kilometers into 1652 cells; each cell is assigned a 6 digit number, the first two digits represent the neighborhood (at sub district government level), the second two represent the community (respect residents committee), the last two represent the exact cell. A through survey about the public facilities in the district was also carried out to map the locations of each public facility in a GIS system. Each public facility has been assigned an 8 digit number and is placed in relevant cell.

The project also identified 4 layers of responsible entities: the first is the district government; the second is the 10 neighborhood committees; the third is the 137 residents committees; the fourth are the institutions in the relevant 1652 cells.

In this project the District Government split the supervision function from the management function. Two centers were established: the Supervision Center and the Command Center. The Municipal administration supervision center was newly established to be independent of the existing municipal

administration commission. The supervision center recruited 400 supervisors with each responsible for about 12 cells about 180,000 square meters area and up to 1400 public facilities. The supervisors patrol their responsible areas to spot, check, report, monitor the municipal administration related problems and ensure the problems are properly solved. Each supervisor is equipped with a mobile handset to use when patrolling his or her cells. The District Municipal Administration has been renamed to become the District Integrated Municipal Administration, a name change to emphasize its coordination responsibility. It operates the command center that coordinates all the specialized departments and lower level governments, as well as providing coordination with other relevant government departments at the municipal level.

At the Supervision Center, the location of all supervisors at work can be located and displayed on a big screen. All the location information is refreshed every 15 minutes through the GPRS network. The information and working status of the supervisor at work, as well as the information of the communities without a supervisor at work can be checked on the screen. All the reported issues are also displayed in different color and symbols; this makes it easier for checking and following up. The Supervision Center also operates a call center to receive phone calls of complaint from the public.

The Command Center receives task from the Supervision Center and coordinates with all relevant departments to get things done. From analysis of the historical data, they found there are a total of 37 specialized departments at the district level which are relevant to municipal administration, such as district civic police, district cleaning department, district gardening department, district civil affairs administration. There are also 21 relevant departments at the municipal level, such as municipal engineering department, municipal road administration, water supply company, gas supply company, central heating company etc. The tasks received are assigned to the relevant specialized department of the district through the network, and the processing status is then monitored. A special section was set up in the District Integrated Municipal Administration to coordinate with the relevant departments at the municipal level. At the Command Center there is also a big screen, with the processing status of all the issues shown.

With GPRS connection to the supervision center through the mobile handset, supervisors can receive instruction from or make phone calls to the center. They also receive complains from the residents (or transferred from the call center at the supervision center), confirm it, and send the information back to Supervision Center. If necessary, the supervisor can take photos with the mobile handset and send these back together with the position on the GIS. The Supervision Center then passes the information on to the Command Center. With accurate information about the report and the location of a problem, the Command Center can easily allocate the responsible department. The responsible department can then sends out staffs to location and solve the problem. After the problem is solved, the supervisor can visit the place and confirm it. Only after this, will a report be marked as clear.

What is very interesting is that, when the residents saw the supervisors taking photo with their PDAs near their residence, they were reluctant to believe that would work - "Before you have Internet, e-government, now you even have camera! No use at all, but a waste of money". When they found that local environmental problems had really been solved in a much more efficient way, the residents were very happy. Indeed, residents are increasingly like to ask the supervisors in their community for help if they encounter any problem and sometimes invite the supervisors to their house and have a talk.

5. Analysis

In the Case of Dongcheng District in Beijing, the mobile system, together with the grid management and process reengineering has enabled the district to better manage its mobile work with both efficiency and effectiveness. Through the split of the enforcement and supervision, the process is

changed, and stimulated the resolution of the problem. The reinforcement of the coordination functionality of District Integrated Municipal Administration has facilitated the information flow between the fragmented departments. In mobile government implementation, the most important issue is the alignment of organizational change with organizational strategic goals, followed by information flow integration and then technology issues (Song, 2005). Mobile technology thus must go together with other management measures. The involvement of the top leadership of the district in the initiative and their full support has certainly been a key factor to success.

The arrangement of the mobile supervisors in the cells not only clarified their responsibility but also actively brings the services to the citizen. Citizens don't need to find a telephone or Internet access to complain or to solicit a public service through virtual interaction. They can just ask the supervisor to get information through from their mobile handsets. While mobile services such as SMS bring information and interaction to people through highly personalized mobile phones; the supervisors, with mobile handset on the move, bring personalized, location and context based physical services to citizens. Information is collected, transmitted from and delivered back to field real time, at the location.

After the implementation of the mobile government project, the supervisors don't need to sit before the computer or telephone at the office desk and wait for the complaints information get through from the call center. The supervisors also become a government consultant for the residents thus providing much better services with the fluid interaction achieved when they are on their patrol. While e-government focusing on Internet use in this district failed to live up to its expectation, the fluid mobile work practice was achieved by bringing public service to citizens face to face. Before the implementation of the mobile system, any problem had to go through a complicated bureaucracy, and almost always got lost and remained unresolved after a long time because of the lack of supervision. Unclear reports used to cause the wrong department to send out their staff to the scene but could not get things done. But now with the mobile supervisor in the field, with GIS and GPS enabled mobile handsets with cameras, it is easier to spot the exact problem and the specific facility without ambiguity.

The management of a district is highly geographically constrained by boundary and government organization is highly hierarchical. Through the integration of mobile system and GIS, GPS enabled grid management, we can observe a managed fluidity which is different from the fluidity of "post modern professionals" as phrased by Kakiyama and Sorensen (2002b). The fluid interaction enabled by mobile handset in local or regional mobility has fitted well in to a hierarchical structure. From the perspective of the duality of mobility by Pica and Kakiyama (2003), we can call this a managed fluid organization. We can also observe a more fluid information flows from supervisor at field to command and supervision center and vice versa. What is more interesting from this case is that the supervisors at mobile work have closer contact with the citizen and build up trust with them – something much easier to do in the local context.

We should thus also be aware of the stable interaction side of mobility in this case. As the supervisors are in constant connection with the supervision center, and their location and activities are continuously monitored, it is more manageable while causing some controversy over privacy issues. In the case of Dongcheng District, the newly hired supervisors for mobile work have been highly inspired by the change brought by their work and the positive reaction from the citizens. They also don't need to report periodically to the center about their locations and working status as all this is highly automated. The stable interaction of mobile work has helped the supervisors to focus more on their work and helped the fluid interaction with the center and the target citizens. The fluid information flow between the center and field achieved in this case has enhanced better hierarchy control with higher efficiency and has shown strong potential to eradicate complicated bureaucratic procedures. With this managed fluidity, we could expect flatter but enhanced hierarchy in the government sector. With better central control and fluid interaction facilitated by mobile technology, we can also expect more

integration of government departments instead of functionally fragmented departments and may also expect a kind of vertical integration. Such integration helps to internalize the friction among different governmental departments and potentially change it into internal cooperation. Vertical integration will help to facilitate public-private partnership for better service delivery. While the mobile government initiative is still in its early stages, we may expect more organizational change in the future.

We could also notice that, by the implementation of this mobile government initiative in Dongcheng District, the local government have created a distinct work environment, a fluid platform for the coordination of the highly mobilized interaction of people, objects, voice, image and data. This work environment can be characterized by its fluid topology, though we recognise it as a managed fluidity, where such heterogeneous elements in the distribution of operations dynamically interact with each other in both physical and virtual spaces and thereby provide effective and efficient services to the citizens.

6. Conclusion

Since the industrial revolution, most work has been carried out in offices, factories, shops and other fixed locations and only in the last few years has it become feasible to move information work away from the fixed desk. For local government this has the potential to take the work closer to the public, allow more integration of services and provide employees with a more flexible approach to work. In this way, mobile government can bring the service near to the citizen and the local environment.

From the case study, we find that while the e-government initiatives have failed to live up to expectations for local citizens, mobile government initiatives have rebuilt trust through closer interaction with the citizens and more effective and efficient service delivery. The stable interaction and managed fluid organization with great potential for enhanced hierarchy and vertical integration can provide a suitable underpinning for mobile government initiatives. We have observed a *distinct managed fluidity* in local mobile government practices and a strong impact on organizational change. It facilitates a fluid information flow and interaction both within the government departments and between the government and citizens.

Table 1: Social Topology, ICT and Government Service Delivery Model

Social Topology	Region	Network	Fluidity
Characteristics	Boundary	Relation	Variation & transformation
Typical ICT Application	Mainframe, local network, (and Pre-ICT)	Telephone, Internet, e-mail, end user computing	Mobile phone, PDA, Other convergence technology, Mobile computing or Ubiquitous computing
Interaction	Physical and co-located	Virtual	Virtual+ Physical
Government Service Delivery	Hierarchy	Internet Based E-Government services	Mobile Government

While technology such as telephone and Internet can enable virtual interaction and build up networks of nodes to transcend the limitation of boundary, the convergence of mobile information and communication technology further enables fluid coordination of work across space and time with an emphasis on 'being local' to provide highly personalized, localized, context aware services to local

citizens, thus bridge the virtual and the physical. We therefore share the views of Abowd et al. (1997) when they maintain that effective use of mobile technology can, if well implemented, give rise to an interaction paradigm shift. Thus based on the discussion in this paper and drawing on the three metaphors of social topology proposed by Mol and Law (1994), I would like to propose a shift from Internet based e-government to m-government with a resulting growth in the fluidity of mobile interactions (See Table 1).

Though the mobile government initiative in Beijing is still in its initial stages, we find the outcome is up to now mainly positive. It certainly suggests that local government should pay attention to the new mobile technologies and their impact on organizations, and face up to the challenges and opportunities it offers to transcend the traditional e-government model, a model which pays undue attention to online Internet portals. But we also recognise that the essential benefits come from an alignment of organizational change and process re-engineering with these mobile technologies. In being mobile, we should think beyond the potential of the mobile technology alone, rather we should think more about the meaning of mobile government as a reshaping of government itself. And this should certainly be the topic for further research.

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