

Towards a Service Paradigm: Transcending E-government

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Abstract: *The convergence of mobile communication and mobile computing technologies opens up new horizons for mobile interaction and mobile working. The use of mobile technology in the government sector not only provides an alternative channel of communication and public service delivery, but more importantly, it can address the mobility of the government itself and in this way transcend the traditional e-government service delivery model by bringing 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. The case of Beijing is presented in this chapter. A distinct fluid organization emerges in mobile government practices in Beijing. With the challenges and opportunities provided by mobile ICT, government should shift from manufacturing mentality to service mentality and be aware of the potentials of mobile government to transform the government to be more agile, responsive, accountable, and action oriented.*

Key Words: Mobile Government, Mobility, Service Delivery, Fluid Government

1.0 Challenges of Mobile Society

The rapid diffusion of mobile ICT such as laptops, mobile phones, PDAs (Personal Digital Assistants), along with emails, instant messaging and other networking services have rapidly fuelled the mobilization of interaction (Sørensen, 2003). People, vehicles, air traffic, post and information become more mobile around the world and our society is increasingly recognized as a nomadic or mobile society (Castells, 1989; Giddens, 1999; Sassen, 1991; Urry, 2000). All these clearly indicate the rapidly growing public interest in mobility and various issues relating to 'being mobile.' (Kakihara 2003) The fluid metaphor of mobility in organizational interactions is also proposed by Kakihara and Sørensen (2002a). Dearle (1998) argues that, as interaction goes with the users, mobility has been regarded as a new paradigm in computing. Hjelm (2000) declared that following the Internet revolution is the mobile revolution. Society will be marked by mobile, "Always-on" citizens, government, as well as the transient online communities. Governments need to take full advantage of the mobile and wireless ICT technology as well as dealing with the fluidity of the interaction with the mobile society.

The challenges of m-government in an "always-on" society with a fluid workforce will be even tougher than the e-government transformation (Maio, 2002). Government, especially local government, has to provide infrastructure and services for its designated region. Governments have to deal with the mobility of government itself. While the conventional e-government efforts focus on providing services through internet portals, it failed to deal with the mobility of the government and the mobile society at large. By analyzing the cases of Beijing, this chapter tries to explore the theoretical underpinnings of the mobile government. And by analyzing and discussing the case of Beijing, this chapter suggests a paradigm shift of

government service model; and by drawing from Mol and Law's three social topologies of mobility, the chapter also proposes a metaphor of distinct fluid organization for a shift from the manufacturing mentality to service mentality for an action oriented, agile, efficient and responsive government.

2.0 Mobile ICT and Mobility

The number of mobile users is increasing and has already surpassed the number of households with internet access (Roggenkamp 2004). Wireless network are socially profound technologies because they bring the power and connectivity of computer networks into the gap between humans as they interact in physical space. These tools can help people organize and coordinate their interactions and exchanges just in time and just in place (Smith 2000). People are not fixed to their office any more. Dealing with bureaucratic document in the office was replaced by fluid interaction in the real context and thus improved efficiency of works (Dahlbom and Ljungberg, 1998).

When exploring the driving forces of mobility and mobile technology, Kristoffersen & Ljungberg (1999, 2000) suggest that a society evolves more through cooperative work instead of bureaucracy; organizations more through service instead of manufacture orientation, and tools adoption such as mobile phones, together contributed to it.

The research of mobility, in the sense of human movement, combined with technologies, that are portable and hence mobile themselves, lead to functional characterizations of mobile technology use (Kristoffersen and Ljungberg, 2000). Mobility was used primarily to denote the movement of human body. It is now used more broadly to refer to the interactions that people perform. Kakihara and Sørensen (2002a) discuss 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 locally conditioned to flexibly coordinated.

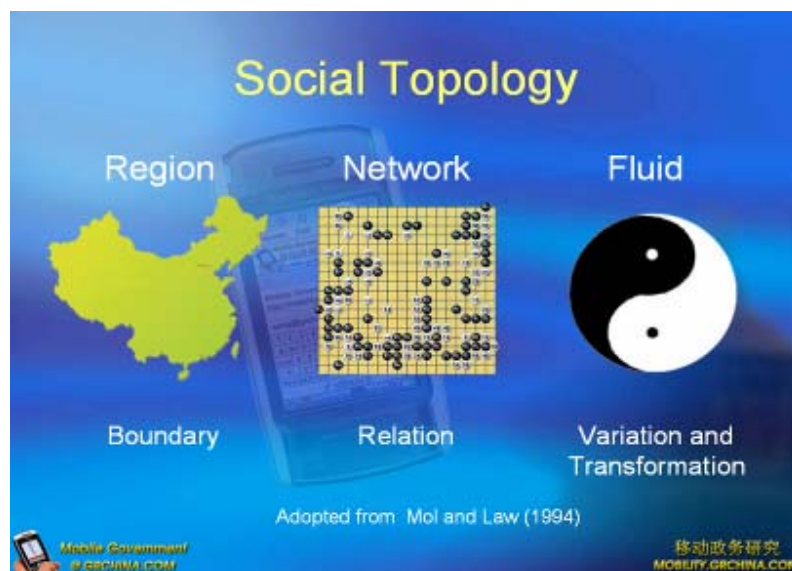


Figure 1: Social Topology (adopted from Mol and Law, 1994)

Mol and Law (1994) proposed three distinct metaphors of social topologies drawn from their investigation on the spatial properties of anaemia, 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, just like the Chinese Weiqi (or Go, kind of chess), where complex connection of nodes creates the whole network structure which can be characterized by relationship between the nodes. 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 exactly the description of Taiji in Chinese culture; it is a world and variation without boundaries and transformation without discontinuity. Therefore we would like to use the boundary of a nation, Weiqi chess, and Taiji in Figure 1 as metaphors of the three social topologies proposed by Mol. and Law.

Mobile workers get their work done not in the formal office, but at different places. No rigid boundary applies for their work. They interact across regions and networks (Kakihara, Sorensen and Wiberg, 2002). Fluidity of mobile interaction also raises the question of interaction overload (Ljungberg and Sorensen, 2000) and asymmetry of interaction (Nardi and Whittaker, 2000) in terms of the individual’s desire to interact versus desire not to interact.

Mobile technologies mobilized the human and technology interaction. And we can see a whole system of routines is mobilized (Pica and Kakihara, 2003). Routines are activities that we perform every day, and are thus familiar with. And the ability to interact with the routines gives an individual ontological security (Giddens 1984) and ability of improvisation in different context (Ciborra 1999). By ability of interacting in different contexts, the new technologies redefine the sense of belonging to a place (Fortunati 2000). Mobile devices should be conceived of as multiple contexts made up, on the one hand of the virtual, and on the other hand of the real. Kakihara and Sørensen (2002a) suggest and discuss the adoption of a fluid metaphor of mobility. Pica and Kakihara (2003) tried to theorize the mobility as duality of stable interaction and fluid organization. Stable interaction with routines enables fluid organizations while increasingly fluid work practices require a blurring of the organizational boundaries, thus “mobility does not mean independence from place but rather an optimal dialectic between real and virtual environment, between stability and fluidity.”

3.0 E-Government and Mobile 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).

There are three main factors which have contributed to this phenomenon. The first factor is the unsustainable level of public expenditure that did 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 a business-like government. The third factor is the rapid development of Internet technology and the increasing awareness of its potential through the Internet boom (Heeks, 2000).

Accenture in its research (2003) justifies that e-government matures through a series of plateau, namely: online presence, basic capability, service availability, mature delivery, service transformation. In the e-government literatures, there are various articles talking about the use of Internet technology to provide effective and efficient services to the public, to reinvent and 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). Jane Fountain (2001) suggests the concept of “virtual state” about a governmental

entity organized with “virtual agencies, across agency and public-private networks whose structure and capacity depends on the Internet and web.” We have to acknowledge the e-government initiatives have already brought much efficiency and effectiveness to the government sector. Peristeras, Tsekos and Tarabanis (2002) review the effects of information technology on a general organization by structuring these effects in four stages: islands of automation, automated process chains, business reengineering through IT and total reinvention. They then analyse the fourth stage as it applies to the government and public administration in particular and argue a major paradigm shift from traditional hierarchy in the way that government and public administration are to function. Ho (2002) also argues e-government as paradigm shift of public service delivery in the internet Age.

While much importance on E-government initiatives focused on Internet portals, we should be aware that Internet technology does not mean all for government. The rapid development in mobile technologies such as internet enabled mobile phones, PDA, WiFi and wireless networks spurred the development of m-commerce and m-business (Sadeh, 2002). It also shed light on the new channel to deliver government services to citizens in a more effective and cheaper way. The use of wireless technology to deliver government services is called the 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). Song (2005b) calls to transcend traditional e-government research and to recognize the potential of mobile government to transform the government organization. In this chapter, we will try to analyse the transforming of mobile government through the case of Beijing.

4.0 A Case of Mobile Government in Beijing

4.1. Local Governance in Beijing

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

With its fast economic development China has experienced rapid urbanization during the last two decades. The cities are changing fast with a large amount of construction, while the relatively 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 bureaucracy of the residents committee, neighbourhood committee, representatives from specialized departments at

neighbourhood 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 find it is not their responsibility and it is re-reported to the hierarchy for reassignment to another department.

4.2. ICT Development in China at a Glance

According to statistics from China Internet Network Information Centre (CNNIC, 2005), there were 94 millions Internet users in mainland China by December 2004 with a 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 335 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 users were estimated to be 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, this chapter 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 Beijing decided to take advantage of ICT to reinvent the municipal administration. As the head of Dongcheng District is very interested in ICT and innovation, Dongcheng District became the first district in Beijing to pilot this initiative. Here we refer the 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.

“The devotedness from the head of the district is the most important. It is not only the mater of money. There is also interest of many parties will be effected. Under the direct command of Mr. Chen Ping, head of the district, a special task force is established. This task force is comprised by head from different governmental department in the district, public management experts, and also experts from IT industry. Mr. Chen Ping will preside most of the important meetings of the task forces and give full support to the task force.” *Staff from the District Integrated Municipal Administration Commission*

Under the leadership of the head of the district, this project started from the beginning of 2004. The district uses grid technology, dividing the area of 25.38 square kilometres into 1652 cells; each cell is assigned a 6



Photo 1: Supervisor taking pictures



Photo 2: Supervisor at patrol

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 (public toilet, bus stop signs, public telephone booth, manhole covers, etc.) 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 its 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 Centres were established: the Supervision Centre and the Command Centre. The Supervision Centre also operates a call centre to receive phone calls of complaint from the public. The Municipal administration supervision Centre was newly established to be independent of the existing municipal administration commission. The supervision Centre recruited 400 supervisors 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 bicycle and a smart mobile phone (or “Cheng Guan Tong” in Chinese, which means “City Management All in One”) to use when patrolling his or her cells.

“This is a fundamental change in the management method. Before that, the specialized department act not only to identify the problem, to solve the problem, but also to conclude the case. There is just no incentive for them to do it better. When there are too many problems, they just pretend to keep one eye closed and the other open. For the first time, the player does not act as a referee any more.” *Government researcher who work for the district government*

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 centre that coordinates all the specialized departments and lower level governments, as well as providing coordination with other relevant government departments at the municipal level.

“After the governmental restructuring in 2000, the coordination responsibility is largely weakened in an effort to facilitate a more fashionable flatter organization, but problems also emerge. Many times when citizens report problems, no department want to solve it, they just kick the ball among them. The head of the government have to summon heads from different department for a meeting, many times for trifle issues. But now, with the reinforcement of the coordination responsibility of the District Integrated Municipal Administration, it is much better.” *Government Researcher who work for the district government*



Photo 3: Supervision Centre



Photo 4: Command Centre



Photo 5: The first Smart phone used in the pilot project

At the Supervision Centre, 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 (General Packer Radio Service) 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 colour and symbols; this makes it easier for checking and following up.

The Command Centre receives task from the Supervision Centre 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 Centre there is also a big screen, with the processing status of all the issues shown. In an interview with a manager from a municipal central heating company, he said the new ways of working provides real value for them, because the information they receive is in a more precise way, such as the location and status of the reported problems, which enables them to make a more efficient and effective response. While he also complains that the district government sometimes use these information to “coercion” them for quick and satisfactory response even when the situation is hard for them.

With GPRS connection to the supervision Centre through the mobile phones, supervisors can receive instruction from or make phone calls to the Centre. They also receive complains from the residents (or transferred from the call Centre at the supervision Centre), confirm it, and send the information back to Supervision Centre. If necessary, the supervisor can take photos with the mobile phones and send these back together with the position on the GIS. The Supervision Centre then passes the information on to the Command Centre. With accurate information about the report and the location of a problem, the Command

Centre can easily allocate the responsible department. The responsible department can then send out the staff to the 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.

“This mobile phone is quite useful and helpful for us to carry our daily work. We can easily check the information through the mobile phone. The job is get much easier, more information is available when we are at work. The people in other places envy us for having this powerful tool; it is expensive. We also got proper training to operate this well.” *Mobile supervisor A*

“We don’t need to report where are we working, my mobile phone automatically report these information to the Centre. We only use it during work hours, we can switch it off after work ... Yes, the centre has constant monitoring of our position, we can’t cross border to do other things. Anyway, we are at work.” *Mobile supervisor B*

“I quite enjoy the work. We have not fixed office in the centre. The community is our office. That is where our work belongs to. I am very familiar with citizens living in this area and have good relationship with them. I enjoy working in the community ... The change in the community is significant because of our work.” *Mobile supervisor C*

“After this innovation, this area is much cleaner and safer. Usually when the manhole covers beside my house are stolen, it takes a few days to be replaced and cause several casualties. The government response now is much better. If you want to do it, you can find the way!” *Local Citizen*

While the interviewees are general happy with the situation, there are also challenges about job safety and technological immaturity:

“I am very happy to have this job. But we are not so familiar with the people working in the centre because we do not work in the same place ... Some times even when the person come up to talk to me during our work, did I know that staff from the centre are here to inspect our works ... First I worried about job security because we are not so familiar with the boss in the centre. But now, we feel OK. The performance evaluation is more objective. Only if I work according to the regulation and keep my responsible area clean and tidy, they have no reason to fire me.” *Mobile supervisor C*

“Occasionally, it has problems to communicate with the centre (because of network problems). It is of cause not as comfortable as take note on the paper (because of the inputting and small screen).” *Mobile supervisor B*

“I am very happy to find this job. The working condition is quite good. People in the community understand us. But there are a few instances that supervisors are intimidated or threatened. One time the supervisor in the labouring community is heavily heat by the illegal street vendors when he is taking photo using his mobile phone.” *Mobile supervisor D*

To dealing with these problems, the centre organized different kind of activities such as chess competition, Kara OK parties, and working experience exchange saloon, to foster the sense of belongs. The safety issues have been integrated into the training sessions for the supervisor to avoid face to face confrontation with the illegal activities. Voice recording could be used instead of photos to report these issues. Special insurance for the mobile supervisor is also purchased by the centre for injures or accidents.

What is very interesting is that, when the residents saw the supervisors taking photos with their smart mobile phones near their residence, they were reluctant to believe that it 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. Residents even 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 cup of tea.

4.4. Most Recent Development: Beijing working towards a fluid government

Photo 6: Beijing Informational City Management Center



Photo 7: Information of management grids of Beijing displayed at the Center



The success of the pilot project in Dongcheng District of Beijing has attracted wide attention in China. The leadership of Beijing decided to push it forward it further. The Informational City Management System which aims to reinvent the municipal administration in all of Beijing is put in to trial operation in Beijing in 31 December, 2005. An informational city management platform at municipal level is established in Beijing Municipal Administration Commission (BMAC). Informational city management platforms at district level (include a command and a supervision center in each district) are also established in Xicheng District, Chongwen District, Xuanwu District, Chaoyang District, Haidian District, Fengtai District, Shijingshan District side by side with Dongcheng District. All the 8 informational city management platforms at district level are connected to platform at the municipal level to enable real time information share and exchange.

Till the end of 2005, all the urban area within the third ring road (including all areas of Dongcheng District,

Photo 8: Smart phone used by supervisors in Beijing



Photo 9: Information about supervisors displayed from Screen at the Center



Xicheng District, Chongwen District, Xuanwu District; parts of Chaoyang District, Haidian District, Fengtai District) and all the area of Shijingshan District, parts of urban areas beyond the third ring road of Chaoyang District, Haidian District, Fengtai district are divided into 10054 grid cells, which covers an area of 304.5 km². The information of 1.37 million public facilities (eg. public toilet, bus stop signs, public telephone booth, manhole covers) have been surveyed and put into the data base. A total of 4600 smartphones have been purchased by Beijing and have been allocated to the 8 urban districts of Beijing. 1706 mobile supervisors are already deployed in the 8 district of Beijing. More supervisors

The system will not only connect all the information platform at district levels, but also connect all the public facilities and public service companies (such as public transport companies, power supply companies, central heating companies, water supply companies, waste water treatment companies, waste management companies) and different governmental department at municipal level (such as Beijing Municipal Committee of Communication, Beijing Construction Commission, Beijing Water Authority, Beijing Environmental Protection Bureau, Beijing Municipal Bureau of Parks, Beijing Traffic Management Bureau etc.) to enable a fluid cooperation and interaction among the government department, public facilities and service business and citizens.

5.0 Analysis of the Mobile Government Case in Beijing

In the information age of high uncertainty, ICT plays an increasingly important role in the transformation of our society and organizations (Castells, 1989; Angell, 2001). The role of ICT in organization has already changed from a mere supportive tool to a major contributor to the form of organizations (Malone, 1987). ICT is a driving force for competitive advantages and should be utilized in a strategic manner (Porter and Millar, 1985). From the case of Beijing, we can clearly observe that government is transformed by implementation of mobile government initiatives. It is necessary to observe the mobile government and its transformation through the organizational change perspective in order to find the theoretical underpinning of mobile government. By combining the organizational change model of Shao and Liao (1996) and Leavitt's Diamond (Leavitt, 1965), we would like to propose the following model (see Figure 2) to analyze the case of Beijing. According to this model, there are six variables in the organizational change: people, structure, processes, technology, connectivity and boundary.

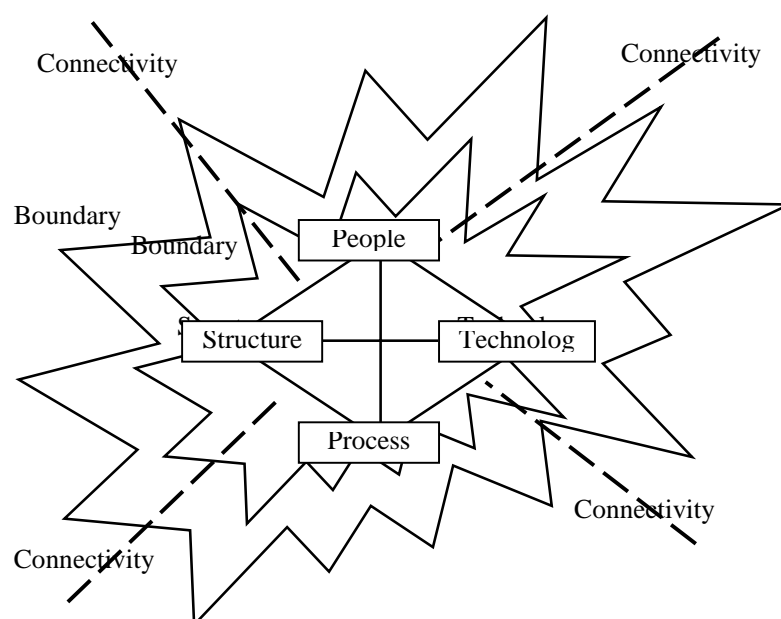


Figure 2: A Revised Model of Organizational Change

People in any organization are essential, especially the organization of today, where information and knowledge matters, with heavy use of information and communication. In the case of Beijing, the forming of the task force to carry out the initiative brings together expertise from academia and ICT industry. People from different department are also involved from the start to discuss the changing issues. This provides a sound base of knowledge and human resource; it also facilitates future implementation.

People are not only the designers who design the technology and the organization, they are also users of the technology and constituency of the organization, shape and reshape the enactment of technology and the organization in the on-going process. People build into the technology certain interpretive schemes, certain facilities and certain norms through the use of knowledge, resources and rules. It is people who use the technology to constantly reshape the organizational structure. Support of the people in the organization is very important. To empower or to deskill? To informate or to automate? (Zuboff, 1988) By training and providing mobile devices, the mobile workers in the cases now acquire more skills on using of the mobile devices to get more useful information while working in the context and on the go. They feel that the organization is investing in them by allocating expensive mobile devices and that they are empowered. Mobile workers generally feel comfortable and happy with the devices, they take the monitoring of their working status during the working hours as reasonable. The worries about job safety is lessened by arrangement of training sessions, gather together activities, and provision of insurances.

Structure is very important in reflecting the dynamic interactions in the case of organizational change. According to Giddens (1984), the structure has three dimensions: signification, domination and legitimation. These dimensions are correspond to respectively the following aspects of interaction: communication (through interpretive scheme), exercise of power (through use of facilities), and sanction (through norms – approval / disapproval).

In the case of Beijing, the decision from the top management, especially the full support of the head of the district is critical. He not only supported the initiative to change, he is also very interested in ICT. The set up of the task force which includes heads from all relevant department, administrative experts, ICT experts and experts from ICT companies not only provides a sound base of knowledge and human resources but also provides legitimacy. By constantly communicating with different departments through task force meetings, circulation of reports in the government, allocation of financial and human resources, publishing of government regulations concerning the change initiative, it creates a structure of signification, domination and legitimation. The exist of the champion in the management is very important for roll out of the mobile system.

Formerly, the responsibility of identifying the problem, solving the problem and confirming the closure of the case was all in one specialized department. But now, enabled by the mobile ICT, information for the first time can flow fluidly from the field to the department and vice versa. The set up of the supervision centre and command centre provides new division of power and the mechanism of check and balance. The reinforcement of the coordination functionality of District Integrated Municipal Administration has facilitated the information flow as well as functioning between the fragmented departments.

Process is directly linked to the organizational structure. It is one of the focal aspects in organizational change. 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 has changed, and stimulated the resolution of the problem. 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 stimulation and 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 smart mobile phones with cameras, it is easier to spot the

exact problem and the specific facility without ambiguity. With the support of smart mobile phone, mobile supervisors don't need to visit office every day. The details of the assignment each day are available on any location, at any time. The mobile system provides them with the information while they are on the go. There is no need of travelling and transferring data manually, workers are more productive and can focus on the job in the field with the community. The mobile phones also enable accurate information to be entered into the central database in real time, ensuring the district authority has up-to-date records on the progress of work. The staffs know instantly what is going on and this way can provide a much better service to the community. By combining change in process and organizational structure with the roll out of the mobile systems, it accelerated the formalization of standard working procedures of local government in Beijing which barely exist before and facilitated the solve of the problems in municipal management.

Technology also matters. ICT in organization has changed from a mere supportive tool to a major contributor to the form of organizations (Malone, 1987). Technology is a product of human action, but after the roll out the technology, it facilitates and constrains human action and hence influences the organizational structure. Technology in traditional organizations tends to focus on production capabilities, whereas technology in organizations nowadays tends to embrace "informate" and "transformate" part of the technology factor. In this case, mobile workers are empowered by the technology through better information sharing and support of work in context. The different government departments are also empowered in their work because they now have better knowledge of the situations in the field, and can thus dispatch and resolve the task more efficiently and effectively. The mobile technology for the first time enabled mobile workers to work in the real context and be able to keep in contact and get the support away from the fixed offices. The mobile technology is largely mature for application in government through the technology progress these years, but there are still problems of relatively expensive prices, small display, inconvenient input, battery life, and the issue of secure and stable connection. These issues still need attention in the mobile government initiatives.

Connectivity is about easiness to connect and being connected with internal and external parties. It is about the interaction with actors within and without the organizational boundaries, it is about the number of communication channels. It is interesting to look at the mobile government practices from the connectivity / interaction perspective. Traditional ways of interactions are collocated personal and physical contact, i.e. meetings and memos. The emergence and convergence ICT leads to more and more virtual interactions, such as telephone, facsimile, internet chatting, e-mail and video conference. But what is the special about mobile technology?

In the case of Beijing, the arrangement of the mobile supervisors in the cells not only clarified their responsibility but also actively brought 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 phones. While mobile services such as SMS bring information and interaction to people through highly personalized mobile phones; the supervisors, with mobile phones 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 centre. The supervisors also become a government consultant for the residents thus providing 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, and also build up trust between mobile supervisors and citizen. Enabled by mobile technology, government workers now spend less time in the office and more time with citizens. This presents significant behavioural and cultural challenges as many workers look towards the work environment as a key source of social contact and interaction.

Boundary is also important for the organization; it defines the line drawn between the organization and the outside environment. Traditional organizations can be viewed by a building, a factory with walls, by dedicated employees work in the same location for the purpose of interaction and coordination. While by the increasing use of ICT, information flows and transactions are increasingly take on the form of virtuality, the boundaries of the traditional organization began to blur.

In the case of Beijing, government staffs no longer stays in the office to process the information, they are in the field, interacting with the citizen. The former metaphor of the government office with government buildings dissolves by the fluid work practice. Through the mobile phones, the mobile workers still have constant connection with the centre. While they are also part of the government organization, some of them feel marginalized from the government staffs who work in the office headquarter. It seemed that the organization have multi-layered boundaries, or that the boundary is just dissolving.

By applying the revised organizational change model, we could notice the further dissolution of the organizational boundaries and transformation of the connectivity, interactions among actors within and outside the organization. This is exactly what Pica and Kakihara (2003) called stable interaction, and fluid organization enabled by mobile technology. Stable interaction transforms the connectivity among actors, within and outside the organization, thus causing a fluid work practice, and leading to further dissolution of the organizational boundary.

The management of a district is 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 Kakihara and Sorensen (2002b). The fluid interaction enabled by mobile phones in local or regional mobility has fitted well into a hierarchical structure. From the perspective of the duality of mobility by Pica and Kakihara (2003), we would like to call this a managed fluid organization. We can also observe a more fluid information flows from supervisor at field to command and supervision centre and vice versa.

We should also be aware of the stable interaction side of mobility in this case. As the supervisors are in constant connection with the supervision centre, and their location and activities are continuously monitored, it is more manageable while causing some controversy over privacy issues. In the case study, 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 centre 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 centre and the target citizens. The fluid information flow between the centre 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 to further dissolve the traditional organizational boundaries as the projects carry on. 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.

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, 2005a). Mobile technology thus must go together with other management measures. In the case of Beijing, mobile technology is accompanied by the grid management, government restructuring and process

re-engineering to get full advantage of the mobile government initiative. The involvement of the top leadership of the district in the initiative and their full support has certainly been a key factor to success.

By the implementation of this mobile government initiative in Beijing, the local government has 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, where such heterogeneous elements in the distribution of operations dynamically interact with each other in both physical and virtual spaces and thereby providing effective and efficient services to the citizens.

6.0 Towards a Service Paradigm

Last few decades has witnessed the continuous increase of the proportion of service works versus manufacturing works. Service work differs greatly from the manufacturing work in that it happens where the customer is instead of where the machinery is; this contributed significantly to the increasing mobility (Kristoffersen & Ljungberg, 1999). Since the industrial revolution, most of the work has been carried out in offices, factories, shops and other fixed locations, depending on the physical settings and working hours of an organization to coordinate the work in time and space. The convergence of mobile information and telecommunication technology in recent years makes it feasible to move information work away from the fixed desk to support the service work engaged with the customers where they are. For Local Authorities this has the potential to utilize the mobile technology, adapting the service mentality instead of the manufacturing mentality, take the work closer to the public, allow more integration of services and providing employees with a more flexible approach to work.

With the fluid work practice enabled by mobile technology, mobile government is quite different from the former organizational forms of government in the era of pre-ICT, and the so-called e-government, which is focused on the use of Internet for service delivery, such as information sharing and online transaction. From the case of Beijing, we could see that, while the e-government initiatives have failed to live up to expectations for local citizens, mobile government initiatives have rebuilt trust through closer personalized interaction with the citizens and more effective and efficient service delivery. Wireless revolution from a business perspective, introduces practical strategies business to be willing to adapt from tethered, PC-centric model to mobile, person-centric techniques and strategies and create new capabilities and options in this mobile world. Mobile devices are considered more personal (Sørensen, 2003). Mobile network are socially profound technologies not only because it provide alternative channel, but also because they bring the power and connectivity of virtual world into the gap between humans as they interact in physical space, it can cope with the fluidity of the mobility of the citizen as well as the government itself. M-government means delivering services in the field – in people's homes or other convenient locations. It means taking services to the customer, rather than the customer having to visit government offices or access the Internet portal to access services. Thus by the analysis above, we would like to argue a government service paradigm shift about mobile government (see Figure 3).

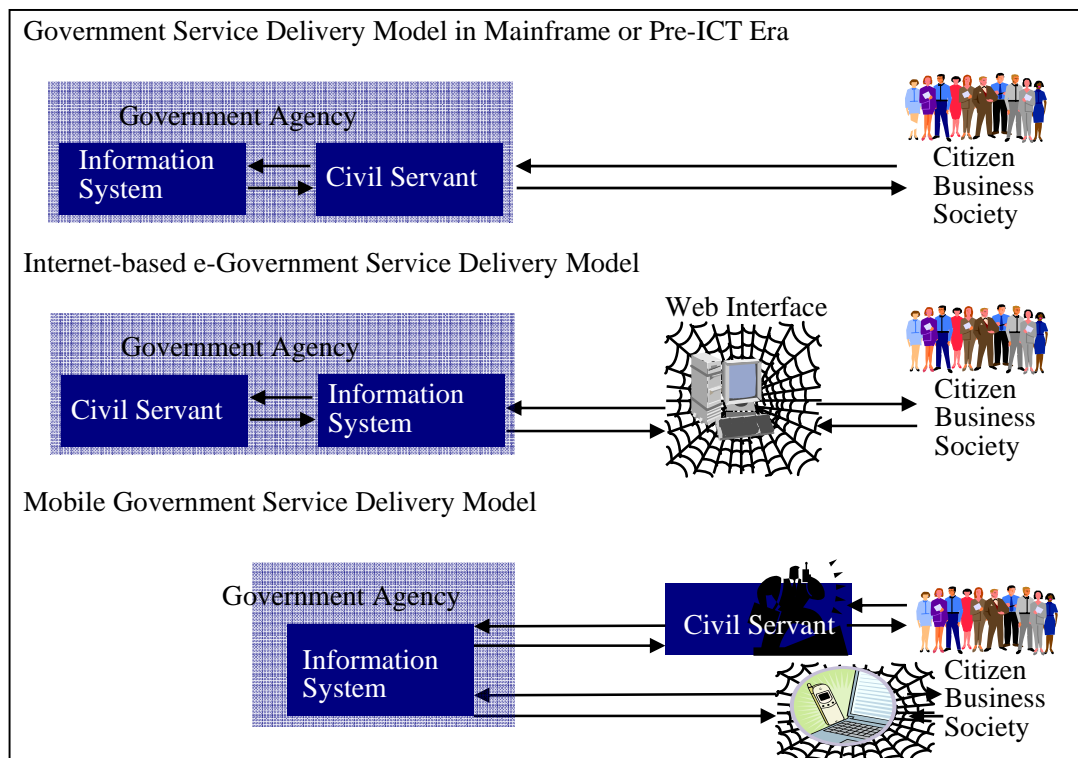


Figure 3: Mobile Government as a Service Delivery Paradigm Shift

In the information age of mobile society, we are continuing to witness the burgeoning growth of new Information and Telecommunication Technologies (ICTs) and its convergence. These new technologies usher in the new virtual world (Gibson, 1984; Stephenson, 1993) and offer strong impetus for social transformation (Castells 1989). They suggest a profound change and mark the contrast of virtual with the physical. This in turn has the advantage of asking us to rethink what we have been taking for granted about the non-changed entity.

Kakihara and Sørensen (2002a) discussed spatial, temporal, and contextual aspects of mobility to illustrate the relationship between mobility and human interaction and hence push forward the fluidity of mobility. Castells (1996, 1989, 2000) proposed the concept of “timeless time” and “space of flows”, which are distinct features of society in the information age. The idea of “timeless time” and “space of flows” just corresponds to the fluid metaphor proposed by Kakihara and Sorensen (2002a). Castells (1989) also declares the rise of network society and network organizations, triggered by the ICT in general and Internet technology in particular, in the information age. While Castells (1989, 2000) argues that networks are old forms of social organization and ICT such as Internet enables it to cope with flexible decentralization and focused decision-making at the same time, thus giving rise to the network organization and network society at large; we would also like to argue that fluid topology is also not new to our organization and society and the mobile technology enables it to cope with flexible decentralization and focused decision-making at the same time, thus give rise to the fluid interaction in the organizations and society, lead to the rise to the fluid organization, which is manifested very well in the case study in this chapter.

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 service to local citizens, thus bridging 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 chapter and drawing on the three metaphors of social topology proposed by Mol and Law (1994), we would like to propose a shift from Internet based e-government to m-government with a resulting growth in the fluidity of mobile interactions to summarize the discussion (See Table 1).

Social Topology	Region	Network	Fluid
Characteristics	Boundary	Relation	Variation & transformation
Typical ICT Application	Pre-ICT (and Mainframe)	Telephone, Internet, e-mail, end user computing	Mobile phone, PDA, Other convergence technology, Mobile computing or Ubiquitous computing
Interaction	Physical and co-located	Virtual Redefined time and space	Virtual+ Physical; Further redefined time, space, and context
Service Delivery	Bureaucratic, office based	Standard “transactions”, informational	Action oriented, coordinated,
Government Model	Hierarchy	Internet Based E-Government	Mobile Government

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

7.0 Conclusion

In this chapter, the case of mobile government in Beijing is analyzed and the concept of distinct fluid organization is proposed to underline the mobile government and its implication. A model of government service paradigm shift is proposed. And finally by linking the social topology, a further model of “Social topology, ICT and Government Service Delivery Model” is proposed to summarize the findings of this chapter.

The mobile government initiative in Beijing is still in its initial stages, and we find the outcome of this initiative has been mainly positive till date. The municipal government in Beijing is now working in full strength to reinvent the municipal administration by use of ICT. The initiative has already covered most of the 8 urban districts with a total area of 304 km². A municipal informational city management platform at BMAC, together with informational city management platforms in 8 urban districts are setup and are in trial operation. This initiative will finally cover all 18 districts and counties of Beijing to enable a fluid government. All the public facilities and public service companies and all governmental departments at municipal level, which are relevant to municipal administration, will also be connected to this informational city management system to enable a fluid cooperation and interaction among the government departments, public facilities and services providers and citizens. By explore the potentials of ICT, Beijing aims to realize a fluid government and to provide better public service to its citizen.

While Dongcheng District is one of the richest central district in Beijing, whether this initiative can be applicable as successfully to other parts of the city or other cities in the developing countries under current technology development is still to be confirmed. While this model is being implemented in the different districts and the municipal level of Beijing, we will keep a close eye on the progress of the project.

Undoubtedly, 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. We should also be aware 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 what the distinct fluid organization means to government.

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