

Achievements and Future Trends of E-Government Service – Implications from the SARS Outbreak

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ABSTRACT

Rapid advances in technology and the advent of the Internet have redefined public expectation of the government and its services. With the great support from Hong Kong and Singapore government, e-government system has achieved temporary success by offering some everyday services through virtual Internet. During last year's Severe Acute Respiratory Syndrome (SARS) outbreak, e-governments in Hong Kong and Singapore ensured the proper running of government services despite of massive physical restrictions caused by SARS outbreak. E-government started to show its value through continuous development in the past decade. The idea of "virtual government" implementation had been proved in some extent. In the meantime, SARS outbreak introduced new challenges to e-government in dealing with abrupt events. The paper will present the new trends and dynamics in e-government development enlightened by feedbacks from fighting with SARS outbreak. The paper will also provide assessment for those functional specifications raised under the SARS outbreak.

Keywords: E-government, CRM, information sharing, e-procurement, SARS

1. TITLE OF THE PAPER

E-government has been broadly defined as the production and delivery of government services through IT applications [6]. Government use of technology, particularly web-based internet applications, to enhance citizen access to government services and to enable citizens to make online transaction is called e-government [9]. E-government has been developed for the delivery of government services using information technology for many years in different countries. E-Government initiative is not just about using IT for government services; it is also an initiative to increase government transparency and increasing governmental efficiency.

E-government includes several types of framework and it behaves differently from country to country. There are three major domains of e-Government – E-Administration (process improvement), E-Services (connecting citizen) and E-Society (building interaction with and within civil society) [3]. Most literature points out the need for e-government initiatives is to reach out to four core groups, in a bid to enhance the total experience level – citizens, business community, government employees and government agencies itself [2][6]. These give rise to the four major category of e-government services, commonly known as Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employees (G2E) and Government-to-Government (G2G).

In this paper, we will first review the various stages towards the e-government maturity, followed by presenting the achievement of the e-government service performance in Hong Kong and Singapore. Other than successful achievements, the paper will review

e-government's role during the SARS outbreak and hence investigate the functional improvement in each of the four major sub-categories. The objective of the analysis and evaluation is the identification of potential improvement area arises from SARS outbreak at growth stage of e-government services globally.

2. PAST ACHIEVEMENTS

Through years of evolvments, developments in G2B, G2C, G2E and G2G services has resulted in two major benefits – efficient governments and innovative governments. E-Government also provides a strategy for addressing the challenges most governments face – such as reduction of operation costs, retention and training of staff and responsiveness to change and for creating an environment for transformation of government activities by the application of E-business methods throughout the public sector E-Government is also positioned by researchers as a promising approach for reducing bureaucracy in Government organizations and increasing citizens' access to the quality services [2].

Past literatures have addressed the achievement of e-government system towards maturity [6]. These stages are summarized as the evolvement in terms of interaction, technical sophistication and service hospitality.

2.1 Information online stage

This stage is the most basic form of e-government marked by the one-way communication between government and users. When Internet gradually goes into everyday life in the mid-90s, governments in developed countries choose to post information or data

on the Internet for public reference. Although this implementation doesn't involve much technical sophistication, it is an effective way for public to be conscious about how government runs and reduces the deviation of information passing between government and users.

Singapore's e-government initiative can be traced back to the early 80s, with the launch of the Civil Service Computerization Program (CSCP). This initiative was conceived as a clear direction of turning government into a world class exploiter of IT and stimulates the IT penetration in Singapore Public Services. Since CSCP's launch in 1981, it had progressively advanced and evolved with the shifting trends in the technological, business and social climate to bring about stimulating changes to the way that government interacting with the public. In the mid 90s, Internet was introduced as a new delivery channel providing information. The Singapore ONE broadband initiative stimulated the delivery of interactive, multimedia applications and services to homes, businesses and schools throughout Singapore.

Hong Kong government started uploading governmental information to their website since the promulgation of the first Digital 21 Information Technology Strategy in 1998. By bring e-government into the agenda of all government bureaus, citizens has gain more accessibility and awareness to the government information and services. Weather forecast and government announcement information are initial service offering in Hong Kong at this stage.

2.2 Simple Communication Stage

This stage involves two-way communication as an interactive mode between Government and constituents [6]. In terms of technical effort, government has used email and feedback panel to answer constituents' request. Most idea of further e-government development is generated from this stage, where government archives constituents' request

In Hong Kong, the average monthly number of page views of all government websites amounts to 155 million, an 80% increase in the Year 2000. Over 1500 government forms can be downloaded online and 400 e-forms are available for completion and submission online. Requests for access to government information are available for submission online.

Singapore's ground breaking e-government service in this stage is the One Stop Change of Address Reporting Services (OSCARS).

2.3 Transactional Stage

The true interaction between government and citizens is enabled by online execution of governmental services

and subsequent financial transactions. The milestone of this stage is connecting the government system with users through web interfaces and allowing citizens with Government electronically anytime – saving hours of paperwork. On the other hand, citizens saved time and inconveniences of traveling to a government agency and queuing time as well.

Typical achievement of this stage in Singapore is the development of the electronic import/export trade documentation system – TradeNet. In the meantime, Hong Kong government opted to put the tax reporting service online as well.

2.4 Service Integration Stage or Seamless Stage

After the development at the transaction stage, most government agencies put up their services on the Internet. However, there may also result in chaos with less integrated service. Some even don't run on the same platform and don't share a common look and feel. Under this context, government attempts to integrate various government services horizontally (integrate with other governmental agencies) and vertically (integrate similar services together) for the enhancement of efficiency, user friendliness, and effectiveness [6]. The development at this stage requires tremendous amount of time and resources to integrate online and back-office systems. Citizens hope to have a uniformed way in accessing all governmental services. Through function re-assessment and combination, the ultimate goal of this stage is to enable user to accomplish all services from a single access point [5].

3. EFFECTIVENESS OF E-GOVERNMENT SYSTEM DURING SARS OUTBREAK

E-government can be explained as the public-sector adoption of e-commerce or e-business. From previous literature [2][6][7]. There are five key principles summarized to measure e-government system's effectiveness:

- *Increased general accessibility.* In the first place, as an e-commerce or an e-business application, it should have. Most literature points out the need for e-government initiatives to reach out to three core groups, in a bid to enhance the total experience level – citizens (or individuals), business community and with itself (interactions within the government).

- *Pure digital processing.* In the meantime, as an IT system, e-government system should have embodied the principle of “put everything online and do everything online”, i.e. successful e-government system should have an aggressive approach to move of information from paper form to digital form and completely replace the paper form processing.

- *Dynamic Capabilities.* It should have dynamic capabilities, which is the e-Government's ability to integrate, build and reconfigure internal and external

organization skills, resources, and functional competencies within a changing environment.

3.1 SARS Outbreak

SARS outbreak in 2003 originated from China. It was previously unrecognized to be potentially fatal. The contagious *Coronavrius* infection emerged in East Asia with subsequent global spread. SARS officially hit the global headline on March 12th, 2003 through a global alert by World Health Organization (WHO). Hong Kong and Singapore both were largely affected.

In Hong Kong, in the five-month intensive fighting with SARS from February to June, there are 299 reported deaths. During March 2003, health officials in Hong Kong and Singapore have implemented quarantine and isolation measures to try and limit the spread of SARS. Temperature screening and health declaration by travelers have been a standard practice at all cross-boundary and international immigration checkpoints. Both two governments have founded hard to management the large scale of data sharing between governmental agencies, hospitals and civil service personnel. E-government system could further improve its functional capabilities upon the challenge encountered during the SARS outbreak.

In the following section, the paper will illustrate the potential trend in each subsection of the e-government arise during the SARS outbreak.

3.2 G2E & G2C Service Under SARS outbreak

One of the initial motivations of e-government service is to simplify its citizen services and decreases the number of paper processing which is costly and difficult to process. G2E services can be seen as an internal B2C services which is nothing special in the Internet era. The G2C services offered by Hong Kong and Singapore government are quite comprehensive. Common functions like tax paying, vehicle license application, identity card application and facility booking has all been available in Singapore and Hong Kong. In this section I will focus on the contrast between people's different attitude towards e-Government service before and after the SARS outbreak according to statistics conducted by Hong Kong and Singapore government.

Although SARS has brought disastrous effect o the regional economy and social order, it stimulates the public adoption to e-government system. During SARS outbreaks, people in Hong Kong normally choose to stay at home and wouldn't be able to access to government agencies through physical means. They gradually exploring other approaches to accomplish those tasks which used to available through physical contact. As a result, the percentage of public utility bills paid through electronic means increase from 29% a year ago to 53% at the end of year 2003. Before the SARS

outbreak in December 2002, 39% of the income tax declaration is done through the e-government system in Singapore to pay income tax, however, this figure has increased to 67% after the SARS outbreak in 2003. The e-government system in Hong Kong and Singapore proves its effectiveness in increasing accessibility during the SARS outbreak.

When citizens are getting used to e-government services, ensuring users' loyalty to e-government services becomes increasing important. Moreover, in order to make e-government system to be more effective, it should leverage on private sector's business ideas and innovation so as to improve services to customers [4]. Therefore, Customer Relationship Management (CRM) features have become increasingly popular among e-government services.

During the SARS outbreak, citizens realized that most e-government services aren't specific to user itself, e.g. they cannot find the SARS regulation pertinent to their own interest. The current e-government B2C services are more uniform, where different users cannot enjoy customized services. However, the core idea of CRM theory is to provide more customer-centric and tailor-made services to citizens and business [8].

Common e-business application like online bookstore usually keeps a profile for returning users and offer personalized search according to the user's profile. Hong Kong and Singapore have the world's highest mobile phone penetration rates, with 3G service impending in the next year. Leveraging the mobile phone concentration would stimulate the e-government to offer more personalized system. The most tempting feature of the m-commerce system is offering the location-based services. For example, users could receiving the booking of nearby public sports facilities through there mobile phone. This further motivates the e-government system to garner the concept of CRM and offer the service to the user who really needs the service.

To implement such a customer orientated e-government system, we can leverage on the current CRM framework. The critical success factor for most CRM system includes:

Knowledge of Customer: E-government system needs to gain users knowledge such as preference, and then use business intelligence tools such as data mining, processing and reporting to form a generic profile. Further possible information to be collected includes customer's demographic information, service history and all previous transaction with the e-government system [1]. When dealing with mobile users, while methods like forms and cookies can be used to collect data, there must be new ways to consolidate customer data through their mobile device with limited storage space. Moreover, the mobile ways of collecting data

must be able to conform to the database formats using web interface.

Capturing and increasing added value. E-government system must continuously innovate to stay ahead of users to make the service more superior after each user transaction. For example, if a user access a sports facility where he used to use his mobile phone to book, e-government system could provide better booking information.

Customer Interaction: E-government system could provide customized user interface and periodically seeking online feedback from users. E-government system could also integrate the real-time online service answering features.

Customer Acceptance: Before a customer-orientated e-government initiative to put into practice, developers need to decide the best mean to implement those functional requirements. For a particular service, they need to decide whether needs to use a graphical rich interface or pure text interface. For integration of mobile service, they need to decide the technology (WAP, SMS, GPRS etc) by considering which technology is more appropriate to reach all users.

The key value proposition for G2C initiatives rests on providing electronic services to citizens that are integrated and user-centric, on a 24*7 timeframe, anytime, anywhere, and through a range of channels.

3.3 G2B Services

G2C and G2E services are e-services for individuals with limited transactions and technical sophistications. However, G2B & G2G are the extensions that generate most potential. A centralized G2B e-procurement system, in the framework of e-government, reduces the cost of issuing invoices and other administrative work for low-value, high-volume goods. It also simplifies the CRM in the government sector. However, the largest potential saving originates from lower prices due to centralized spending. This is motivated by the lack of organization in governmental purchase of SARS-related items like thermometer and masks during the SARS period. The critical success factors (CSFs) of such e-procurement system includes:

- Efficient processes without excessive idle times
- Existence of monitoring and evaluation systems that permit the continuous improvement of the process
- Adequate training of the employees in order to enable them taking advantage of the new system.

The above CSFs should be coupled by a set of KPIs that should be monitored as used in enterprise level e-procurement system:

- Tender lead times
- Percentage of governmental purchasing with accepted quality (in accordance with the predefined

technical specifications).

- Productivity of resources
- Budget accuracy (deviation of the actual governmental purchasing compared with the related budget).
- Cost (including all the relevant cost categories, together with the cost of the purchased goods or services).

Another possible trend in e-government is public-private partnerships. Firstly, having business involvement brings about competitive pressures in the e-government journey, in line with Osborne and Gaebler's principles of reinventing government [7]. Secondly involvement of business brings in the required expertise from the market to turn "e" quickly as it is not possible for government agencies to train staff overnight or attract large amount of such talents from the market easily.

3.4 G2G Services

G2G service is very limited in both e-governments of Singapore and Hong Kong, where different government agencies could integrate their services or form partnerships to offer better service and information transparency between agencies as well. By performing vertical and horizontal integration, an e-government system could leverage the strength of e-services provided by different government agencies.

During the SARS outbreak, the *Contact Tracing Information System* implemented in Singapore has been a good start of G2G system where different governmental agencies provide and demand different domains of information. The Ministry of Health, Immigration Checking Authority, Hospitals, Ministry of Education are sharing the same information knowledge base but perform different tasks during the combating with SARS.

Inter-governmental information sharing could be an inflexible process nowadays. During the SARS outbreak, Asian countries failed to establish a joint monitoring and collaboration system to combat SARS because of a lack of information sharing service capabilities. Bilateral free trade treaties signed in Asia Pacific Region, gives more incentives for one government to provide services via internet to other governments to facilitate better information exchange. Governments which share resources could be more motivated to implement the inter-governmental G2G service (e.g. Singapore purchases water regularly from Malaysia).

4. CONCLUSION

Despite of the negative economical impact of the SARS outbreak, it has provided a big stage for e-government system to show its magic in Asian countries. It provided an excellent test ground to evaluate our current

development achievement and indicated a clear way to achieve the ultimate goal in e-government development. The successful operation of the e-government system during the SARS outbreak is a milestone in the history of e-government development. In some extent, the e-government system development could determine a government's effectiveness under emergency situation.

The e-government system started from some G2E and G2C applications, where the current focus has shifted to more valued-added G2B and G2G applications. The ultimate (mature) stage of the e-government development (See Figure 1) is to achieve a *Virtual Government* where all government service and interaction is available without any physical interaction. This is also coincidental to what the current ubiquitous network development tries to achieve.

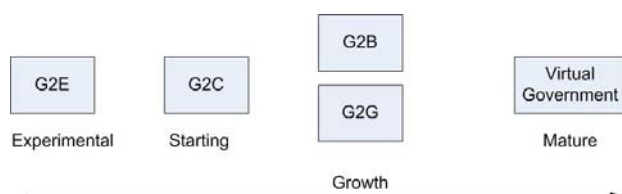


Figure 1: stages in e-government development

ACKNOWLEDGEMENT

The research is supported by various colleagues and students in the School Of Industrial Engineering, Georgia Institute of Technology.

REFERENCES

- [1] Eirinaki, M., & Vazirgiannis, M., "Web Mining for Web Personalization", *ACM Transactions on Internet Technology (TOIT)*, 3:1 Feb 2003, pp 1-27.
- [2] Fernandes, D.; Gorr, W. and Krishnan, R. "ServiceNet: One-Stop E-Government Services." *Proceedings of Seventh Americas Conference on Information Systems*, 2001.
- [3] Heeks, R. "Understanding E-Governance for Development", *Institute for Development Policy and Management, University of Manchester, I-Government Working Paper Series* No. 11, 2001.
- [4] Kenyon, J., and Vakola, M., "Customer Relationship Management: A viable strategy for the retail industry?", *International Journal of Organization Theory and Behavior*, 2003, 6:3 pp 329
- [5] Layne, K. and Lee, J. (2001). Developing fully functional E-Government: A four stage model. *Government Information Quarterly*, Vol.18, 2001, pp. 122-136.
- [6] Moon, M. J., "The Evolution of E-Government among Municipalities: Rhetoric or Reality?" *Public Administration Review*, Vol.62, No.4, 2002, pp. 424-433.
- [7] Osborne, D. and Gaebler, T.. *Reinventing government: how the entrepreneurial spirit is transforming the public sector*. New York: Plume.
- [8] Peppard, J., "Customer Relationship Management (CRM) In Financial Services", *European Management Journal* (18:3), 2000, pp. 312-327
- [9] Watson, R.T. and Mundy, B. A Strategic Perspective of Electronic Democracy. *Commun, ACM* 44, 1 (Jan. 2001), 27-30.