

Sharing Information for Product Quality and Food Safety in China: Barriers and Enablers

Lei Zheng
Center for Technology in
Government
University at Albany, State
University of New York
518 442 3892
lzheng@ctg.albany.edu

Yuanfu Jiang
E-government Research
Center, National School of
Administration,
Beijing, China, 100089
010 689 29228
jyf@nsa.gov.cn

Tung-Mou Yang
Department of Informatics
University at Albany, State
University of New York
518 956 8248
ty915885@albany.edu

Theresa A. Pardo
Center for Technology in
Government
University at Albany, State
University of New York
518 442 3892
tpardo@ctg.albany.edu

ABSTRACT

This paper examines the technological, managerial, and political barriers as well as enablers for the success of an information sharing initiative in China. A case in the product quality and food safety policy domain is studied. Furthermore, it compares the results of the case study in China with prior research conducted mainly in the western countries to identify similarities and differences, and discusses the impact of political, economic, social and cultural factors on those similarities and differences.

Categories and Subject Descriptors

H.4.2 [Information Systems Applications]: Type of systems – e-Government applications

General Terms

Management, human factors, theory, performance

Keywords

Information Sharing, Barriers, Enablers, China, Product Quality

1. INTRODUCTION

Information sharing has long been recognized as a critical enabler for enhancing organizational effectiveness and efficiency while better strategic decisions and problem solving can be achieved with aggregated information and knowledge [1]. Information sharing can lead to significant cost savings and data reuse without duplicated data collections [2-6]. In the public sector, information sharing is defined as exchanging or otherwise giving other agencies access to information [4]. Information is scattered across groups or group members, while some have the information that others might need [7]. Information sharing can thus help government agencies to provide better public services and to solve

critical public problems through facilitating interorganizational collaboration. Today, the delivery and management of public services increasingly relies on complex networks of interdependent organizations to deal with ambitious or complex issues [8], because networks of multiorganizations can solve problems that cannot be achieved, or achieved easily, by single organizations [9]. Thus, a reciprocal and voluntary collaboration between two or more government agencies or between public and private or non-profit entities becomes necessary to deliver government services [10]. With the development of information and communication technology, interorganizational networks and external alliances have become more common [11], and consequently sharing information across government organizations has become more attractive and practical as well [4, 12].

However, achieving information sharing is a complex task. This paper will examine the technological, managerial, and political barriers as well as enablers for the success of an information sharing case in China. The product quality and food safety policy domain will be studied. Furthermore, it will conduct a preliminary comparison between the results of the case study in China with prior research conducted mainly in the western countries to identify similarities and differences, and will discuss the possible impact of some political, economic, social and cultural factors on those similarities and differences.

2. LITERATURE REVIEW

In order to facilitate information-sharing initiatives, particularly in the public sector, identifying factors that could influence information sharing to achieve desired goals is critical [12]. We categorized them into three perspectives as follows.

2.1 The Technological Perspective

The advancement of information technology increases the ease of information flow and provides more alternatives to share and integrate information. Different organizations may use various types of hardware, software, data standards and definitions, as well as programming languages, and the task of integrating them could be very challenging [2, 4, 12, 13]. In addition, system outsourcing could become a barrier, as contractors may reveal critical government information, may be out of business, and may fail to collaborate for the sake of competition [14].

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

ICEGOV2008, December 1-4, 2008, Cairo, Egypt

Copyright 2008 ACM 978-1-60558-386-0/08/12... \$5.00

2.2 The Organizational Perspective

While technological challenges are the most noticeable, other challenges such as organizational factors that are deeply embedded in institutional and professional realities also create barriers to cross-boundary information sharing [4, 12, 15]. Over time researchers began recognizing the importance of organizational perspectives and have begun to focus on identifying and examining organizational factors [4, 16-18].

Weber claims that ideal bureaucracy is an efficient and fair organization with laws and administrative regulations established [19]. However, hierarchical structure of bureaucracy might impede information sharing within an organization. Centralization in hierarchical structure has a significant negative impact on sharing of information in a multiunit organization [20]. When employees have limited autonomy and need to get approval from superiors for most decisions, their interests to share information with other groups are greatly reduced [20]. In addition, Willem and Buelens claim that horizontal departmentization in bureaucracy could also constitute barriers for information sharing [17]. Gil-Garcia and Pardo [5] found that the complexity of cross-boundary information sharing gradually increases from the organizational level, the inter-organizational level, to the intergovernmental level.

Researchers also discovered that formalization, such as formal rules, guidelines and procedures, and regulation, could be barriers to information sharing as well. Less formalized structure and voluntary arrangements could lead to more flexible and open interactions among employees [17, 20], and seem to be more successful than formal and mandated structuring of collaboration effort [21]. In recent case studies, formal authority appeared to be necessary although no particular structure of formal authority relationships among participating organizations is found to be associated with networking success [22].

Heterogeneous organizations may have different origins, values, and cultures [12, 18], making it difficult to align their missions and identify common goals. Furthermore, different organizations have individually developed their operation procedures, control mechanisms, and work flows, which may increase the difficulty of information sharing and integration [12].

Many employees are reluctant to share and contribute their own information to shared databases [7]. People's perceptions of costs and benefits may influence information sharing activities [4]. According to Davis, perceived usefulness and perceived ease of use are two critical determinants to employees' decisions to accept using new information systems [23]. An information contributor may need to spend a great amount of time and effort to get information ready for sharing, and expect that further requests for clarification and assistance may be evoked. Without receiving clear benefits, a contributor would be reluctant to share information [7, 24]. Also, cross-boundary information sharing may sometimes require reengineering current working processes, and staff may resist those changes due to inertia or personal interests [25]. Furthermore, some employees regard information as a symbol of power [16]. Sharing information is viewed as losing power and social influence [26]. As Willem and Buelens [17] pointed out, power games can negatively influence information sharing activities. Lack of trust could also influence information sharing among different organizations [4, 18]. Trust may be affected by the concerns of losing autonomy and misuse of

information by other organizations. A framework was proposed to understand how trust is built to facilitate cross-boundary information sharing in the public sector [3, 27]. Researchers also claimed that, through reward and incentive mechanisms, employees' intention to share information and knowledge can be greatly enhanced [17]. Research has also highlighted leadership as a one of the key enablers for the success of IT initiatives in general and information sharing in particular [6, 22, 28].

In addition, many government agencies do not have prior experiences--especially positive experiences--in information sharing and also lack the capabilities to carry out information sharing initiatives [29]. Some agencies are even unaware of what useful information is available in other agencies [30].

2.3 The Legal and Political Perspective

Information sharing initiatives in government agencies are embedded in a complex legal and political environment. Laws and policies thus have strong influences on organizations in the public sector. In a democratic system, government agencies need to cope with pressures from legislators, courts, interest groups and citizens [31]. Layers of mandates such as crosscutting regulations and crossover sanctions escalate coordination requirements and constitute pressures for leaders working in a network structure [8]. The legitimacy of a cross-boundary sharing program often rests on general legal authority over a governmental function, on specific legislation, or on a formal executive directive [22]. Without supportive legislation, information sharing initiatives in the public sector may lack funding and resources to make themselves sustainable [3, 4].

Particularly, information sharing initiatives could be hindered by policies that prohibit government agencies from sharing sensitive and regulated information for the sake of public safety and national security [3-5, 13]. Also, information privacy and confidentiality are also critical for organizations in the public sector. Policies that address those concerns properly could increase the trust of the general public on government information sharing projects [2, 30]. Also, pre-defined policies in agencies regarding program boundaries and goals could become potential barriers for information sharing [18]. Explicit statutory authority should define the circumstances in which information can and/or cannot be shared, which could help reduce agencies' hesitation to share information [4, 30].

Research has also found that support from top-level executive leaders is critical for the success of cross-boundary information sharing initiatives. One study found that knowledge networks are more likely to succeed when basic legal authority is augmented by the political support of a currently serving chief elected official [22]. Executive involvement has an influence on cross-boundary information sharing initiatives through their support of the actions of informal leaders, respect for the autonomy of participating organizations, ability to affect the willingness of key actors to participate, as well as ability to make financial resources available [6].

Furthermore, partisan dynamics in different agencies matter as well. Some participating organizations may be concerned about losing autonomy or control to the opposite party, and may perceive that sharing information may help the organizations run by the opposite party [2, 12]. In addition, sharing information may also expose the involved agencies to public scrutiny and

evaluation from supervising agencies. All these concerns can greatly reduce the willingness of government agencies to participate in information sharing projects [12, 18, 30].

Based on the literature review, Table 1 summarizes the factors that could influence information sharing initiatives. They are categorized into three perspectives: technological perspectives, organizational perspectives, and political perspectives.

Table 1. Factors influencing information sharing

Technological and Information Perspectives	
■	Information technology compatibility - Hardware and software - Data standards and definitions
■	Outsourcing
Organizational and Managerial Perspectives	
■	Over centralization
■	Departmentization
■	Over formalization
■	Diversity in values and cultures
■	Procedures
■	Perceptions of costs and benefits - Easy-to-use and usefulness of technology - Information is perceived as power and valuable asset - Concern of losing autonomy - Time and effort to share information - Resistance to change - Feedback and recognition
■	Trust among organizations
■	Incentives
■	Leadership
■	Capabilities, experiences and awareness
Legal and Political Perspectives	
■	Legislations and policies - Funding and resources - Information privacy, confidentiality and sensitivity
■	Top executive support
■	Partisan dynamics in government agencies
■	Public scrutiny and evaluation

2.4 Investigating Factors in Other Countries

The list of factors is comprehensive and in general, very informative. However, most research done to generate this list was conducted in western countries. The extent to which these findings are applicable to other countries with different political, economic, and cultural settings has not been addressed. Do the same barriers and enablers exist in non-western countries? Would some factors play a more significant role in those countries and some play less? This paper will begin to answer these questions.

3. RESEARCH METHODS

A case study was conducted to identify the barriers and enablers in a cross-boundary information sharing initiative in China. The case is China's product quality and food safety policy domain. Data was collected through in-depth interviews and government documents. More than twenty semi-structured interviews were conducted; each lasting between 1-2 hours. Interviewees were identified using a snowball method and included people from

multiple sectors, different functional government agencies, different levels of government, and different professional backgrounds, in order to gain a variety of perspectives on the case. Documents collected were mainly published government reports and meeting minutes found on websites of related agencies, as well as public news reports. The data was transcribed and coded to identify common patterns with an inductive approach using grounded theory. Furthermore, the paper compares the results of the case in China with prior research conducted mostly in western countries to identify similarities and differences, and discusses the impact of potential political, economic, social and cultural factors on those similarities and differences.

4. INTRODUCING THE CASE

Information sharing initiatives in China's product quality and food safety policy domain are mainly the responsibility of the General Administration of Quality Supervision, Inspection and Quarantine of China (AQSIQ). AQSIQ is a ministerial administrative agency directly under the leadership of the State Council of China (the Cabinet). The responsibilities of the administration include product quality supervision, inspection on import-export commodity, inspection and quarantine clearance, entry-exit health quarantine, entry-exit animal and plant quarantine, and safety inspection on import-export food. AQSIQ has nineteen in-house functional departments, such as the Department of Inspection and Quarantine Clearance and the Department of Supervision and Management of Product Quality. Moreover, AQSIQ has fifteen direct affiliates, which provide technical support for AQSIQ programs such as the Information Center.

Two major units of AQSIQ are directly in charge of product quality and food safety issues: the Exit-Entry Inspection and Quarantine unit and the Supervision of Quality and Technology unit. The Exit-Entry Inspection and Quarantine unit is responsible for inspection of the quality and safety on commodities exported to or imported from other countries. The Supervision of Quality and Technology unit is responsible for supervision of the quality and safety of commodities circulated exclusively in the domestic market.

At the provincial and local levels, AQSIQ also sets up 35 direct Exit-Entry Inspection and Quarantine Bureaus (CIQ) covering 31 provinces, nearly 300 branches and over 200 local offices alongside the seaports, land ports, airports, and other commodity-distribution centers. Those CIQs are under the direct vertical leadership of AQSIQ, and serve as the local agencies of AQSIQ. Similarly, under the Supervision of Quality and Technology unit, there are also thirty-one provincial Bureaus of Quality and Technology Supervision (BQS) with more than 2,800 administrative divisions affiliated. However, unlike CIQs, BQSs are administered by their corresponding provincial governments, and AQSIQ only provides them with business guidance and has no direct vertical leadership over them.

4.1 AQSIQ's Information Sharing Initiatives

AQSIQ began to explore technology to support its business processes in 2001. In 2004, "Three New E-applications" were launched, namely E-Declaration, E-Supervision, and E-Discharge.

E-Declaration refers to the electronic inspection declaration process of export and import commodities among AQSIQ, CIQs and private companies. In the past, the whole process was fully manual making it time-consuming, costly, and labor-intensive. By 2008, the declaration process is almost fully electronic, and directly decreased commodity clearance time.

E-supervision refers to AQSIQ's supervision of manufacturing processes within firms. E-supervision enables real-time supervision through simultaneous transmissions of process data and surveillance video from the manufacturers to AQSIQ. The results of inspection and quarantine are electronically sent to port CIQs via the Internet during and after the commodities are produced. Thus, E-supervision supplements E-declaration by exercising "in-advance" monitoring. There are three essential components in the process: 1) pre-supervision and management of export goods; 2) expediting the discharge process for export goods; 3) fast inspection of import goods.

E-Discharge application is made up of two components: E-Certificate transmission and E-Custom clearance. E-transfer system refers to the electronic transmission of inspection permits among CIQs in different provinces (cities). For export business, commodities will first be inspected by the CIQ in its origin location. After passing the inspection, the CIQ will issue a paper-copy inspection permit to the export company; meanwhile an electronic copy of the permit will be transmitted to a CIQ in the province (city) with a seaport, land port or airport, wherever those commodities will be exported. When the commodities are finally transported to the port, the port CIQ will verify the paper copy permit that the company holds with the electronic copy in the system before discharging them to the Customs. For import business, permits will be electronically transmitted from a port CIQ to a CIQ in the inner-land instead. E-Customs clearance refers to the electronic transmission of customs clearance permit between AQSIQ and the General Customs of China. It is required by law that commodities for export be inspected by AQSIQ for quality and safety first before Customs declaration. After commodities pass inspection, AQSIQ will issue a customs clearance permit to the export company; meanwhile an electronic copy of the permit will be transmitted to the Customs. When commodities arrive the customs, the Customs will verify the hard copy permit the company holds and the electronic permit sent from AQSIQ beforehand.

Other cross-ministry information sharing initiatives include: information sharing between AQSIQ and the Ministry of Agriculture with regard to entry-exit animal and plant quarantine; information sharing between AQSIQ and the Ministry of Environmental Protection with regard to waste raw material import; and information sharing between AQSIQ and China's central bank as one component of the project of establishing a national credit system.

All these initiatives are aimed to accelerate the speed of clearance, lessen the burden for both AQSIQ and corporations, enhance working efficiency, as well as strengthen the enforcement of supervision and inspection. They have the potential to improve the efficiency, effectiveness and accountability of AQSIQ's businesses.

4.2 Various Information Sharing Relations

The case involves multiple stakeholders and includes various information sharing relations. Along the vertical axis, the case consists of information sharing between the China's State Council (the Cabinet) and various ministries, a national ministry and its local agencies throughout the country, and between a provincial government and its various agencies. Along the horizontal axis, the case embraces information sharing among different nations, among different ministries of the State Council, among different departments of a ministry, among counterpart agencies in various provinces, as well as information sharing between the public sector and the private sector.

5. FINDINGS: BARRIERS

A number of barriers for achieving the goals of the initiatives existed or still exist. They could be divided into technological, organizational and political barriers using the framework developed in the literature review.

5.1 Technological Barriers

5.1.1 Technology and Cost Are Not Big Issues

Overall, technology and cost seemingly are not big issues for officials involved in the case. Though infrastructure issues such as band width and cost are pointed out by some managers, especially those from less developed regions, most interviewees addressed that what matters more is not technology but management model: "Sometimes, a successful model may not require much investment on technology, while an application that spend a lot of money may turn out be a failure."

5.1.2 Legacy System Integration

Some participating agencies mentioned that they have already built up their own information systems and run it for a couple of years before nation-wide initiatives were launched. Therefore, the integration between the new system and legacy system becomes a challenge for them as those systems may use various kinds of hardware, software and programming languages.

5.1.3 Data and Standards

A couple of participants mentioned that E-Supervision application involves over 100,000 standards concerning more than 4,000 products. They all need to be measurable for the system to run successfully. The task is very detailed and time-consuming. In addition, while CIQs throughout the country use only one standard, BQSSs in different provinces adopt various standards. Furthermore, the data standard that AQSIQ uses and the Customs uses are also different. The former uses national standard, while the latter uses the Customs Association standard. Those differences greatly hinder the information sharing and integration among them.

5.1.4 Outsourcing Model

Establishing a safe and sustainable outsourcing model turned out to be a challenge as well according to participants, because government information is politically and legally sensitive and is subject to high security concern. Besides, the contractors' service quality, motivations and technology maturity are directly linked to the image of AQSIQ. As such, AQSIQ wants to keep a strong control over the contractors throughout the design,

implementation and maintenance phases. In history, some contractors ran out of business or failed to renew contracts, and thus seriously threatened the maintenance stability, service quality, and information security of E-applications of AQSIQ.

5.2 Organizational and Managerial Barriers

5.2.1 Departmentization

AQSIQ is formed by merging several formerly independent departments. At the central government level, the unit of Supervision of Quality and Technology and the unit of Exit-Entry Inspection and Quarantine are two separated departments of AQSIQ. The former targets the import-export business and the latter focuses on the domestic market. According to a number of interviewees, although the two units are responsible for similar functions and have the potential to share quite a lot of useful information with each other, information sharing between them remains minimal so far.

Furthermore, different units and departments of AQSIQ all have established their own information systems, which are not fully compatible with each other. Even basic demographic information of corporations was not shared among the departments. Participants mentioned that in many cases, those departments collected same set of information from corporations individually and redundantly. Consequently, corporations have to be inspected by those departments repeatedly for the same or similar purposes.

5.2.2 Centralization vs. Decentralization

From the vertical perspective, the case study finds two kinds of hierarchical administrative relationships: vertical administration and non-vertical administration. The former refers to the situation that a local functional agency serves as the local office of a functional department in a higher level government and reports directly to the latter. For example, a CIQ is under the direct vertical administration of AQSIQ. The latter refers to the situation that a local functional agency reports directly to its respect provincial government and does not report to a functional department in a higher level government. For example, a BQS reports directly to its provincial government and has a non-vertical relationship with AQSIQ.

From AQSIQ's perspective, the vertical administration arrangement is more favorable for building up a top-down centralized system. The case study found that the centralization system between AQSIQ and CIQs is implemented more successfully than the system between AQSIQ and BQSSs. Leaders and managers in AQSIQ all contribute it to the fact that CIQs are under the direct vertical administration of AQSIQ while BQSSs are not.

However, the case study shows a tension between the centralization and decentralization efforts. CIQs, especially those in the relatively developed provinces, are not fond of the centralized efforts of AQSIQ. A CIQ in a more developed region usually has built up a legacy system, which, very likely, is more advanced than that of AQSIQ, because the agency faces more special local needs, heavier workload, as well as more diversified and complex context. The centralized system is unlikely to meet all those local needs. As a result, those kinds of CIQs tend to resist the request from AQSIQ for system integration. To the opposite, a CIQ in a less developed region is more willing to follow the instructions from AQSIQ as it faces fewer special

needs, lighter workload, as well as less diversified and complex context. The centralized system usually can work pretty well there.

Furthermore, it seems that centralization impedes information sharing between CIQs and BQSSs at the provincial level. While AQSIQ requires CIQs to integrate their systems with the national centralized system, provincial governments also asks their respective BQSSs to integrate with the provincial platforms. Therefore, both CIQs and BQSSs have limited autonomy to make their own decisions for information sharing and integration. When an official in a provincial BQS was asked why it is difficult to share information with the CIQ in the same province, he answered: "Because they report directly to AQSIQ, and we report directly to the provincial government, we do not have the same leader and we do not even attend the same meetings."

5.2.3 Leadership

Some interviewees addressed that most top leaders do not pay enough attention to informatization and do not regarded informatization an organizational strategy. The department responsible for E-Government initiatives at AQSIQ was Information Center. Overall, Information Center is neither an influential nor a powerful department in AQSIQ. Also, the director of Information Center is just a department head rather than a member of the top executives, as Public CIO system has not been established in China yet.

In practice, information-related responsibilities are not centralized to the Information Center, but are separately taken by each business departments. Many decisions regarding information sharing are made without the participation of Information Center. The leaders of Information Center lack sufficient power to coordinate among various business departments. One manager pointed out that: "Real experts on both informatization and business have little voices in the organization. The spirit is willing but the flesh is weak." Another interviewee also pointed out the importance of leadership attitude as well as leader's power: "A leader should first have a positive attitude towards informatization, but it may be even more important that this leader also have sufficient power to make influence."

5.2.4 Staff Resistance

Developing a new system inevitably requires process reengineering. However, some staffs have been used to the old processes, and are not willing to accept any changes. "When we asked them why they prefer the old process, they said because it has been always like this and they have been familiar with it; other than that, they cannot raise up other reasons.", a manager addressed. In some cases, launching a new system may actually lock the unreasonable old process. "We called that 'electrifying old inspection' rather than 'Electronic inspection'", one manager commented.

Furthermore, informatization often inevitably reduces the number of employees, which leads to resistance from staff for the concern of layoff. However, "That is not a major issue," one leader pointed out: "it does exist, but informatization is an irresistible trend, we have no choices but following the trend, and people all know that."

5.2.5 Cross-agency Complexity

More complex issues emerge with regard to cross-ministry initiatives. Some agencies have prominent conflicts of interest with each other mainly because they have overlapped clients. One agency believes that other agencies need its information more than it needs theirs, and sharing information with others would increase their burdens and reduce their working efficiency without getting significant benefit return for them. One agency complained that some agencies who used their information have never returned any feedback to them. When the benefits on participants are not mutually equal, participants do not have enough incentives to continue an initiative. In addition, capability issues matter as well. One manager addressed that they wanted to cooperate with an agency, and then it turned out that the agency did not have the capability to collect information within its own organization.

Besides, one leader mentioned that many cross-agency information sharing initiatives are still in a bi-lateral, rather than a multi-lateral approach. The former may solve a specific problem but contribute less in enhancing the whole community's capability. Besides, long-term coordination mechanisms among agencies were not in place, nor were effective incentive-driven mechanisms. "In reality, many cross-agency initiatives started with ambitious goals but ended up with no actions and no results.", one manager pointed out.

5.3 Policy and Political Barriers

One leader addressed that some initiatives are hard to implement because the roles and responsibilities for participant agencies are not explicitly defined by law. Even when they are specifically defined, law enforcement is not rigorous and strict enough. "Many times when a problem happens, no agency is in charge, instead, agencies are all pointing at others."

With regard to cross-national information sharing, according to some leaders and manager who are involved in the international negotiations, the most challenging barrier seems to be the absence of international laws that unify standards for all nations. As such, conflicts emerge frequently among nations because each country adopts its own standards. So far, no international organizations have successfully coordinated the efforts of developing cross-nation standards. Most ongoing negotiations are in a bi-lateral rather than multi-lateral approach, even though every participant knows the latter could be much more efficient than the former.

6. FINDINGS: ENABLERS

In spite of above barriers, the case also found a number of enablers that contribute to the success of the initiatives and a number of measures that have been taken to address the barriers. Those factors are summarized as follows.

6.1 Leadership

6.1.1 Top Leadership Support

Top leadership support is found to be one of the most significant factors leading to the success of the initiatives. The State Council plays a key role in facilitating government informatization. Premier Wen Jiabao chairs the State Council Informatization Leadership Commission, and Director Li Changjiang of AQSIQ is a member of the commission. One major responsibility of the

Group is to inquire requests, coordinate, and establish information sharing platform among ministries.

Golden Quality project is approved and supported by the State Council as a national level E-Government project. In China, all national-level E-Government projects start with the character of "Golden". So far, more than a dozen of Golden projects have been carried out. The main goals of the Golden Quality project are to build up and strengthen E-applications in the unit of Supervision of Quality and Technology, which is much less advanced than those in the unit of Exit-Entry Inspection and Supervision; and then to integrate the applications of the two units to build up a unified platform at the AQSIQ level. According to the participants, as a national project, the implementation of Golden Quality project receives greater attention and support from the State Council, which is very critical to the success of the project, especially with regard to cross-agency negotiation.

6.1.2 Crisis and Top Leader Involvement

The case finds that the outbreak of a crisis could sometime increase the community cohesion and promoted consensus making. Most importantly, top leader involvement can be triggered by the outbreak of crisis. Right after the product quality and food safety incidents outbreak internationally and domestically in the summer of 2007, Vice Premier Wu Yi stepped in, and chaired as well as organized a special team to deal with the crisis. Members of the team are leaders of all ministries related to product quality and food safety issues. The establishment of the special response team greatly facilitated cross-ministry collaboration, enabled resources mobilizing and finally solved quite a number of longstanding problems. The success of the E-Customs clearance application is also a result of the special team's coordination. By January 2008, three months after the Vice Premier stepped in, the E-Customs clearance application finally reached its goal of covering 100 percent of the import and export commodities. However, before the crisis, the negotiation for collaboration on the same goal had been lasted for five year between AQSIQ and the Customs without reaching an agreement.

6.1.3 Agency Leadership Involvement

The involvement of leadership of AQSIQ also played a key role for the success of the initiatives. One managers mentioned that one leader of AQSIQ happens to be familiar with the informatization work and show great understanding and support to the three E-applications.

Several leaders at AQSIQ mentioned that, some measures have been taken to address the problem of weak status of informatization leaders in AQSIQ. Two departments were set up in the AQSIQ to be responsible for the informatization work: the Informatization Office and the Information Center. The former executes the planning, regulatory and managerial functions, and is chaired by a vice director of AQSIQ, which strengthens the power of the office within AQSIQ. The latter is responsible for the implementation of specific applications. Two departments have different names, but share the same workforce. The budgets for e-applications are now under the centralized management of the Informatization Office. Data collection activities are centralized and coordinated by the Information Center and then shared with other business departments. Information needs are first proposed by the business departments and then realized with technological

tools by the Information Center. Several reward and incentive mechanisms have been established to encourage information sharing among departments.

6.2 Balancing Centralization and Localization

The unit of Entry-Exit Inspection and Quarantine successfully built up a centralized system by taking advantage of its direct vertical administration over all CIQs throughout the country. A leader described their efforts with proud as “unified thoughts, unified planning, unified rules, unified implementation, unified supervision, unified maintenance, unified process, unified platform, unified standards, and unified programming language.” Meanwhile, other than those centralization goals, the unit also adopted some measures to satisfy the special needs of local CIQs. Some successful cases of local CIQs are studied, promoted and absorbed into the centralized system of AQSIQ. Technically, some data transformation platforms are set up to bridge the new centralized system and local legacy systems. The efforts of balancing centralization and localization proved to be critical to the success of the initiatives according to the participants.

6.3 Technology and Process Solutions

Systems are upgraded constantly to enhance the functions of applications. When integrating the new system with the legacy systems, code-transfer platform is established among different data standards. In addition, experienced professionals and experts from both AQSIQ and local bureaus are invited to participate in a joint working group. Members of the group bring in ideas from various perspectives and work together in designing processes and applications. Surveys are also conducted to solicit needs and requirements from local agencies, various departments, and private companies. According to the participants, those efforts greatly solve the problems related to technology and process at AQSIQ.

6.4 Inventing a New Outsourcing Model

An IT company, iTowNet was established with the investment from AQSIQ and a private company to implement the IT applications of AQSIQ. In this way, AQSIQ realizes strong control over iTowNet, and iTowNet is considered by AQSIQ as trustable and stable contractor which can guarantee the service quality and sustainability of AQSIQ’s IT applications, as well as the security and confidentiality of AQSIQ’s information. As a result of the close relationship between iTowNet and AQSIQ, iTowNet becomes very familiar with the business of AQSIQ and is able to provide AQSIQ with suitable IT solutions and services backed by its experienced workforce and strong technological capability.

As a company instead of a government agency, iTowNet could also develop its own business in the market. In this way, it keeps its flexibility and do not have to rely exclusively on government revenue to survive, which in turn saved a great amount of operational costs for AQSIQ. According to AQSIQ and iTowNet, this outsourcing model creates a win-win situation for all stakeholders.

6.5 Other External Factors

Interviewees also mentioned some external factors that have contributed to the success of the initiatives. First, as an inevitable

trend, informatization has a proven record for improving government work around the world. According to some participants, learning from the experiences of the developed countries and moving towards informatization, rather than against it, has become a consensus of the whole society in China. This has created a favorable environment for the implementation of information sharing initiatives. Besides, the newly enacted Open Government Information Regulation of China is also considered by many interviewees as a potential facilitator for information sharing initiatives. “When more information is opened to the public, sharing information among government agencies will also become much easier.”, one manager addressed.

7. DISCUSSIONS

Comparing the results of the case study in China and prior findings from the western countries, we find many similarities. It seems that despite all the differences between countries, some factors that could influence information sharing seem to be consistent across countries. However, we did find a few differences in terms of the barriers and enablers between China and the western countries.

First, the tendency towards centralization in China seems to be especially high. As a result, the role of leadership support and involvement for the success of initiatives also appears extraordinarily significant. However, the role of legislatives and courts in China are seemingly not as prominent as those in the western countries. In addition, most enablers and solutions in the case seem to be ad-hoc efforts based on personal relationship, and address a specific problem solving; rather than systematical solutions based on rule of law and institutional mechanism, and address the overall capacity building.

All these differences may be explained by the unique political and culture context of China. China has a centralized, top-down, one-party, and executive-oriented system. Besides, it has a long tradition and culture preference towards collectivism, hierarchy, stability and people relationship.

Furthermore, informatization is considered as an inevitable trend in the case and has a positive impact for the success of initiatives. This may be explained by the fact that China is a developing country. One advantage of being a developing country is that it has a “trend” to follow based on the experiences of the developed countries, and take leap frog action when possible.

8. CONCLUSIONS

This paper examines the technological, managerial, and political barriers as well as enablers for the success of an information sharing initiative in China. A case in the product quality and food safety policy domain is studied. Furthermore, it compares the results of the case study in China with prior research conducted mainly in the western countries to identify some similarities and differences, and discusses the impact of political, economic, and cultural factors on those similarities and differences.

It will be interesting for future studies to further explore the impact of those factors in other countries with different context. In addition, future studies may consider conducting some quantitative research to test the findings from the case study.

9. REFERENCES

- [1] Drucker, P.F., et al., Looking Ahead: Implications of the Present, *Harvard Business Review*, 1997. 75(5): p. 18-32.
- [2] Zhang, J. and Dawes, S.S., Expectations and Perceptions of Benefits, Barriers, and Success in Public Sector Knowledge Networks, *Public Performance & Management Review*, 2006, 29(4): p. 433-466.
- [3] Zhang, J., Dawes, S.S., and Sarkis, J., Exploring Stakeholders' Expectations of the Benefits and Barriers of E-Government Knowledge Sharing, *The Journal of Enterprise Information Management*, 2005, 18(5): p. 548-567.
- [4] Dawes, S.S., Interagency Information Sharing: Expected Benefits, Manageable Risks, *Journal of Policy Analysis and Management*, 1996. 15(3): p. 377-394.
- [5] Gil-Garcia, J.R. and Pardo T.A., E-Government Success Factors: Mapping Practical Tools to Theoretical Foundations, *Government Information Quarterly*, 2005. 22: p. 187-216.
- [6] Gil-Garcia, J.R., Pardo, T.A., and Burke, G.B., Government Leadership in Multi-Sector IT-Enabled Networks: Lessons from the Response to the West Nile Virus Outbreak, in *Leading the Future of the Public Sector: The Third Transatlantic Dialogue*. 2007. University of Delaware, Newark, Delaware, USA.
- [7] Cress, U. and Kimmerle, J., Information Exchange with Shared Databases as a Social Dilemma: The Effect of Metaknowledge, *Bonus Systems, and Costs. Communication Research*, 2006, 33(5): p. 370-390.
- [8] O'Toole, L.J., Treating Networks Seriously: Practical and Research-Based Agendas in Public Administration, *Public Administration Review*, 1997, 57(1): p. 45-52.
- [9] Agranoff, R. and McGuire, M., Big Questions in Public Network Management Research, *Journal of Public Administration Research and Theory*, 2001. 11(3): p. 295-326.
- [10] Dawes, S.S. and Préfontaine, L., Understanding New Models of Collaboration for Delivering Government Services, *Communications of the ACM*, 2003. 46(1): p. 40-42.
- [11] Tapscott, D. and Carston, A., *Paradigm Shift: The Promise of New Technology* 1993, New York: McGraw-Hill.
- [12] Pardo, T.A., et al. Modeling the Social & Technical Processes of Interorganizational Information Integration, in *Proceedings of the 37th Hawaii International Conference on System Sciences*, 2004, Hawaii.
- [13] Gil-Garcia, J.R., Chengalur-Smith, I., and Duchessi, P., Collaborative e-Government: impediments and benefits of information-sharing projects in the public sector, *European Journal of Information Systems*, 2007. 16(2): p. 121-133.
- [14] Park, J.-Y. and Kim, J.S., The Impact of IS Sourcing Type on Service Quality and Maintenance Efforts, *Information & Management*, 2005. 42(2): p. 261-274.
- [15] Gil-Garcia, J.R., et al. Interorganizational Information Integration in the Criminal Justice Enterprise: Preliminary Lessons from State and County Initiatives, in the *38th Hawaii International Conference on System Sciences*, 2005. Big Island, Hawaii.
- [16] Kolekofski Jr., K.E. and Heminger, A.R., Beliefs and attitudes affecting intentions to share information in an organizational setting, *Information & Management*, 2003. 40: p. 521-532.
- [17] Willem, A. and Buelens, M., Knowledge Sharing in Public Sector Organizations: The Effect of Organizational Characteristics on Interdepartmental Knowledge Sharing, *Journal of Public Administration Research and Theory*, 2007, 17: p. 581-606.
- [18] Pardo, T.A. and Tayi, G.K. , Interorganizational information integration: A key enabler for digital government, *Government Information Quarterly*, 2007. 24(4): p. 691-715.
- [19] Weber, M., *From Max Weber: Essays in Sociology*. 1958: Oxford University Press. 512.
- [20] Tsai, W., *Social Structure of "Competition" Within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing*. Organization Science, 2002. 13(2): p. 179-190.
- [21] Milward, H.B., *Inter Organizational Policy Systems and Research on Public Organizations*. Administration & Society, 1982. 13: p. 457-478.
- [22] Eglene, O., Dawes, S.S., and Schneider, C.A., Authority and leadership patterns in public sector knowledge networks, *The American Review of Public Administration*, 2007. 37(1): p. 91-113.
- [23] Davis, F.D., Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology, *MIS Quarterly*, 1989. 13(3): p. 319-340.
- [24] Goodman, P.S. and Darr, E.D. , Computer-Aided Systems and Communities: Mechanisms for Organizational Learning in Distributed Environments, *MIS Quarterly*, 1998. 22(4): p. 417-440.
- [25] Aldrich, H.E. and Ruef, M., *Organizations Evolving*. Second ed. 2006: Sage Publications. 344.
- [26] Ardichvill, A., Page, V., and Wentling, T., Motivation and Barriers to Participation in Virtual Knowledge Sharing Communities or Practice, *Journal of Knowledge Management*, 2003. 7(1): p. 64-77.
- [27] Pardo, T.A., Gil-Garcia, J.R. , and Burke, G.B. , eds. Building Response Capacity through Cross-Boundary Information Sharing: The Critical Role of Trust, *Exploiting the Knowledge Economy: Issues, Applications, Case Studies*, ed. P. Cunningham and M. Cunningham. Vol. 3. 2006, IOS Press: Amsterdam. 507-514.
- [28] Mintzberg, H., *Managing Exceptionally*. Organization Science, 2001.
- [29] Cresswell, A.M., et al., Sharing Justice Information: A Capability Assessment Toolkit, 2005, *Center for Technology in Government*: Albany, NY, USA.
- [30] Landsbergen, D.J. and Wolken, G.J., Realizing the Promise: Government Information Systems and the Fourth Generation of Information Technology, *Public Administration Review*, 2001. 61(2): p. 206-220.
- [31] Wilson, J., *Bureaucracy: What Government Agencies Do and Why They Do It*. 1989: Basic Books, Inc. 433.