Organizational Adaptation to Sustain Information Technology: The Case of E-Government in Developing Countries

Nurdin Nurdin[1, 2], Rosemary Stockdale[2], and Helana Scheepers[2]
[1]On leave from STAIN Datokarama Palu and STMIK Bina Mulia Palu Indonesia
[2]Faculty of Information and Communication Technologies, Swinburne University of Technology
nnurdin@swin.edu.au
rstockdale@swin.edu.au
hscheepers@swin.edu.au

Abstract: This paper presents a model for information technology (IT) sustainability within government organizations in developing countries. Previous studies indicate that most government IT implementations in developing countries fail to be sustained and to achieve their implementation goals. The causes of sustainability failure include technology, economics and financial, political, cultural, and organizations and their people. However, between those factors, organizations and people are most commonly found to be related to IT sustainability failure as neither organization nor their people are adapted to a new environment when IT is implemented. This causes lack of fit between government organizations, the people and the IT, which then results in failure to sustain the technology within their organizations. This study, therefore, proposes a model of government organizational adaptation to sustain IT implementation. In constructing the model, firstly, we examine how the process of adaptation of organizational and people factors are undertaken within government organizations from a variety of e-government studies. Previous studies show that government organizational bureaucracy, management, structure, hierarchy, culture, and business processes, should be adapted to meet the new IT requirements when government organizations are undertaking IT implementation. Government organizations should also change their missions and visions in response to new work systems resulting from IT implementation. Government employees' skills, at all levels, need to be improved in order for them to be actively involved in the implementation process. Secondly, using constructs from the literature review we identify two published cases of governments IT sustainability failure in India and Indonesia. Both cases of e-government implementation show that the sustainability failure factors are caused by lack of adaptation of organizational and people factors to the IT. Thirdly, a solution as to how the factors should be adapted is proposed and finally a model is constructed. We conclude that government IT sustainability is critically determined in the adaptation process of government organizations and people to the IT during the implementation process. Limitations and future research are then addressed.

Keywords: Organizational adaptation, sustainability, Information Technology, E-government, Developing Countries

1   Introduction

Adoption and implementation of e-government in developing countries is not considered as successful as their counterparts in developed countries. Developing countries face challenges in making IT work over time and institutionalizing it in daily routines within their organizations (Braa, Monteiro, & Sahay, 2004). For example, data shows that about 85 per cent of e-government implementations have resulted in failure (Heeks, 2003). Heeks argues that the majority of e-government failure can be categorized as sustainability failure where the initiative is initially successful but its use fails to be sustained for a period of time after implementation and operation.

Sustainability of IT is defined as "the technology that is capable of being maintained over a long period span of time" (Misund & Hioberg, 2003). We argue that sustainability in e-government systems is achieved if the systems are able to be operated and utilized within government organizations for the government organizations' life cycle. By utililization we mean that the IT is settled and accepted as a daily phenomenon that is institutionalized and routinized within the organization's life (Avgerou, 2000; Cooper & Zmud, 1990). When the IT is taken for granted within the organization, the organization and its people might put their effort into sustaining the use of the technology by adapting themselves to it.

However, the majority of government organizations fail to adapt themselves to e-government systems. This lack of ability for adaptation has been found as a main factor of e-government sustainability failure (Heeks, 2002a). We define the adaptation throughout this paper as "the modification and

alterations in the organizations or its components in order to adjust to changes in the environment" (Cameron, 1984, p. 123). Heeks (2002a) adds that the lack of adaptation in organizations to e-government systems has caused a mismatch between government organizations and the systems. The technology characteristics, which require flexibility of government organizations to ease cooperation and coordination, might conflict with rigid government hierarchies. For example, hierarchical and centralized management systems and the structure of African countries has caused a clash between e-government systems and government organizational contexts (Heeks, 2002a). Even though government organizational adaptation in e-government implementations has been discussed by studies such as Heeks (2002a) and Burn & Robins (2003), its relationship to e-government sustainability and how the organizational factors should be adapted have not been extensively studied.

This study investigates what organizational and people adaptation factors affect the sustainability of information technology within government organizations. We use two cases of e-government implementation sustainability failure in South Sulawesi Indonesia (Hwang & Syamsuddin, 2008) and the Sustainable Access in Rural India (SARI) project (Kumar & Best, 2006)), to identify organizational factors related to e-government implementation sustainability. The aim is to construct a conceptual model of organizational adaptation for e-government implementation sustainability. We also aim to provide practical and conceptual knowledge on how organizational factors should be adapted in order to enable the sustained use of e-government initiatives over a long-term period. We address the following research questions:

What are the factors of government organizations and people that should be adapted to sustain e-government systems? and How should these factors be adapted?

The paper is organized as follows. Section 2 presents theories relate to organizational adaptation, while section 3 presents theories on IT sustainability. Government organization adaptation factors are discussed in section 4, followed by details of the methodology employed to develop the proposed model.The two cases on e-government sustainability failure are then examined before we discuss the findings of the study. The model of organizational adaptation to sustain government IT implementation is constructed in section 8. Concluding remarks and limitations of the research are presented in the final section.

2　Oganization adaptation

Organizational adaptability is defined by Buch (2009) as an organization's capacity to embrace change or be changed to fit an altered environment. Adaptation is not viewed as a one stop process of organizational change but as a continuous process during an organization's life cycle. Davenport (1993) stresses that adaptation is a process of organizational change that should be practised in the context of a continuity process of human and organization improvement over time (Davenport, 1993). This enables an organization and its people to effectively adapt to environmental change (Guha, Grover, Kettinger, & Teng, 1997).

Many studies in information technology implementation, for example Howell and Cooke (1989), indicate that the nature of the work environment within organizations will be different when technology is introduced. Regardless of whether they are private or public organizations, the change of organizational and people factors to meet these new work environments are necessary to maintain alignment. The objective is to alter organizational and people aspects to meet alignment with the changing of the organizational environment during or after IT implementation. Cooper & Zmud (1990) refer to adaptation as a post adoption stage of IT implementation where an organization and its people adjust to fit the IT application.

E-government implementation requires the adaptation of organizational factors to create a match between government organizations and the technology (Heeks, 2002a). Welch & Pandey (2006) also argue that e-government is more readily adopted when it fits well with the organization. The fit might be best achieved when government organizations, people, and technology are mutually adapted because the sustainability of e-government projects rely on the interplay of these three factors (George Aichholzer, 2004).

3   IT sustainability

Pezzey (1992) associates the term sustainability with the concept of development which involves improvement or increase of utility. This concept implies that sustainability is not only about preserving something but also about improving a condition for an unlimited time in the future. Pezzey (1992), who uses the sustainability concept in multidiscipline perspectives such as history, economics, environment, agriculture and technology, does not refer sustainability to a specific time.

In the context of technology implementation, Luftman & Brier (1999) refer to sustainability as the ability to preserve the technology over a long period. Similarly, Braa, Monteiro, & Sahay (2004) state that sustainability is about making information systems work over time. If a technology is successfully implemented and used but is unable to endure for future utility, it is not considered as sustainable because it has not been in continuous operation (Krishna & Walsham, 2005).

From an e-government perspective, we define information technology sustainability as the retaining and using of e-government systems with no intention by government organizations and its people to abandon it and return to the manual system. Avgerou (2000) describes this phenomenon as an IT innovation that has been taken for granted and institutionalized within organizations to sustain its operations. Similarly, when e-government systems have been taken for granted and institutionalized the government organizations are able to sustain the technology for a long period of time.

4   Government organizations adaptation

The issue of government organizations' adaptation to e-government implementation has been identified by scholars such as Aicholzer & Schmutzer (2000) and Burn & Robins (2003). Adaptation is viewed as a process to create a match between a government organization and the e-government system (Heeks, 2002a), particularly when an organizational context does not fit with an IT implementation. The organizational context is often ignored when IT is introduced into an organization (Avgerou & Walsham, 2001) thereby causing alignment problems between daily work processes and the technology.

In the context of private organizations, organizations' fit to IT might include organizational strategy (such as communication between hierarchies, relation between IS mission, plan and business processes, as well as commitment of the employees) and structure (such as organizational structure, centralization or decentralization, and employees' skills) (Chan, 2002). Similarly, studies in public organizations also indicate that organizational fit to IT relate to those same factors. An e-government system is no different to other technologies in that they require adaptation of government organizations to fit the system. This concept of adaptation is often associated with re-engineering and adaptation of organizational structure (Burn & Robins, 2003; Wimmer, 2002), but adaptation might incorporate other organizational and people factors. The organizational and people factors and how they should be adapted are identified from the literature and shown in Table 1.

No	Organizational and People Adaptation factors	Authors
1	**Change bureaucracy and management process** – bureaucracy and management are transformed to new business perspectives that allow employees to work effectively in new socio-technical perspectives.	(Burn & Robins, 2003; Heeks, 2002a; Ho, 2002)
2	**Change organizational structure and hierarchy** – organizational structure and hierarchy are simplified to ease work processes, and distribute knowledge and skills of IT across organizations.	(G. Aichholzer & Schmutzer, 2000; Heeks, 2002a; Ho, 2002; Schwarz, 2002; Wimmer, 2002)
3	**Change organizational culture –** organizational culture is transformed to create new norms that promote openness, trust, commitment, and discourage resistance and risk avoidance. **(Organizational culture** is defined as "programming of the mind which distinguishes the members of one human group from another" (Hofstede, 1984). It consists of a set of values, beliefs, assumptions, and symbols (Barney, 1986). Therefore, transparency, employees' resistance and trust, leadership and commitment can be categorized as elements of organizational culture)	(Burn & Robins, 2003; Evans & Yen, 2006; L. O. Kim, Zailani, Ramayah, & Fernando, 2009; Luk, 2009; Shareef, Archer, Kumar, & Kumar, 2010; Wong & Welch, 2004)

No	Organizational and People Adaptation factors	Authors
4	**Create clear mission and vision** – new mission and vision of government organizations' business processes are created to align with new technology systems.	(S. Kim, Kim, & Lee, 2009; Montealegre, 1998; Sharifi & Manian, 2010)
5	**Adapt business processes and back office** – business processes are adjusted to new technology requirements which leads to less direct physical contact, including alignment between back and front office.	(G. Aichholzer & Schmutzer, 2000; Tseng, Yen, Hung, & Wang, 2008; Wimmer, 2002)
6	**Improve organizational and employees' skill** – governments train their employees, encourage learning habits among employees and departments such as knowledge and skill transfer, and willingness to learn from others.	(G. Aichholzer & Schmutzer, 2000; Burn & Robins, 2003; H. J. Kim, Pan, & Pan, 2007)
7.	**Involvement of all employees** – the involvement of government employees in e-government projects is not limited to higher levels only, but should involve all levels of employees to improve their awareness and sense of ownership of new technology in their daily work.	(Ebrahim & Irani, 2005; Folstad, Jorgensen, & Krogstie, 2004; Luk, 2009)

Table 1. Government organizations and people adaptation factors (Theoretical constructs)

5 Methodology

Building on Heeks' (2002a) idea that government organizations should undergo adaptation in order to sustain technology implementation, we propose an organization adaptation model to sustain e-government implementation within government organizations. We acknowledge that e-government sustainability relates to many factors such as technology, economics and financial, political, cultural, and organizations with its people. However, our model only focuses on the adaptation of organizational and people factors with e-government while other factors were not included in this study. Our focus on adaptation stage due to the importance of organizational factors to meet compatibility with technology characteristics as argued by Cooper and Zmud (1990). Therefore, firstly we identified the academic literature on the adaptation of organization and people factors that relates to e-government sustainability.

In constructing our model, we follow Shang and Seddon's (2002) strategy of identifying key constructs from the literature and using published case study data to inform the building of a framework; in their case for classifying enterprise systems benefits. In our study we adopt a similar approach to gain the benefit of existing rich data sources from contexts that are otherwise difficult to access. We use two existing cases of e-government implementation in developing countries to examine how the implemented systems were used for a certain period, but were not sustained. The first case addresses an e-government implementation in Tamil Nadu India (Kumar & Best, 2006), while the second case concerns an e-government implementation in South Sulawesi province in Indonesia (Hwang & Syamsuddin, 2008; Syamsuddin, 2011).

We applied a directed content analysis approach in which our theoretical construct was defined from the literature before our analysis of the cases (Hsieh & Shannon, 2005) (see Table 1). The constructs were then used to analyse both published cases through an iterative, interpretive approach, where our concentration was on particular findings deemed relevant to our study as suggested by (Heaton, 1998). We acknowledge that our interpretation of the published data may produce different meanings from the aims of the original studies, but it provides relevant perspectives to our study constructs (Hammersley, 2007). As a result, we argue that this strategy allows us to build new perspectives to enrich our study and build new knowledge (Bornat, 2008). In this study, we perceive new knowledge as the building of a government organization adaptation model to sustain information technology using previous e-government cases of implementation failure.

In this context, we focus on factors that contribute to e-government implementation sustainability. The findings in the published papers discuss a number of sustainability failure factors explicitly and implicitly. Explicit factors are examined against the theoretical constructs in Table 1, while implicit factors are interpreted and connected with the authors' analysis indicated in the papers. For example, the authors of the first published case stated that "the government officials were not trained adequately to understand and provide this new mode of service" (Kumar & Best, 2006, p. 9). The authors associate this inadequate training with the failure of e-government to be sustained. From the quote and authors' interpretation of their data, we ascertained that employees' skills in the SARI project were not sufficiently advanced and the inadequate training they received in early project

implementations was a factor in the lack of sustainability of the *telekiosks* initiative. Similar analysis procedures were also applied in understanding other organizational factors.

The two cases are summarised in the next section and, based on our analysis, we draw out the key organizational and people factors from both cases (Table 2) to inform the theoretical constructs drawn from the literature (Table 1). Finally, a discussion of the factors that hinder sustainability is used to inform the proposed model depicted in Figure 1, which indicates that government IT sustainability is critically determined in the adaptation process of government organizations and people during the IT implementation process.

6   The case studies

This section describes two relevant case studies of e-government implementation within two local governments in India and Indonesia. Both cases depict e-government sustainability failure in a developing countries context and provide insights that inform the construction of the model proposed in this study.

6.1   Case study 1

This first case briefly describes an e-government implementation in India; Sustainable Access in Rural India (SARI) (Kumar & Best, 2006). The SARI project, which is located in Tamil Nadu India, was an e-government collaborative project between universities in India and USA, a telecommunication company, and a non-government organization. The local staff and elective political representative were not deeply involved. The aim of the project was to provide e-services through *telekiosks* to rural people in Tamil Nadu. The project was started by building 39 *telekiosks* in November 2001, although only 12 *telekiosks* regularly provided e-government services such as birth and death certificates and old age pension certificates. The purpose of the project was to help the local government reduce the cost and time of services provision. The project did not aim to transfer back office operations into the electronic system, but simply changed front office system services by receiving electronic documents delivered from villages' *telekiosks*.

At the beginning, the project was well supported by the government and successfully implemented providing significant benefits of e-services to citizens. The *telekiosks* were operated by self-employed entrepreneurs and groups of non-government organizations, while technical support was provided by a telecommunication company. The kiosks offered a variety of e-services during the one year of their successful operation. The services, which save citizens' time, cost and effort, include registering of birth and death certificates, applications for old age pensions, community and income certificates, and reporting of general grievances by citizens. Kumar and Best (2006) found that instead of working to gain positive appreciation of the telekiosks from villagers, the field level government staff did not provide adequate support for the system. The study concluded that this lack of support arose from the fear that government staff would see an erosion of their own power and a consequent loss of income from potential redundancies.

Another finding from the study was that during the one year of the successful operation of the system, the Taluk office manager was strongly committed to keeping the project operational. When he was removed from the position in December 2002, the kiosks' operation began to deteriorate and the project, failing to be sustainable, was closed in February 2003. Kumar and Best's (2006) study concluded that the failure to sustain the e-government initiative resulted not only from the lack of commitment of staff, but also from a range of other organizational and people factors. These are presented in Table 2.

6.2   Case study 2

The second case concerns local e-government in South Sulawesi, Indonesia and mainly focuses on its capital city Makassar (Hwang & Syamsuddin, 2008). According to a report provided by TELKOM Indonesia (UNPAN, 2002), Makassar is one of four pioneer provincial capital cities in eastern Indonesia to implement integrated e-public services system (SIMTAP) supported by Indonesia National Telecommunication Company (TELKOM). When the report was submitted to UNPAN in 2002, two cities (Takalar and East Kutai) had fully implemented the systems, while Merauke was in the planning stage and Makassar was in an ongoing implementation process.

The SIMTAP system and the Makassar city web site were implemented in 1996. The telecommunication company provided the Internet infrastructure and training to government staff, while the finance was allocated by the local government. The city website was used to promote local resources to national and international level, while SIMTAP was aimed to provide online integrated e-services to the local communities. These services included, for example, online licensing and application submissions. It was intended to provide faster public services, increased revenue (e.g. up to 154 % from online ID and certificate services), and paper efficiencies of up to 70% (UNPAN, 2002). In the TELKOM report, it was also revealed that the most challenging issue during the implementation process was redefining the local government business process to fit with the new system.

As the e-government initiative was a collaborative project between the local government and the telecommunication company, both top local government and telecommunication leaders were involved in the project although other staff were not included. A relatively large amount of the local government budget was allocated and an agreement regarding planning, development, and maintenance between the local government and the telecommunication company was signed. According to Hwang and Syamsuddin (2008), the official website was online for six months after launching . After that period, the website was no longer updated and maintained, which resulted in difficulties in accessing and obtaining services. Meanwhile, the SIMPTAP system was finished and implemented in Makassar by 2001 but had not been used by the time of Hwang and Syamsuddin's study in 2008. The organizational and people factors affecting the sustainability of the e-government services are also presented in Table 2.

6.3 Findings from the case studies

Some organizational and people key factors related to e-government sustainability failure have been outlined in e-government studies as depicted in Table 1. Applying those perspectives, we have analyzed the presences of these factors from the two cases of e-government implementation; SARI Project Tamil Nadu in India and E-Government in South Sulawesi Indonesia. The list of the factors found is presented in the Table 2.

Case 1 SARI Project Tamil Nadu India	Organizational and people factors	Case 2 E-Government South Sulawesi Indonesia
Old management strategy and long bureaucracy process- though the online system was running, additional verification of document applications was still carried out by multiple levels of staff (such as field level staff and Taluk office level staff)	**Management and bureaucracy** **Organizational structure and Hierarchy**	**Organization structure and Hierarchy are not redesigned** – organizational structure and hierarchy are not adapted to the new work environment where multi-level structure was still maintained.
Employees' skills were not improved – government staff were unable to deal with the systems particularly in response to citizens' online applications as a result of inadequate training.	**Employees' Skill**	**Employees' skill shortage** – local government employees only received basic training to operate the technology and it was provided to few employees. As a result, some services that should have been provided by the systems were not operated due to unavailability of human resources.
Back office unchanged – local government back office operation was not aligned to front office operation, which should have provided e-government services such as electronic applications.	**Back office and Business Process**	**Business process unchanged** – the government way of doing business remains similar to pre-implementation of the technology in which old work flows were preferred, such as face to face interaction, rather than online interaction.
Employees' resistance – government staff perceived technology as a threat to their role authority. Their view of comfortable traditional contact with citizens in providing these services before the technology implementation still remained. **Low employees' support** – local government bureaucracies, at higher and	**Organizational Culture factors**	**Employees' resistance** – government employees resisted changing their attitude to the workplace. For example making physical contact with clients was preferred to online contact. **Low employees support** – top and medium local leaders did not give enough support such as financial and political.

lower level of employees, did not support to maintenance of the systems after the implementation. **Unsustainable leader commitment** – new local leader did not devote the same quality of commitment and leadership to the project. Low commitment of the new leader had an impact on coordination and monitoring of the project maintenance and development.	**Mission and vision**	**No change in mission, vision, and goals of the government** – local government employees did not know why e-government was important, how it would help them in providing services, and what they want to achieve. E-government was viewed merely as a slogan not as public reform.
Low involvement – physically and psychologically local government staff were not deeply involved in the project. Although they were aware of the project, they never considered the project as a serious public initiative.	**Involvement of Employees**	**Low involvement** – the project implementation only involved top local government leaders and the national communication company, while other staffs were ignored.

Table 2. Organizational and people factors impacting e-government sustainability

We argue that these cases represent phenomena that are the focus of our study because the organizational and people factors in both cases affected the sustainability of the e-government systems and led to failure of those systems. The theoretical perspectives identified in Table 1 are also used to verify how those factors in Table 2 are adapted during the implementation of e-government in our discussion section.

7 Discussion

In this section we present a comparative analysis of the two case studies concerned with the organizational and people aspects involved in both cases of e-government implementation. The focus is on the factors, see Table 2 above, that cause sustainability failure in the two cases of e-government implementation. The factors are analysed using organizational and people adaptation perspectives from other e-government implementation studies (Table1).

7.1 Change management process and bureaucracy

The notion of bureaucracy is often viewed as being synonymous with inefficiency in government organizations. Bureaucracy may impede government organizations' reforms when implementing innovations such as e-government. Conversely, when an organization's bureaucracy is modified according to a new environment, the organization might experience benefits. For example, in a Canadian study the government experienced inefficiency and low responsiveness of services before there was a restructure of the organization and its managerial bureaucracy. After restructuring was carried out to meet the new technology environment, services were seen to be delivered effectively and efficiently (Teofilovic, 2001).

However, in the context of the e-government implementation in South Sulawesi Indonesia, the bureaucracy and management process were maintained. Employees were still required to do physical interaction in management processes instead of online interaction. As the e-government system was not used frequently, the employees and citizens did not get significant benefits from this IT implementation. As a result, e-government is no longer maintained.

In the SARI project, document application verification was still carried out at multiple levels of the hierarchy even though an online system was in operation. Instead of time saving, this long bureaucracy delayed citizens' application processes because they had to rely on staff in different hierarchies. This situation was caused by old bureaucracy that was still preserved within the local government organization. Government organizations with an old bureaucracy paradigm often do not switch to a new paradigm that enables flexible management, inter-departmental team work, and coordination within their organizations as suggested by Ho (2002). A new government bureaucracy is required to reform and restructure in order to provide flexibility for IT implementation.

Government employees require conditions that support them in performing their work as easily as their counterparts in the private sectors, such as simple government layers of management (Li, 2005). Flexible government organizational bureaucracy and management processes allow employees to coordinate and cooperate in operating and maintaining e-government systems. As a result, the system is able to be adapted to the new work environment.

7.2   Change organization structure and hierarchy

Organizational incompatibility with a new technology implementation can be seen in the case of e-government implementation in South Sulawesi Indonesia (Hwang & Syamsuddin, 2008). The case study describes the government structure as remaining unchanged after the implementation. The e-government system was not well managed because there was no departmental or organizational structure that took responsibility for managing the system. Similarly, in the SARI project progress monitoring in India (Kumar & Best, 2006) was impeded by the organization's structure because of difficulties in coordination among different levels of government organization hierarchies. As a result, coordination to monitor the project among employees and project teams could not be regularly carried out. This resulted in a failure to sustain the project.

Government organizational structures should be re-engineered and adapted along with the e-government initiative to strategically fit the system (Wimmer, 2002). For example, Macome (2008) describes the implementation of an invoice information system in the Mozambique Electric Company as a successfully transformation of organizational aspects such as structure and management to creatively adapt to new technology. When organizational structure and hierarchy are adapted according to new work systems that involve technology, the alignment between organizational structures and new technology requirements is achieved. Organizational restructuring to create alignment is identified as one of the critical success factors in IS implementation within organizations (Henderson & Venkatraman, 1993).

7.3   Change of organizational culture

Organizational culture has become a major issue in e-government adoption and implementation. The presence of e-government might affect the workplace conditions because e-government leads to change in the nature of the government organization (Deakins & Dillon, 2002). This means some aspects of government organizations and their employees should be adapted to the new technology implementation requirements. This adaptation requires government organizations to change their traditional beliefs and norms to modern paradigms such as leadership style (Ho, 2002) and to encourage government employees' commitment to sustain e-government (Moon & Norris, 2005). Supportive and committed leaders who mobilize all resources to maintain IT implementation can lead to sustained initiatives within government organizations. For example, the implementation of the OPEN system in Seoul, South Korea has gained maximum success due to continuity of leadership commitment and support from the Mayor of the city (S. Kim, et al., 2009).

However, this was not found in the SARI project where the new leader was not as committed and supportive as the previous leader. His low commitment and support to the project resulted in uncertainty in the SARI project maintenance and development. Similarly, in both case studies, employees distrusted the e-government system as they believed that the project would harm their authority and power.   This in turn ruined the project sustainability because of employees' unwillingness to serve citizens through the online systems. This distrust has also caused resistance toward the use of IT among government employees. Mitchell (1998) argues that people will resist technology unless they generate information on real benefits provided by the technology. The transparency of government information can reduce the distrust and resistance to use the system among employees. Transparency includes governments' willingness to be transparent such as to reveal their work and decision processes and procedures (Wong & Welch, 2004).

7.4   Develop clear mission and vision

Top and middle level leaders within the local government of South Sulawesi Indonesia did not understand why e-government was implemented. They did not understand its importance nor how it would help them in services provision (Hwang & Syamsuddin, 2008). Their lack of understanding of the issues was caused by undefined mission and goals in the implementation of the technology. As a result of the implementation not being incorporated in the government mission and vision development, the future development and maintenance of the technology was threatened. For example there was no regular budget allocation to maintain the systems and to educate employees. The existence of clear mission and vision focus during the adoption and implementation process of e-government is important to maintain an organization's future directions and enhance organizational readiness (Sharifi & Manian, 2010). The mission and vision can be stated clearly before e-government

implementation to direct organnizations' planning and employees' attention to e-government. The mission and vision might also be exhibited by top leaders to inspire a mindset change of government agencies to raise their understanding about the importance of the transformation of government into e-government (Ke & Wei, 2004). This leads to more e-government implementation-oriented policies such as budget allocation and infrastructure development.

However, in context of the South Sulawesi case, the employees had a poor understanding of the essence of e-government implementation which led them to misuse the government budget. They viewed the e-government implementation as a chance for business benefit between the company and the government rather than as a project for citizens' benefits (Hwang & Syamsuddin, 2008). In fact, if the mission and vision are clearly stated, it can provide government organizations and employees with a clear direction for future success of the technology use, development, and maintenance. An excellent example where the mission and vision was explained clearly is found Sragen local e-government project in Indonesia (Farholt & Wahid, 2008).

7.5   Improve employee skills

The case of e-government implementation in South Sulawesi Indonesia and Tamil Nadu show that when the governments implemented e-government systems, their employees were only supported with basic training to operate computers (Hwang & Syamsudding, 2008; Kumar & Best, 2006). These basic skills were not enough to support the operation of such complex online services provided by the systems. Government officials who operated telekiosks in the SARI project India did not know how to deal with the new business mode after the technology implementation because of inadequate and irregular training scheme (Kumar & Best, 2006). As a result, their response time to citizens' online applications was slow.

Addressing this issue, government organizations should improve their organizational and employee learning to adapt to the changes in the work environment when new technology is implemented. Because organizational learning capacity seems to be determined by employees' learning, it is important for a government to concentrate on improving this learning. For example knowledge sharing between government and technical staff to succeed in the implementation and adaptation of IT (Zhang, Dawes, & Sarkis, 2005). This strategy can help knowledge and skill transfer from technical to non-technical employees particularly during and after the implementation process.

Skills and knowledge can also be gained through experience or by observing other organizations (Huber, 1991). In the context of e-government implementation, the government may learn from previous implementation experience, such as learning from failure or from other successful government IT implementations (Heeks, 2002b). Learning from others can help governments gather information about technology, electronic services, business integration strategy and problems faced during the implementation (Cook, LaVigne, Pagano, Dawes, & Pardo, 2002). It has been found that organizations with greater learning-related knowledge, and diversity are more likely to initiate and sustain technologies (Fichman & Kemerer, 1997).

7.6   Adapt business process and back office

The findings from South Sulawesi local government show that the business processes of the local government (Hwang & Syamsuddin, 2008) remained similar to those of the pre-implementation era of e-government. Old work flows such as face to face interaction in serving citizens were maintained. Six months after the system implementation, new business processes were yet to be designed to align with the new system. This caused infrequent use of the systems within the government organization that contributed to the abandoning of the systems. It seemed the government leaders did not view the adaptation of their business processes to new working system as a critical factor.

Adaptation of government business processes with the new working system in a new technology implementation is critical for successful transformation of government services delivery (G. Aichholzer & Schmutzer, 2000). Government business processes can be adapted to new business paradigms such as public-private partnership, multi-functional service shops, and one-stop government shops (Wimmer, 2002). Even though business redesign within government organization is often restricted by law (Reidl, 2003), governments can take action by issuing new regulations when conducting a new business strategy. For example in Seoul, the government released new regulations to mandate the use of a system to disclose administrative procedures as part of a new government business strategy (S. Kim, et al., 2009).

In the context of a government organization with greater autonomy, this strategy is likely to be implemented to legalize new business processes. For example, local government in Sragen Indonesia (Farholt & Wahid, 2008) released new regulations to accommodate a one stop service (it was called KPT) for permits and licenses. The change in regulations has become a fundamental criteria for technology implementation within Sragen local government. This implies that adaptation of business startegy to a new working technology plays an important role to sustain the use of technology for both government organizations and their stakeholders.

7.7 Maximize employees involvement

Involvement is defined as an organizational value that supports members of an organization to gain a sense of responsibility and commitment in the organization (Denison & Mishra, 1995). High involvement of government employees in e-government implementations includes the involvement of all staff across all levels of hierarchy (Folstad, et al., 2004). Folstad et al. (2004) add that employees' involvement will increase their willingness to participate in e-government project implementation and their participation will increase adaptability during and after implementation.

In the case of South Sulawesi Indonesia, it was revealed that e-government implementation only involve higher level leaders, while lower level employees were not involved (Hwang and Syamsuddin, 2008). As a result, employees did not fully participate in utilizing the systems to serve citizens. The employees also did not recognise the importance of the systems in serving citizens since they were not involved from the early stages of implementation. Similarly, Tamil Nadu government employees did not consider and pay serious attention to the SARI project because they were not involved in the project. Their low involvement impacted their willingness to support the project development and maintenance in both cases.

Employee involvement is critical for e-government implementation because it help them identify and articulate the benefits of the project as well as provide means for their participation throughout the project life cycle (Folstad, et al., 2004). As their involvement in the project is high, they will view the information technology as a critical success factor for their organization (Reddick & Frank, 2007). Employees and leaders involvement is shown not only in the context of their willingness to participate but also in building partnerships, improving commitment, and taking maximum responsibility in the adoption and implementation of e-government initiatives.

8 Adaptation model for government information sustainability

We argue that implementation of IT within government organizations resembles that of implementation in the private sector where stability might be achieved after the IT is institutionalized and routinized (Avgerou, 2000; Cooper & Zmud, 1990). However, the characteristics of public organizations are different from private organizations as described by Rainey & Bozeman (2000). We argue that the most important stage of technology implementation within government organizations is adaptation. Adaptation includes the installation, development, and maintenance of IT, improvement of employees skills and changes in organization procedures (Cooper & Zmud, 1990). The adaptation we discuss in this paper relates to the process of making government organizations gain fitness to sustain new technology use within their organizations.

The conclusion of the discussion above is depicted in Figure 1 which illustrates the process of organizational adaptation to sustain IT. Because our main focus is organizational and people factors and how they should be adapted to sustain IT, the organizational factors are listed under the adaptation process. We also argue that a government organization's fit with IT can influence the implementation outcome. Ginzberg (1980, p. 374) states that "an organization's fit of an information systems can influence the implementation outcomes which means the better the fit, the greater the likelihood of a successful outcome of the information systems implementation". Therefore, the conceptual model in this study is considered ideal to support the success of IT sustainability adoption and implementation within government organizations.
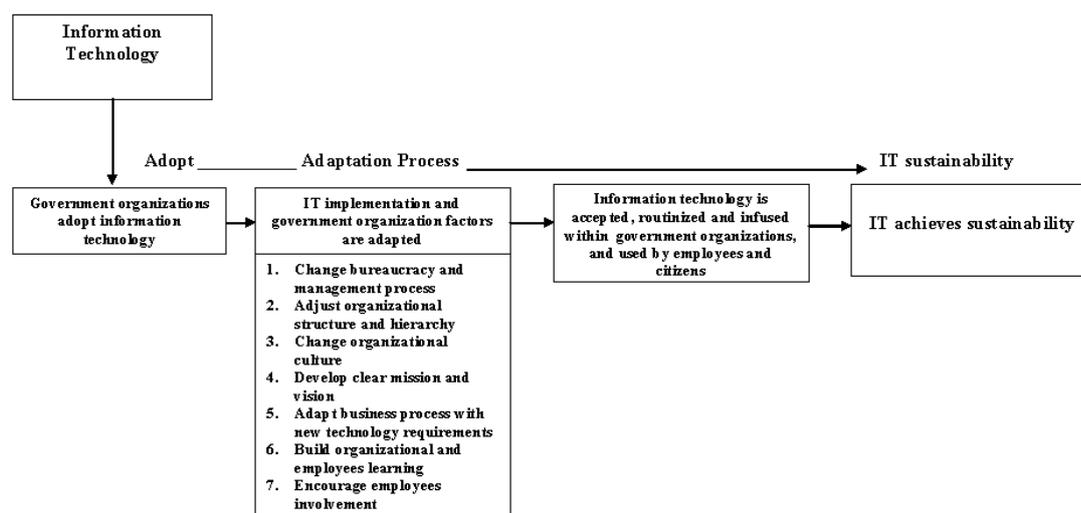
Figure 1. Organization adaptation to sustain government IT implementation developed based on Cooper and Zmud (1990).

The proposed government IT implementation sustainability model above shows that government organizations may adopt IT from external agencies. The government organizations need to adjust their organizational and people characteristics to fit the IT requirements in performing their daily tasks such as management, administration, and services delivery. Practically, bureaucracy and management as well as organizational structure and hierarchy should be simplified to reduce organizational red tape because most IT implementation with government organizations is intended to create efficiencies in management and services. In addition, the presence of IT within government organizations also requires their willingness to manage their organization and provide services to citizens with new paradigms. This requires government organizations and their people to adjust their culture, mission and vision, and business processes with IT characteristics. For example, government employees should accustom themselves to less physical contact when delivering services by using IT as the nature of IT services requires more virtual contact as a part of increasing efficiency and effectiveness.

IT implementation also requires new knowledge and skills from all levels of government employees. This means government employees need to improve their knowledge and skills on how to utilize IT within their organizations. The knowledge and skills are not obtained in a certain period of time, but via an ongoing learning process as the technology is changed and improved continuously. Finally, IT implementation requires technical skills across all levels, but mostly at lower levels of staff as indicated by Devados, Pan & Huang (2003). However, some e-government implementations, such as in Case 1 SARI project, only involves leaders at higher hierarchy levels. This is not sustainable because higher level leaders only have management and decision making competencies. Therefore, we propose the involvement of employees at levels to support the technology implementation.

When organizational and people factors have been adapted to IT, the government organizations, employees, and citizens use the IT as a part of their business processes and diffuse it to all level of government institutions. They should accept the technology by committing to use it in organization work processes. That usage, then, should be viewed as a normal activity in their organizational life as argued by Cooper & Zmud (1990). As a result, e-government technology might be retained within government organization life cycles and achieve its sustainability over a long period.

9 Conclusion and future research

The findings reveal that government organizations should adapt some of their organizational aspects to meet the fitness and alignment in sustaining IT. The IT implementation cases discussed in this paper illustrate the failure to sustain IT within government organizations over a long period. This we find to be due to the lack of adjustment of government organizational factors in the IT environment. Therefore, we conclude that government organizations bureaucracy, management and business process, structure and hierarchy, culture should be simplified to fit with the new IT environment. New clear missions and visions towards IT implementation goals also need to be established. Since IT

implementation requires new knowledge and skills from employees, learning within government organization should also be encouraged to enable the employees' involvement across organizational levels. The success of all organizational and people adaptation factors are crucial to support IT implementation sustainability within government organizations.

However, our research is focused on one aspect of adaptation; that of organizational aspects that should be adapted to establish fit with the technology. In fact, some studies mention that technology should also be adapted into government organizations (Heeks, 2002a), to find its fitness within the organization. However, this issue is not addressed in this study and is recommended as a subject for future research. Other factors of a non-technological focus such as finance, economics, and political influences are also not considered in this study, and further research in these areas is required. Finally, this research draws on two established case studies to illustrate the importance of organizational and people factors. Further empirical studies are required to provide greater evidence of the appropriateness of the conceptual framework in Figure 1 and extend the generalizability of the framework.

References

Aichholzer, G. (2004). Scenarios of E-Government in 2010 and Implications for Strategy Design. *Electronic Journal of E-Government, 2*(1), 1-10.

Aichholzer, G., & Schmutzer, R. (2000, 2000). *Organizational challenges to the development of electronic government.* Paper presented at the Database and Expert Systems Applications, 2000. Proceedings. 11th International Workshop on.

Avgerou, C. (2000). IT and Organizational Change: an Institutionalist Perspective. *Information Technology and People, 13*(4), 234-262.

Avgerou, C., & Walsham, G. (2001). *Information Technology in Context: Studies from the Perspective of Developing Countries*. Brookfield, VT USA: Ashgate.

Barney, J. B. (Writer). (1986). Organizational Culture: Can It Be a Source of Sustained Competitive Advantage?, *Academy of Management Review*: Academy of Management.

Bornat, J. (2008). Crossing Boundaries with Secondary Analysis: Implications for Archived Oral History Data. Retrieved 02 June 2012, from University of Essex: http://www.restore.ac.uk/archiving_qualitative_data/projects/archive_series/documents/ArchivedEthicsandArchivesEssex19-0-.08JBornat_000.pdf

Braa, J. r., Monteiro, E., & Sahay, S. (2004). Networks of Action: Sustainability Health Information Systems Across Dveloping Countries [Article]. *MIS Quarterly, 28*(3), 337-362.

Buch, K. (2009). Adaptability: A Crucial Organizational and Personal Skill. Retrieved 14 October 2010: http://www.thepublicmanager.org/pdf/2009%20Adaptability%20v2.0.pdf

Burn, J., & Robins, G. (2003). Moving Towards E-Government: A Case Study of Organizational Change Process *Logistics Information Management, 16*(1), 25-35.

Cameron, K. S. (1984). Organizational Adaptation and Higher Education. *The Journal of Higher Education, 55*(2), 122-144.

Chan, Y. (2002). Why haven't we mastered alignment? The important of the informal organization structure. *MIS Quarterly Executive 1*(2), 97-112.

Cook, M. E., LaVigne, M. F., Pagano, C. M., Dawes, S. S., & Pardo, T. A. (2002). Making a Case for Local E-Government. *Center for Technology in Government* Retrieved 22 April, 2010, from http://prof.incheon.ac.kr/~sjinwan/egov/chamgo/Making%20a%20case%20for%20e-Local_Government.pdf

Cooper, R. B., & Zmud, R. W. (1990). Information Technology Implementation Research: A Technological Diffusion Approach. *Management Science, 36*(2), 123-139.

Davenport, T. H. (1993). Need Radical Innovation and Continuous Improvement? Integrate Process Reengineering and TQM. *Planning Review 21*(3), 6-12.

Deakins, E., & Dillon, S. M. (2002). E-Government in New Zealand: the Local Authority Perspective. *The International Journal of Public Sector Management, 15*(5), 375-398.

Denison, D. R., & Mishra, A. K. (1995). Toward a Theory of Organizational Culture and Effectiveness. *Organizational Science 6*(2), 204-223.

Devadoss, P. R., Pan, S. L., & Huang, J. C. (2003). Structurational analysis of e-government initiatives: a case study of SCO. *Decision Support Systems, 34*(3), 253-269.

Ebrahim, Z., & Irani, Z. (2005). E-Government Adoption: Architecture and Barriers. *Business Process Management Journal, 11*(5), 589-611.

Evans, D., & Yen, D. C. (2006). E-Government: Evolving Relationship of Citizens and Government, Domestic, and International Development. *Government Information Quarterly, 23*(2), 207-235.

Farholt, B., & Wahid, F. (2008). E-Government Challenge and The Role of Political Leadership in Indonesia: The Case of Sragen *Proceedings of the 41st Hawaii International Conference on System Sciences - 2008*, 1-10.

Fichman, R. G., & Kemerer, C. F. (1997). The Assimilation of Software Process Innovations: An Organizational Learning Perspective. *Management Science, 43*, 1345-1363.

Folstad, A., Jorgensen, H. D., & Krogstie, J. (2004). Users Involvement in E-Government Development Projects. *Nordic Conference on Human-Computer Interaction: Proceedings of the third Nordic Conference on Human-Computer Interaction, 82*, 217-224.

Ginzberg, M. J. (1980). An organizational contingencies view of accounting and information systems implementation. *Accounting, Organizations and Society, 5*(4), 369-382.

Guha, S., Grover, V., Kettinger, W. J., & Teng, J. T. C. (1997). Business Process Change and Organizational Performance: Exploring an Antecedent Model. [Article]. *Journal of Management Information Systems, 14*, 119-154.

Hammersley, M. (2007). Towards a Usable Past for Qualitative Research. *International Journal of Social Research Methodology, 7*(1), 19-27.

Heaton, J. (1998). Secondary analysis of qualitative data. Retrieved 04 May 2012, from University of Surrey: http://sru.soc.surrey.ac.uk/SRU22.html

Heeks, R. (2002a). E-Government in Africa: Promise and Practice. *Information Polity, 7*(2-3), 97-114.

Heeks, R. (2002b). Information Systems and Developing Countries: Failure, Success, and Local Improvisasions. *The Information Society, 18*(2), 101-112.

Heeks, R. (2003). Most E-Government for Development Projects Fail: How can Risks be Reduced? Retrieved 15 November, 2009, from http://unpan1.un.org/intradoc/groups/public/documents/CAFRAD/UNPAN011226.pdf

Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal, 32*(1), 472-484.

Ho, A. T.-K. (2002). Reinventing Local Governments and The E-Government Initiative. *Public Administration Review, 62*(4), 434-444.

Hofstede, G. (Writer). (1984). Cultural Dimensions In Management And Planning [Article], *Asia Pacific Journal of Management*: Springer Science & Business Media B.V.

Howell, W. C., & Cooke, N. J. (1989). Training the Human Information Processor: a Review of Cognitive Models. In I. L. Goldstein (Ed.), *Training and Development in Organizations* (pp. 121-182). San Fransisco: Jossey-Bass.

Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research, 15*(9), 1277-1288.

Huber, G. P. (1991). Organizational Learning : The Contributing Processes and The Literature. [Article]. *Organization Science, 2*, 88-115.

Hwang, J., & Syamsuddin, I. (2008). Failure of E-Government Implementation: a Case Study of South Sulawesi. *Proceeding of the 2008 Third International Conference on Convergence and Hybrid Information Technology. , 2*, 952-960. Retrieved from http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=04682369

Ke, W., & Wei, K. K. (2004). Successful E-Government in Singapore. *Communications of The ACM, 47*(6), 95-99.

Kim, H. J., Pan, G., & Pan, S. L. (2007). Managing IT-enabled transformation in the public sector: A case study on e-government in South Korea. *Government Information Quarterly, 24*(2), 338-352.

Kim, L. O., Zailani, S., Ramayah, T., & Fernando, Y. (2009). Factors Influencing Intention to Use E-Government Services Among Citizens in Malaysia. *International Journal of Information Management, 29*, 458-475.

Kim, S., Kim, H. J., & Lee, H. (2009). An Institutional Analysis of an E-Government Systems for Anti Corruption: The Case of OPEN. *Government Information Quarterly, 26*(1), 42-50.

Krishna, S., & Walsham, G. (Writer). (2005). Implementing public information systems in developing countries: Learning from a success story [Article], *Information Technology for Development*: Taylor & Francis Ltd.

Kumar, R., & Best, M. L. (2006). Impact and Sustainability of E-Government Services in Developing Countries: Lessons Learned from Tamil Nadu, India. *The Information Society, 22*(1), 1-12.

Li, B. (2005). On the Barriers to the Development of e-Government in China. *ACM International Conference Proceeding Series; Proceeding of 7th International Conference on Electronic Commerce 113*, 549-552. Retrieved from http://portal.acm.org/citation.cfm?id=1089650

Luftman, J., & Brier, T. (Writer). (1999). Achieving and Sustaining Business-IT Alignment [Article], *California management review*: California Management Review.

Luk, S. C. Y. (2009). The impact of leadership and stakeholders on the success/failure of e-government service: Using the case study of e-stamping service in Hong Kong. *Government Information Quarterly, 26*(4), 594-604.

Macome, E. (2008). On the Implementation of Information System in the Mozambican Context: The EDM Case Viewed Through ANT Theory Lenses. *Information Technology for Development, 14*(2), 154-170.

Misund, G., & Hioberg, J. (2003). Sustainable Information Technology for Global Sustainability. Retrieved 14 December 2010: http://www.ia.hiof.no/~gunnarmi/omd/dig_earth_03/

Mitchell, R. B. (1998). Sources of Transparency: Information System in International Regimes. *International Studies Quarterly, 42*, 109-130.

Montealegre, R. (1998). Managing information technology in modernizing [`]against the odds': Lessons from an organization in a less-developed country. *Information & Management, 34*(2), 103-116.

Moon, M. J., & Norris, D. F. (2005). Does Managerial Orientation Matter? The Adoption of Reinventing Government and E-Government at the Municipal level. [Article]. *Information Systems Journal, 15*(1), 43-60.

Pezzey, J. (1992). Sustainability: An Interdiciplinary Guide. *Environmental Values, 1*, 321-362.

Rainey, H. G., & Bozeman, B. (2000). Comparing Public and Private Organizations: Empirical Research and the Power of the A Priory. *Journal of Public Administration Research and Theory, 10*(2), 447-469.

Reddick, C. G., & Frank, H. A. (2007). The perceived impacts of e-government on U.S. cities: A survey of Florida and Texas City managers. *Government Information Quarterly, 24*(3), 576-594.

Reidl, R. (2003). Design Principle for E-Government Services. *Proceedings of E-Gov Day*. Retrieved from http://www.ifi.uzh.ch/egov/Wien03.pdf

Schwarz, G. M. (2002). Organizational Hierarchy Adaptation and Information Technology. *Information and Organization, 12*, 153-182.

Shang, S., & Seddon, P. B. (2002). Assessing and managing the benefits of enterprise systems: the business manager's perspective. [Article]. *Information Systems Journal, 12*, 271-299.

Shareef, M. A., Archer, N., Kumar, V., & Kumar, U. (2010). Developing Fundamental Capabilities for Successful E-Government Implementation. *International Journal of Public Policy, 6*(3-4), 318-335.

Sharifi, M., & Manian, A. (2010). The Study of the Success Indicators for Pre-Implementation Activities of Iran's E-Government Development Projects. *Government Information Quarterly, 27*(1), 63-69.Syamsuddin, I. (2011). Evaluation of E-Government Innitiatives in Developing Countries: An ITPOSMO Approach. *International Research Journal of Applied and Basic Sciences, 2*(12), 439-446.

Teofilovic, N. (2001). The Reality of Innovation in Government. *Online at: http://www.innovation.cc/peer-reviewed/reality.pdf . Accessed on 04 January 2010*.

Tseng, P. T. Y., Yen, D. C., Hung, Y.-C., & Wang, N. C. F. (2008). To explore managerial issues and their implications on e-Government deployment in the public sector: Lessons from Taiwan's Bureau of Foreign Trade. *Government Information Quarterly, 25*(4), 734-756.

UNPAN. (2002). Progress Report of Integrated e-Government Pilot Project in Indonesia. Retrieved 21 April 2012, from Telkom Indonesia: http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan012308.pdf

Welch, E. W., & Pandey, S. K. (2006). E-Governmnent and Bureaucracy: Toward a Better Understanding of Intranet Implementation and Its Effect on Red Tape. *JPART 17*, 379-404.

Wimmer, M. A. (2002). A European perspective towards online one-stop government: the eGOV project. *Electronic Commerce Research and Applications, 1*(1), 92-103.

Wong, W., & Welch, E. (2004). Does E-Government Promote Accountability? A Comparative Analysis of Website Openness and Government Accountability. [Research]. *Governance: An International Journal of Policy, Administration, and Institutions, 17*(2), 23.

Zhang, J., Dawes, S. S., & Sarkis, J. (2005). Exploring Stakeholders' Expectations of the Benefits of e-government Knowledge Sharing. *The Journal of Enterprise Information Management, 18*(5), 548-567.