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RESOURCE ENACTMENT IN E-GOVERNMENT SYSTEMS IMPLEMENTATION: A CASE STUDY ON THE E-FILE SYSTEM IN SINGAPORE

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Abstract

Discerning the prevalence of e-government systems implementation internationally and an insufficiency in research on this contemporary phenomenon, this research adopted a case study methodology in analyzing the implementation of the E-File System in a Singaporean government agency. The analysis was conducted by leveraging the resource-based view and the enactment concept as the theoretical guide. This yielded a process model of resource enactment in the implementation of the e-government system and provided answers to the research question of 'How are capabilities developed in the implementation of e-government systems?' and the associated question of 'What are the capabilities involved in e-government systems implementation?'. The concept of resource enactment is advanced through the analysis. In conclusion, theoretical and practical implications as well as suggestions for future research are offered.

Keywords: E-government, resource-based view, resource enactment, enactment, case study

Introduction

To stay relevant in this rapidly changing, information-rich, and knowledge-intensive environment, public organizations have been undergoing transformation and reform to focus on service quality and being customer-oriented (Jones and Thompson 1999). Moreover, it has been argued that as people increasingly experience good quality service from private organizations, they will become less tolerant of poor services from public organizations and expect them to reduce cost while maintaining or even increasing their level of service (Holmes 2001). Consequently, governments have been 'under considerable pressure to adopt the values and operational techniques of the private market sector' (Box et al. 2001, pg. 608) to improve their performance and enhance their capability (Eikenberry and Kluver 2004). In response, many forward-looking governments around the world have since put in place various reformation programs in hope of achieving better performance.

In these reformation programs, ICT (Information & Communication Technology) has often been featured to play a considerable role in delivering enhanced performance through various e-government initiatives (Hinnant and O'Looney 2003; Holmes 2001; Jones and Thompson 1999). E-government can be broadly defined as the use of ICT to facilitate the business of government (UN and ASPA 2002) in bringing about greater customer orientation, enhanced efficiency, improved effectiveness (Watson and Mundy 2001), greater faith among the citizenry toward the government (Cahill et al. 2004), reduced bureaucracy (Fountain 2001), and even as an impetus to catalyze national development (Ma et al. 2005). In fact, apart from developed countries like the U.S., many developing countries, like China (Ma et al. 2005), are also investing heavily in implementing e-government systems (AFP 2003;

Grant and Chau 2005). Thus, the implementation of e-government systems is fast becoming a global phenomenon. However, despite the billions of dollars invested into the implementation of e-government systems (AFP 2003; Businesswire 2002), the envisioned benefits of e-government continued to be persistently elusive (Ke and Wei 2004; Heeks 2006). Moreover, research on this global phenomenon of e-government systems implementation has remained nascent (Gronlund and Horan 2004; Schelin 2003), with the existing literatures being largely rhetorical rather than empirical (Chan et al. forthcoming; Hinnant and O'Looney 2003).

This paper intends to alleviate this deficiency by asking the research question of 'How are capabilities developed in the implementation of e-government systems?'. In answering this research question, the related question of 'What are the capabilities involved in e-government systems implementation?' will need to be addressed alongside. As the concept of capabilities is rooted in the resource-based view (RBV) (Teece et al. 1997; Eisenhardt and Martin 2000; Montealegre 2002), the RBV was adopted as an analytical sense-making lens. In addition, the enactment concept (Boudreau and Robey 2005; Orlikowski 2000; Weick 1979, 2001) was also introduced to aid the theorizing of the capabilities development process, as it afforded the notion of human agency and aligned with the understanding that ICT systems implementation is a intrinsically socio-technical intervention (Hirschheim et al. 1991; Kim and Kaplan 2006). Such a synthetic employment of RBV and the enactment concept in the analysis of the case data enabled the derivation of a process model of resource enactment in e-government systems implementation. Moreover, the analysis also identified the focal capabilities and the symbiotic enactment of complementary resources at different phases of the e-government systems implementation process. In addition to elucidating the global phenomenon of e-government systems implementation, the results of this study also contribute a systemic understanding of how resources can be enacted in shaping the process and outcome in the implementation of ICT systems, of which e-government systems is an instance.

E-government

Governments were among some of the early adopters of modern day ICT (Bozeman and Bretschneider 1986), where most of these early applications focused on the use of ICT to automate internal backend operations (Gronlund and Horan 2004). The emergence of the Internet marked a watershed as governments began to experiment with leveraging ICT to support their external dealings with their citizenry (Ho 2002). This shift of focus was also partly motivated by the global thrust of the New Public Management movement, which often emphasized the use of ICT as a change catalyst to transform the government from its bureaucratic and inflexible stereotype to one that will be customer-oriented and efficiency-conscious (Davison et al. 2005; Heeks 2006).

As earlier noted, e-government can be broadly defined as the use of IT to facilitate the business of government. Nevertheless, as the business of government is extremely diverse (Grant and Chau 2005), a range of new terms has been formulated to further streamline the vast concept of e-government. Some of these new terms include: e-governance (e.g. Tan et al. 2005), e-democracy (e.g. Anttiroiko 2003), e-service (e.g. Hinnant and O'Looney 2003), e-consultation (e.g. Whyte and Macintosh 2002) and e-Voting (e.g. Moynihan 2004). Among these various focuses on e-government, the spotlight has often been directed toward e-services (Al-Kibsi et al. 2001; Evangelidis 2004; Layne and Lee 2001), which can be succinctly defined as the use of IT for the delivery of government information and services to its customers. Lenk (2002) had gone even further to single out e-service as a key driver of public sector modernization.

The e-government system that was examined in this research was a system that was meant for the delivery of e-service. Differing from most conventional ICT systems implementation, the implementation of e-service based e-government system often required more direct interaction with the external citizenry that will be impacted by the implementation of the system. Moreover, with a greater potential user base, such systems often have more stringent requirements in terms of robustness and scalability (Chan et al. forthcoming) as well as more intense engagement of various stakeholders during its implementation (Chan et al. 2003; Tan et al. 2005). Nevertheless, apart from the literature on the implementation of generic ICT systems (e.g. Markus and Mao 2004; Xia and Lee 2005), little knowledge has been expounded on the internationally pervasive phenomenon of e-government systems implementation. To address this deficiency, this study aspired to examine the capabilities involved in the implementation of e-government systems. Given that the concept of capabilities was developed from the RBV (Teece et al. 1997; Eisenhardt and Martin 2000; Montealegre 2002), RBV is utilized as the conceptual lens.

Resource-based View

The RBV is widely acknowledged to be grounded upon the seminal work of Penrose (1959), who argued that organizations are essentially composed of a collection of organization specific resources. It is the ability of the organization's management in combining these resources to exploit market opportunities that determines the performance of an organization (Collis and Montgomery 1995).

Resources are defined to be the most basic unit of analysis in the production process of any organization (Gant 1991). Resources can exist in either a tangible or an intangible form (Collis and Montgomery 1995; Wernerfelt 1984). A common example of tangible resource is financial resource, while knowledge resource (Nonaka 1994; Tanriverdi 2005) and social resource, which can be understood as the organizational quintessence of relationships, norms, and culture (Adler and Kwon 2002; Feldman 2004), are examples of intangible resources. Despite the traditional tendency to overlook the importance of intangible resources (Grant 1991), it has been proposed that intangible resources are more susceptible to produce advantageous outcomes (Carmeli and Tishler 2004; Hart 1995).

In studying how organizations innovate and transform themselves, Nelson and Winter (1982) found that the basis of organizational innovation and transformation lies in their ability to leverage the embedded organizational routines and processes to deploy organizational resources. Unfortunately, they have fallen short of formalizing a theoretical proposition to consider such ability, attributing to 'the academic literature on capabilities stalled for a couple of decades' (Teece et al. 1997, p. 513). But since the early 1990s, numerous scholars have begun to build upon Nelson and Winter (1982) in developing the concept of capabilities in organization (e.g. Collis 1994; Eisenhardt and Martin 2000; Montealegre 2002; Teece et al. 1997). Although 'there are almost as many definitions of organizational capabilities as there are authors on the subject, ...they all concern the ability of the firms to perform an activity (be it static, dynamic or creative) more effectively than competitors with otherwise similar resource endowments' (Collis 1994, p. 144-145). Furthermore, it is increasingly being acknowledged that capabilities are the key determinants of organizational performance (e.g. Eisenhardt and Martin 2000; Melville et al. 2004; Wade and Hulland 2004).

The development of capabilities is also popularly accepted to be path dependent as the gradual evolutionary path undertaken by the capability development process directly impacts the resultant capability (Collis 1994; Eisenhardt and Martin 2000; Zahra and George 2002). This also implied that the development of capability is a longitudinal process that occurs over a period of time (Santhanam and Hartono 2003; Teece et al. 1997). Despite path dependency, it does not necessarily mean that there is only one specific path which the development of a particular capability definitely has to undergo. On the contrary, there are a multitude of possible paths that can lead to the realization of any one particular type of capability (Barney 2001; Bowman 2001; Eisenhardt and Martin 2000).

In the Information Systems literature, it has been revealed that the mere implementation of an ICT system alone does not assure the production of performance improvements (Clemons and Row 1991; Powell and Dent-Micallef 1997). Instead, studies have shown that organizational performance improvements can be observed when the implementation of an ICT system is accompanied by the presence of complementary organizational resources (Mata et al. 1995; Santhanam and Hartono 2003). Moreover, these complementary organizational resources are often posited as belonging to the category of intangible resources such as social resource (Piccoli and Ives 2005; Wade and Hulland 2004) and knowledge resource (Melville et al. 2004; Tippins and Sohi 2003). However, there is an absence of a systematic, empirically based conceptualization of how resources are configured during ICT system implementation to create organizational performance improvements (Sambamurthy et al. 2003). The enactment concept (Boudreau and Robey 2005; Orlikowski 2000; Weick 1979, 2001) was thus introduced to aid the theorizing of capability development in e-government system implementation, as it affords the notion of human agency and allows for the conceptualization of the resource configuration process as a form of enactment.

Enactment Concept

Enactment is a key constituent process of organizing (Weick 1979, 2001). The underlying theme of the enactment process is human agency (Boudreau and Robey 2005; Weick 2001), emphasizing the action of human agents in fulfilling certain emergent outcomes. Orlikowski (2000, p. 425) noted that the notion of enactment conveys the sense of 'to constitute, actuate, perform' or 'to represent in or translate into action'. It embodies 'the central point that when people act, they bring events and structures into existence and set them in motion.' (Weick 1988, p. 306) It focuses on the notion of social practices as embedded, embodied, and materialized aspects of human agency in constituting particular social outcomes (Orlikowski and Yates 2002). As human actions are highly dynamic and

malleable, the enactment process is neither predictable nor easy to control (Boudreau and Robey 2005). In essence, enactment can be understood as a set of material and symbolic actions (Smircich and Stubbart 1985) that produces new organizational structures and resources as well as creates organizational constraints and opportunities. It can be effected through a series of organizational processes and routines (Feldman 2004) that mobilize existing organizational structures and resources (Orlikowski 2000) to realize certain emergent outcomes (Fountain 2001; Walsham 1993).

The enactment process is also known to be coupled with the contextual environment (Weick 1979; 2001). Organizational human agents are able to act in response to various environmental stimuli through enactment (Daneels 2003; Fountain 2001). It is also through enactment that organizational human agents intrusively construct the environment they reside in (Rindova et al. 2004). Thus, both the enactment process and the environment impinge upon each other (Pawlowski and Robey 2004; Reed 1997). Moreover, earlier enactment has an impact on subsequent enactment (Fountain 2001) as organizational human agents enact events that shape subsequent enactments (Orton 2000; Osborne et al. 2001). Thus, the enactment process is also a path-dependent and self-limiting process (Daneels 2003).

The enactment concept has previously been applied to the study of ICT system (e.g. Boudreau and Robey 2005). These studies affirmed the role of ICT system as an enabler of organizational change. At the same time, it has also been illustrated that the potential of ICT system to effect organizational change is contingent on how the implemented ICT system is enacted by human agents in the organization (Orlikowski and Barley 2001). The enactment of ICT system usage does not necessitate the human agent to exercise total free will, as the human agent may be 'transformed into an agent of the socially constructed world of the organization' (Lee 1994, p. 151). Fountain (2001, p. 89) further argued that the enactment of ICT system 'is the result of various cognitive, cultural, structural and political embeddedness.' Boudreau and Robey (2005) also alluded that the enactment process is arbitrated by organizational resources such as knowledge and social capital through a process of social construction.

Both Boudreau and Robey (2005) and Orlikowski (2000) have also demonstrated that the enacted usage of an ICT system may not necessarily abide with its original design or intended usage. Every 'engagement with a technology is temporally and contextually provisional, and thus there is, in every use, always the possibility of a different structure being enacted' (Orlikowski 2000, p. 412).

While existing studies applying the enactment concept have largely focused on the usage of ICT (e.g. Boudreau and Robey 2005; Orlikowski 2000), it has been noted that the engagement of human agency is greater during the earlier phases of ICT system implementation rather than later, e.g. during its usage (Orlikowski 1992). This research thus examined the engagement of human agency in the implementation of an e-government system by leveraging the enactment concept.

To reiterate, this research intends to examine the process of e-government systems implementation through the theoretical lens of the RBV and the enactment concept to arrive at a process model of e-government systems implementation. Through such an endeavor, it is anticipated that the answers to the research question of 'How are capabilities developed in the implementation of e-government systems?' and the associated question of 'What are the capabilities involved in e-government systems implementation?' can be derived.

Research Method

This research was conducted as an interpretive case study (Klein and Myers 1999; Walsham 1995) and the empirical data was based on the implementation of the E-File System at the Alpha Agency (AA) in Singapore. Santhanam and Hartono (2003) had stressed the importance of selecting recognized industrial leaders when investigating ICT-related capabilities. Such an emphasis was also in line with the principle of theoretical sampling in conducting case study (Eisenhardt 1989; Lee and Baskerville 2003). The selection of the AA case corresponded with this emphasis, as Singapore has been consistently ranked in different e-government league tables to be among the top internationally (Accenture 2005; Dutta and Lopez-Claros 2005; UN 2005), and the E-File System is among one of the often cited exemplar of e-government system implementation in Singapore. Furthermore, AA has also won numerous awards in association with its implementation of the E-File System. For these reasons, it was decided that this case study on the AA will be valuable in offering elucidating insights to inform both the research and the practice of e-government systems implementation for government agencies in other countries.

The three main sources of qualitative research data, i.e., (i) in-depth, open ended interviews, (ii) observation, and (iii) written document (Patton 1990), were collected in this case study. Interviews were conducted between May and July 2005 with officers in AA who were involved in the implementation of the E-File System, as well as with the system developers and different external users of the E-File System. The interviewed officers in AA came from a cross section of the agency, ranging from the CEO to the frontline officers and representing a diversity of organizational divisions in AA. Table 1 provides a summary of these interviews. All interviews were recorded with the consent of the interviewees and were subsequently transcribed. During this period, observations were made on the operations at the premise of AA as well as through exploratory usage of the E-File System. Relevant documents pertaining to the E-File System were also collated from AA where possible. In addition, secondary data in form of news articles on the AA and the E-File System was also collated.

	AA Officers	System Developer	External Users/Stakeholders	Total
Number of Interviews	20	3	9	32
Approximate Hours of Interviews	24	3	8	35

An interpretive approach (Klein and Myers 1999; Walsham 1993, 1995) was used in analyzing the collected data, with the RBV and the enactment concept being utilized as conceptual lenses during data analysis (Lee and Baskerville 2003; Walsham 1995). Literature on e-government as well as ICT systems implementation were also referenced to inform the data analysis process. The data was first organized into the three conceptual implementation phases of planning, developing, and operating through open coding (Strauss and Corbin 1998) so as to identify the resources and capabilities involved in the implementation of the E-File System. Axial coding (Strauss and Corbin 1998) was done to further define the identified resources and capabilities into different types. At the same time, the enactments of the various resources were also identified. This gave rise to the concept of resource enactment, which can be understood as the behavior and actions of human agents in constituting organizational resources. Finally, selective coding (Strauss and Corbin 1998) was conducted to further refine the analysis toward parsimony and consistency. For instance, although numerous types of resources were identified during open and axial coding, these were amalgamated into only three generic and pertinent types of knowledge resource (e.g. procedure knowledge/know-how, declarative knowledge/know-what, and transactive memory/know-who), social resource (e.g. culture, organizational practices/norms, historical legacy, trust, stakeholder relationship, and commitment) and leadership resource (e.g. strategic support/champion, leadership) during selective coding. Although these three levels of analysis are noted sequentially here, the entire analysis actually occurred in a highly iterative fashion (Strauss and Corbin 1998; Walsham 1993).

Case Background

Like many countries in the world, the application of certain licenses in Singapore used to be an unwieldy process, typified by the filing of multiple paper documents and long queues at the counters. At the Alpha Agency (AA), about two weeks were needed between the filing of the application and the ultimate issuance of the licenses. The voluminous amount of backend data entry and the bulk of paper documents that accompanied the filing of every application often resulted in latency in the timely updating of information on the database. Moreover, with the pressure to clear the data entry backlog, temporary clerks had to be recruited to expedite the data entry jobs. Typographical errors were also prone to occur, resulting in data discrepancies and sometimes even disputes.

In 2000, AA began to explore ways to improve their operational performance and their customer service. An interviewee from AA described:

“We were [already] doing our best to shorten processing time, shorten updating time, extending hours, etc. But there is only so much a human being can do... We were looking at our timelines and time frames, [we’re] already working at our utmost. ... [But] when you looked around the world, our standards were [not impressive]...The people, the [external users] that we were dealing with [were getting] more demanding and they’re not unreasonable demands.”

Indeed, it was possible to understand the intensifying demands from the external users as piles of supporting documents had to be submitted and multiple trips had to be made before a license can be finally issued. An informant from AA explained the rationale behind employing ICT in their endeavor to improve the situation through the E-File System:

“[We] recognized how much ICT could do for us, to help us perform our jobs. Over time, ICT has developed so rapidly. It has taken on all kinds of forms and development and you could make use of it and exploit it to do many things. We already had the kind of environment where, [whenever] you wanted to do something new or you wanted to do something better, the thinking was already to look first at how ICT could help you... So, the mindset was already there that ICT could provide a lot of solutions.”

Analysis and Discussion

Planning Phase: Developing the Capability to Be Innovative

The planning of the E-File System implementation began in 2000. During this period, there were a couple of imperatives from the environment that required AA to be innovative in planning for the implementation of the E-File System. The first imperative was the escalating demands from the external users for more expeditious services. This was coupled with the broader transformational climate for e-government within the Singapore government. This came in the form of the E-government Action Plan (eGAP), which envisioned to “*delight customers*” with convenient and easy to use e-services. The eGAP served as an institutionalized strategic imperative and facilitated the implementation of e-government systems like the E-File System. This was expressed by a member of AA’s senior management:

“Many of the things that we hoped to put in place were quite radical...if the [parent] Ministry was not supportive of the e-government initiatives [i.e., eGAP]; I believe we would have a harder task persuading them [to implement the E-File System].”

Hence, the milieu during the planning phase of the E-File System implementation was considered to be an *imperative environment*, where the twin strategic imperatives of customer demand and the Singapore Government’s strategic intent for e-government became impetuses for the implementation of the E-File System. The novelty of the idea at that time coupled with the absent of pre-existing knowledge in undertaking such a bold and massive Internet based technological initiative required AA to focus on the *capability to be innovative* in planning for the implementation of the E-File System. For instance, cognizant of the need to conduct appropriate process re-engineering in implementing the E-File System, AA recruited the expertise of external consultants to help in reengineering existing processes. Moreover, overseas study trips were also conducted to learn from two other countries which have already implemented similar e-filing systems. As documented in one of the study reports generated from these overseas study trips, the purpose of these study trips were:

“To enable [AA] to understand how such a system actually operates in a real live environment and how it can be adapted for use in our own proposed E-File Project.”

Therefore, the *knowledge resource* appeared as the focal resource in developing the capability to be innovative (Leonard and Sensiper 1998). As the enactment of *knowledge resource* was based on collaboratively leveraging upon the knowledge of parties that were external to AA, the process of knowledge resource enactment was termed as *surrogating*. In addition, the enactment of both the *social resource* and the *leadership resource* were observed to augment the enactment of *knowledge resource*.

The *social resource* that was enacted basically took on the form of the congenital norm of active ICT exploitation in AA. The establishment of this norm can be traced to the early 1980s, when there was a government wide Civil Service Computerization Program focusing on backend operations automation. In planning for the implementation of the E-File System, AA attempted to enact the *social resource* through an opportunistic exploitation of this congenitally endowed *social resource*. Consequentially, such an enactment of *social resource* was termed as *capitalizing*. By *capitalizing* on the congenital *social resource*, it was found that AA was able to facilitate the *surrogating* of *knowledge resource*. For instance, as AA was endowed with the congenital norm of active ICT exploitation, the necessity of engaging external consultants to conduct a comprehensive process re-engineering study required little justification as the need for process re-engineering in implementing the E-File System was already well understood. Thus, by *capitalizing* on the congenital norm, AA managed to secure the needed funds for conducting the process re-engineering.

The *leadership resource* was also observed to be enacted in a manner that augmented the *surrogating* of *knowledge resource* (Nonaka et al. 2000). This was especially apparent in the *surrogating* of *knowledge resource* from external parties (Inkpen 2005). In planning for the E-File System implementation, the senior management instituted and even chaired dialogue sessions to gather the feedbacks and opinions of external users. These feedbacks and opinions were subsequently incorporated into the design of the E-File System. The intention for doing this was revealed by a senior officer in AA:

“[We] tried to establish from the beginning that this was going to be a radical change for... all those people out there who have been doing business with us all these years. There was a necessity to buy them over.”

The senior management team was also actively involved in advocating and planning for the implementation of the E-File System. Thus, they were perceived to be “*walking the talk*” and providing a role model for the rest of the officers in AA. As the *leadership resource* was enacted through a visible advocacy and exemplary role modeling by the senior management team, the enactment of the *leadership resource* was termed as *championing*.

Hence, the environmental climate was found to be *imperative* and a corresponding focus on developing the *capability to be innovative* was identified. The development of the *capability to be innovative* was achieved through focusing on the enactment of the *knowledge resource* through *surrogating*. Moreover, the *capitalizing* of *social resource* and the *championing* of *leadership resource* were also found to have supported the *surrogating* of *knowledge resource*.

Developing Phase: Developing the Capability to Be Adaptive

After months of planning, the tender for the development of the E-File System was called and was awarded to a locally based systems integrating firm in mid 2001. Change was a constant during this phase, and most of the changes were instigated by some environmental factors. For example, as the E-File System was eventually developed on a pre-existing technical platform, AA did not have a total free reign in the design and functionality of the technical platform. In face of such constraints, organizations often undergo adaptation by making improvisational work-around (Orlikowski and Hofman 1997), which was what AA attempted to do.

AA also made adaptive adjustment in working with the new vendor. When two unacquainted organizations first establish a new working relationship with each other, frictions and conflicts are known to occur due to a lack of mutual understanding and trust (Arino and Torres 1998). Notwithstanding, constructive outcomes can be achieved through careful communications and adaptation (Chan et al. 2003). This was how AA managed their relationship with the new vendor and made headways in developing the E-File System.

Effort was also made to adapt those AA officers who were affected by the implementation of the E-File System, as some were anxious about their ability to cope with new technologies and some were apprehensive about the risk of being made redundant (Pinsonneault and Kraemer 2002; Venkatesh and Davis 2000). Thus, effort was made to allay the anxiety of affected AA officers.

In view of the adaptive changes occurring during this phase, the environmental climate was termed as *commutative*. In such a *commutative* environment, the focal capability in AA was observed to be the *capability to be adaptive*. Indeed, organizations are known to adopt adaptive stance in dealing with a *commutative* environment (Boudreau and

Robey 2005; Orlikowski 2000). Human are known to be change averse (Denrell & March 2001), and the mismanagement of *social resources* is a key cause of failure in the implementation of ICT systems (Jiang et al. 2006). AA was observed to have focused on the enactment of *social resource* throughout the developing phase. Moreover, *leadership resource* and *knowledge resource* were enacted supportively to support the enactment of *social resource*.

The enactment of social resource was observed in the manner in which AA related with the different stakeholders implicated by the implementation of the E-File System. In addition to having dialogue sessions with the external users, training seminars were also provided to equip them with the relevant skill and knowledge to use the E-File System. Such developmental endeavor can help in nurturing a greater sense of confidence and commitment among the external users (Gallivan et al. 2005). Besides training the external users, experiential training was also provided for AA officers to test and experiment with the testing environment of the E-File System.

In working with the vendor, it was observed that AA concentrated on cultivating a better degree of mutual understanding with them. A Steering Committee co-chaired by the CEOs of AA and the vendor firm was established to provide strategic oversight in steering the implementation forward. An interviewee from AA provided insight into the perception of such a move:

“They chaired this Steering Committee together...the two highest [executives] from both sides came together...So that will tell you the kind of commitment placed on this project”.

Communications with the vendor was also carefully managed in order to inculcate better mutual understanding. Another interviewee from AA shared:

“Sometimes we had to explain a few times to make sure that what we had communicated was what they understood... so to avoid [misunderstanding], we put everything into writing, into documentation, to make sure that it's expressed properly... So sometimes, a bit of time was required to actually pass on the knowledge so that everybody was on the same plane.”

As the enactment of *social resource* was largely based on the developmental engagement and training efforts invested by AA in handling its relationships, the enactment of *social resource* was termed as *cultivating*.

Leadership resource was also found to be enacted in a way that supported the *cultivating* of *social resource*. The senior management was prompt in allaying the concerns of the officers by assuring them of their job security. The senior management also affirmed AA's commitment to help them in adapting to the impending changes and motivated the officers to rise to the challenge in scaling higher service standards for the citizenry. This was done chiefly during “*Viewpoints*” sessions where the senior management will meet the line officers according to their departments. As the enactment of *leadership resource* coincided with the transformational style of leadership, where followers are moved ‘beyond immediate self-interests through idealized influence (charisma), inspiration, intellectual stimulation, or individualized consideration’ (Bass 1999, p.11), it was termed as *transforming*.

The enactment of *knowledge resource* was also found to support the *cultivating* of *social resource*. This was most prevalent in the form of *knowledge resource* known as transactive memory (Austin 2003), which can be simply defined as the knowledge of who knows what, and was most evidently enacted in the relationship between AA and the vendor. The vendor development team was located at AA's premise throughout the development of the E-File System. This helped the vendor to quickly build up transactive memory and contextual knowledge about AA's operations through constant interaction and active observation. Subsequently, such knowledge also facilitated the *cultivating* of *social resource* in terms of boosting trust and mutual understanding between AA and the vendor. As the enactment of *knowledge resource* revolved around the purposeful diffusion and inculcation of appropriate *knowledge resource*, it was termed as *imbuing*.

Therefore, the focus was found to be on developing the *capability to be adaptive* in the *commutative* environmental climate of the developing phase. The development of *capability to be adaptive* was achieved by concentrating on the *cultivating* of *social resource*. It was also found that the *transforming* of *leadership resource* and the *imbuing* of *knowledge resource* have supported the *cultivating* of *social resource*.

Operating Phase: Developing the Capability to Be Responsive

After much preparation and labor in developing the E-File System, the completed system was launched in early 2003. On the day of the launch, all counter services were terminated and the only way of transacting with AA was

through the E-File System. This resulted in a sudden surge of traffic onto the system and caused the E-File System to emanate signs of instability. An external user recalled:

“During [those] time, the filing of the information was so slow... [The system was] not that responsive. You click a button, [then] you had to wait for one, two or three minutes before you [can] see something.”

As crowds of disgruntled external users waited in the AA lobby to file their transactions at the self-service kiosks, a decision was made to reopen the counters and have the counter officers to help the external users with their transactions. Nevertheless, the turn around remained slow, and by about 5pm, there were still 40-50 agitated external users waiting. Moreover, the frontline officers, having faced the heat from the external users, were starting to feel demoralized and disenchanted with the newly launched E-File System. As the environment during this operating phase exhibited signs of dynamicity and volatility, it was thus termed as *propulsive*.

Such a *propulsive* environment necessitated AA to be highly responsive in responding to various issues. Organizations operating in a dynamic environment need to be sensitive and responsive and be capable of enacting resources in response to the volatility of the environment (Eisenhardt & Martin 2000; Sambamurthy et al. 2003; Teece et al. 1997). Although the developing phase also demanded AA to react to different challenges that arose from developing the E-File System, the speed and urgency of reaction required during the operating phase was a key differentiator between the two phases. For instance, in responding to the amassed external users at the lobby, AA promptly decided to reopen the counters. Subsequently, another decision was made to revert to paper forms as an interim measure in coping with the situation. Moreover, responsive actions were also taken to address the de-escalating morale of the officers and the instability suffered by the E-File System. As the central focus of AA during this phase was on being highly *responsive* to the situation presented by the *propulsive* environment, the focal capability was termed as the *capability to be responsive*.

The importance of the *leadership resource* has often been stressed in a *propulsive environment* as the *leadership resource* plays a strategic role in steering initiatives through unsettling clutter (Ireland & Hitt 2005). Unlike the earlier phases, where the enactment of the focal resource was supported by the enactment of the other two resources, the operating phase showed that the focal *leadership resource* actually drove the enactment of the *knowledge resource* and the *social resource*.

The senior management in AA took on a direct and personal interest in dealing with the various exigencies that arose. For example, *leadership resource* was enacted by the senior management when they choose to personally deal with the agitated external users at the lobby instead of remotely supervising the situation. This also helped to boost the morale of the officers, as it was perceived as an indication of solidarity. An interviewee from AA disclosed:

“Our CEO was very encouraging...She gave us a lot of encouragement and she was also involved [in handling the external users]... She is not a CEO who is an armchair [leader]. [Just] sit in her room and that's it.”

A member of the senior management also shared:

“This is something which is initiated by senior management; we are imposing this huge change on our officers. We should be there, seen to be part of that whole process.”

The senior management was also directly involved in calibrating the E-File System to an optimal state of operations. The CEO took a personal interest in chairing the post-mortem meetings and maneuvered the various parties involved in the development of the system to work collaboratively in resolving the instability. As the senior management assumed a direct and personal stance in leading the various parties in dealing with the situation, the enactment of the *leadership resource* was termed as *presiding*.

It was observed that the enactment of *knowledge resource* was also being driven by the *presiding* of *leadership resource*. This was clearly visible when the senior management brought the various parties together to resolve the instability experienced by the E-File System as the unique *knowledge resource* that each party was endowed with was evoked and shared. Since the enactment of *knowledge resource* was through boldly invoking relevant knowledge from various parties, it was termed as *conjuring*.

The *presiding* of *leadership resource* was also found to have driven the enactment of *social resource*. For instance, to bring the various parties to work collaboratively, the senior management attempted to build a common vision and a mutual goal among the various parties. This manifested not only the *presiding* of *leadership resource*, but it also evidenced the enactment of *social resource* as it led to the emergence of consensus and rapport among the parties

involved. Another illustration was the solidarity shown by the senior management in joining the front-line officers to deal with discontented external users. Such *presiding of leadership resource* by the senior management led to the emergence of *social resource* as it became a morale booster. As the enactment of the *social resource* during this phase revolved around the cordial assuagement of relationships, it was termed as *conciliating*.

Thus, the focus was found to be on the *presiding of leadership resource* in developing the *capability to be responsive* while operating in a *propulsive environmental climate*. It was also observed that the *presiding of leadership resource* instigated the *conjuring of knowledge resource* and the *conciliating of social resource*.

The process model as shown in Figure 1 was derived from the analysis of the E-File System implementation in AA. As illustrated in the model, the implementation process composed of three phases. Each phase was marked by an idiosyncratic environmental climate and focal capability. The focal capability for each phase was developed through the corresponding enactment of knowledge resource, social resource, and leadership resource. A focal resource was also identified for each phase. Furthermore, a unique term was coined to describe the manner in which each of the resources was enacted in the three different phases. The characteristics of the various types of resource enactment are summed up in Table 2.

Phase	Planning	Developing	Operating
Environmental Climate	Imperative	Commutative	Propulsive
Focal Capability	Capability to be Innovative	Capability to be Adaptive	Capability to be Responsive
Focal Resource	Knowledge Resource	Social Resource	Leadership Resource
Symbiotic Relationship Among Enactment of Resources			
	Figure 1. A Process Model of Resource Enactment in E-Government System Implementation		

Conclusion

In conclusion, this research has contributed to alleviating the current deficiency of empirical study on the nascent but yet internationally endemic phenomenon of e-government systems implementation. It has built upon the RBV and the enactment concept to advance the theoretical concept of resource enactment through the analysis of the E-File System implementation, resulting in the derivation of a process model of resource enactment and identified nine types of resource enactment. More significantly, it has offered a systemic understanding of how resources can be enacted in the implementation of ICT systems such as e-government systems.

The above analysis of the E-File System implementation also provided the basis upon which answers to the research question of ‘How are capabilities developed in the implementation of e-government systems?’ and the associated question of ‘What are the capabilities involved in e-government systems implementation?’ can be derived. In answering ‘What are the capabilities involved in e-government systems implementation?’, three unique focal capabilities were uncovered in each of the three implementation phases. During the planning phase, where the environmental climate was *imperative*, the focal capability was the *capability to be innovative*. During the developing phase, where the environmental climate was *commutative*, the focal capability was the *capability to be adaptive*. Finally, during the operating phase, where the environmental climate was *propulsive*, the focal capability was the *capability to be responsive*.

Table 2. Various Types of Resource Enactment in E-Government System Implementation		
Resource Type	Resource Enactment	Characteristic
Knowledge Resource	Surrogating	Collaboratively leveraging on the knowledge resource from external parties
	Imbuing	Purposefully diffusing and inculcating the required knowledge resource among relevant parties
	Conjuring	Boldly invoking the knowledge resource from relevant parties
Social Resource	Capitalizing	Opportunistically exploiting congenitally endowed social resource
	Cultivating	Developmentally engaging and training relevant parties to build up social resource
	Conciliating	Cordially assuaging relevant parties to build up social resource
Leadership Resource	Championing	Visibly advocating for the implementation and exemplarily providing role model for relevant parties
	Transforming	Actively changing the mindset and actions of relevant parties
	Presiding	Directly and personally leading relevant parties in coping with a situation

In answering the research question of ‘how are capabilities developed in the implementation of e-government systems?’, the above analysis has demonstrated that each of the focal capability was developed through some unique form of resource enactment. The *capability to be innovative* was developed chiefly through the *surrogating of knowledge resource*. Moreover, the *surrogating of knowledge resource* was supported by the *capitalizing of social resource* and the *championing of leadership resource*. The development of the *capability to be adaptive* was through the *cultivating of social resource*, which was supported by the *transforming of leadership resource* and the *imbuing of knowledge resource*. Finally, the *capability to be responsive* was developed through the *presiding of leadership resource*, which correspondingly drove the *conjuring of knowledge resource* and the *conciliating of social resource*.

Theoretical and Practical Implications

Both theoretical and practical implications can be drawn from the analysis of this case study. In terms of theoretical implication, the evolution of focal capabilities in congruence with the evolving environmental climate suggested the presence of *dynamic capability*. *Dynamic capabilities* have been defined as capabilities ‘that operate to extend, modify or create ordinary capabilities’ (Winter 2003, p. 991). Such capabilities are considered to be dynamic, as ordinary capabilities are constantly extended, modified, and created in response to changing environmental climate (Teece et al. 1997; Wheeler 2002). Some scholars have also defined dynamic capabilities to be the ‘processes that use resources – specifically the processes to integrate, reconfigure, gain, and release resources – to match and even create market change....They are organizational routines through which firms achieve new resource configurations’ (Eisenhardt & Martin 2000; Wheeler 2002, p. 127). This definition of *dynamic capability* matches the process of resource enactment, as resources were dynamically enacted in relation to the changing environmental climate to create ordinary capabilities. Thus, it is proposed that the *dynamic capability of resource enactment* underlies the implementation of e-government systems.

Furthermore, the *dynamic capability of resource enactment* is suggested to be developed through the symbiotic enactment of complementary resources. As revealed in the analysis of the E-File System implementation, the three key complementary resources were *knowledge resource*, *social resource*, and *leadership resource*. Previous studies posited that organizational performance improvements can be observed when complementary organizational resources were present during the implementation of ICT systems (Mata et al. 1995; Santhanam and Hartono 2003). Moreover, the analysis found that these key complementary resources were all intangible resources. When considered in conjunction with literatures that suggest the superiority of intangible resources in generating advantageous outcomes (Carmeli and Tishler 2004), it seems to denote the notion that the implementation of e-government systems would be enhanced when juxtaposed with the integrative enactment of complementary intangible resources. In offering further theoretical development, this study has conceptualized how each of the three key complementary resources can be synergistically enacted in developing different focal capability under contrasting environmental climate.

It was also observed that throughout the implementation of the E-File System, the *leadership resource* was consistently instigating the enactment of other complementary resources. This may be indicative of the strategic role of the *leadership resource* as an important ingredient in the implementation of e-government systems. In fact, the *leadership resource* has traditionally been regarded to be an important resource for ICT innovation (Armstrong and Sambamurthy 1999). Progressing further, this study has conceptualized three different types of leadership resource enactment during the implementation of an e-government system.

Besides elucidating the little explored global phenomenon of e-government systems implementation, the results of this study also has implication to the broader subject of ICT systems implementation. As noted by Sambamurthy and Kirsch (2000), existing studies on ICT systems implementation have informed our understanding on the importance of particular issues in the ICT systems implementation process, such as user partnering and managerial support (e.g. Jiang et al. 2006; Sharma and Yetton 2003). Nevertheless, most of these studies have stopped short of offering any conceptualization on *how* these important issues can be tackled. This study is not merely offering a new theorization of some important issues in ICT systems implementation. More importantly, it is posited to provide a theorization of *how* ICT systems can be implemented through the development of the resource enactment concept. The ICT systems implementation process is theorized as a dynamic capability where complementary intangible resources are symbiotically enacted. At a more detailed level, this study has also theorized the manner in which the three key resources can be enacted under different environmental climate to develop corresponding capability during each of the three implementation phases. The characteristics of the various types of resource enactment have been summarized in Table 2.

In terms of practical implication, this research has highlighted three key capabilities and three key complementary resource that practitioner should focus on when implementing e-government systems. The development of the three key capabilities was marked by the symbiotic enactment of complementary resources. While it may be premature to take the conceptualized resource enactment process to be definitive, it can nevertheless serve as an important sensitizing guide for practitioners involved in the implementation of e-government systems. Moreover, in revealing that e-government systems implementation is a dynamic process that required sensitivity and adaptation to the contextual environment, this research has demonstrated that practitioners can and should undertake interventions to alter the contextual environment in implementing e-government systems.

Limitations and Future Research

While this research has benefited from the rich insights offered by the case study methodology for theoretical development (Eisenhardt 1989), it has also suffered from the paucity of the case study methodology in providing findings that possessed strong statistical generalizability (Lee and Baskerville 2003). Consequently, future research may build upon this study in advancing the dynamic capability of resource enactment concept in e-government system implementation through surveys. One approach is to conduct surveys on government agencies from different jurisdictions on a global scale so that the results may aid in advancing the corpus of knowledge on this internationally pervasive phenomenon of e-government systems implementation. Alternatively, further qualitative studies may even be conducted to refine and extend the resource enactment concept in the implementation of other forms of ICT systems. Together, these suggested research directions may potentially lead to the eventual development of a theory of resource enactment in ICT systems implementation.

Notwithstanding the limitation of the case study methodology in generating strong statistical generalizability, findings from case study are known to offer good theoretical generalizability (Lee and Baskerville 2003). Therefore, future research can further develop the resource enactment concept by conducting further case study on e-government systems implementation in distinct governmental settings of other countries. Results from such future studies can be analytically compared against this Singapore-based study to yield further revelations on how the implementation of e-government systems may be affected by the greater cultural, political and societal environment. Indeed, it is envisioned that such comparative case study potentially holds the promise of revealing valuable insights on adapting and contextualizing international e-government best practices to the unique local condition experienced by governments of different countries around the world (Grant and Chau 2005).

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