Transforming Organizational Capabilities into Agile IT Adoption: A Case Study of Beijing International Airport

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Transforming Organizational Capabilities into Agile IT Adoption: A Case Study of Beijing International Airport

Completed Research Paper

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Abstract

In this increasingly hypercompetitive environment, agile IT adoption practices constitute the foundation that drives the speed and extent of the adoption of appropriate IT systems especially in times of urgency. These practices are a priori conditions that enable enterprise agility that is becoming an imperative competitive requirement for firm’s survival. The main contribution of this study is it provides an explanation of how agile IT adoption practices can be developed within an organization. It also highlights the various types of agile IT adoption practices that can be developed within an organization. It achieves this by using a single embedded case study design that investigates into four large IT system implementations during the construction of Beijing’s International Terminal 3 Airport for the 2008 Olympics Games. Looking through the theoretical lens of the coevolutionary of organizational control and trust upon the collected data, several inductively derived models which detail the development of the four agile IT adoption practices consisting of 2 sensing practices: preemptive-based and precision-based; and 2 responding practices: adeptness-based and improvement-based, are presented. This paper concludes with a discussion of the implications and potential theoretical and practical contributions of these models.

Keywords: Case study/studies, Enterprise agility, Information technology adoption, IS control, IT capabilities, Trust, Information systems project management
Introduction

Businesses in today’s economic landscape are confronted with rapid technological advancements, globalization, dramatic regulatory uncertainties and acute time-to-market pressures. Consequently, the business competitive environment has become hypercompetitive, especially in the fast moving and high-tech industries (McAfee et al. 2008; Thomas II 1996). How can an organization strive in this turbulence? One answer to this question is for the organization to develop enterprise agility to sense and respond readily to environmental changes (Sambamurthy et al. 2003).

As a result, enterprise agility is regarded by many scholars as one of the key determinants of firm’s success and profitability in today’s hypercompetitive business environment (e.g. Mathiassen et al. 2006; Overby et al. 2006; Sambamurthy et al. 2003). Then we begin to ask what enables the development of enterprise agility in an organization? Many researchers advocate that IT plays that critical enabling role (e.g. Baskerville et al. 2005; Gallagher et al. 2008; Overby et al. 2006). IT enhances enterprise agility by providing the digital option that an organization leverages to improve richness and reach of its knowledge and processes (Sambamurthy et al. 2003). IT can bridge the ‘agility gap’ between an organization’s current enterprise agility and what it needs to ensure its survival (van Oosterhout et al. 2006, pp. 135, Figure 1). IT can also be deployed to enhance the core competencies (Seo et al. 2008) and enable capabilities (McAfee et al. 2008; Overby et al. 2006) of an organization that is closely linked to the development of enterprise agility.

Given the multiple roles that IT can play, the adoption of IT is seemingly highly desirable to any organization (Baskerville et al. 2005). However, the adoption of IT alone is insufficient to ensure long-term survival of an organization in a hypercompetitive environment. We posit that the key determinant of the long-term survival and profitability of an organization is going to be dependent upon both the adoption of an appropriate IT system and the speed of which it is adopted, i.e. agile IT adoption. With the environment being increasingly hypercompetitive, the consequence of not achieving agile IT adoption is going to make the effort to sustain an organization’s survival demanding. Accordingly, this will amplify the urgency and needs for the organization to look into ways to enable agile IT adoption. Yet, after more than a decade of study into organizational IT adoption, very few researches have investigated IT adoption factors like urgency to adopt, speed of IT adoption, extend of IT adoption and appropriateness of IT adoption (i.e. agile IT adoption) together in their research models. In describing the dominant IT adoption research, Fichman (2004) propounds to the effect that most of these researches place their focus on identifying the quantity of the ‘Right Stuff’ (independent variables) such as size & structure, knowledge & resources, management support, compatibility and competitive environment that will influence the quantity of an IT innovation (dependent variables) such as earliness of adoption; frequency of adoption; and extent of implementation, while unwittingly leaving out the urgency and speed of IT adoption in these researches. This study responds to the call by Fichman (2004) by attempting to identify the specific agile IT adoption practices that enables an organization to quickly sense the appropriate IT system to adopt and the respective IT adoptions’ enablers/inhibitors, and to respond readily to enhance the speed and extent of that IT system adoption within the organization. In doing so, this study goes beyond treating organizational IT adoption as a single activity or ‘black box’. Rather, we treat organizational IT adoption as a set of controlled ‘sensing’ and ‘responding’ activities that enable an organization to achieve both scale and speed in IT adoption especially in times of urgency.

The literature of coevolution of organizational control and trust is an appropriate theoretical lens for this study because practices are created and sustained through the exercise of organizational control over its resources and processes. Invariably, organizational control is always intertwined with trust. This is evident in many studies from the literature of control (e.g. Das et al. 1998; Inkpen et al. 2004; Rustagi et al. 2008). Hence, the coevolution of organizational control and trust forms good foundation on which agile IT adoption practices within an organization could be built. This study presents a case study of multiple simultaneous IT implementations during the construction of Beijing’s international T3 terminal in its attempt to answer the following research questions: (1) How are agile IT adoption practices developed within an organization? and (2) What types of agile IT adoption practice can be developed in an organization?

Theoretical Background

Enterprise agility is defined as a set of organizational capabilities that permits an organization to sense change in the internal and external environments and to respond effectively and efficiently to the change in a timely and cost
effective manner (Overby et al. 2006; Sambamurthy et al. 2003; Seo et al. 2008). In a hypercompetitive business environment, these changes create a “fog of the future” that obscure the “vision” of an organization causing it to lose sight of “sudden death threat” and/or “golden opportunity” (Sull 2005). Consequently, it is no surprise that enterprise agility is fast becoming imperative for any organization which needs it not just to achieve and/or sustain competitive advantage (Sharifi et al. 2001) but also its survival (Baskerville et al. 2005).

The enabling roles of IT towards the derivation and maintenance of enterprise agility within an organization is well-established among enterprise agility researchers in IS. Some of these concepts include: (1) Sambamurthy et al. (2003)’s real option theory which explains the way in which the adoption of IT can digitalize the process and knowledge flow within an organization that subsequently leads to the derivation of enterprise agility; (2) Van Oosterhout et al. (2006)’s research model, that analyzes the change factors requiring enterprise agility, has specifically identified IT system within an organization as one of the key enablers of enterprise agility; (3) Weill et al. (2002) demonstrate the way in which appropriate development of IT infrastructure can lead to strategic agility; and (4) Zain et al. (2005) have illustrated in their research model the mechanisms through which the adoption of an IT system can enhance an organization’s agility. These concepts converge in their ideas about the enabling roles of IT towards enterprise agility in an organization. Intuitively, before IT can help to achieve enterprise agility, “agile IT adoption” is a highly desirable process for any organization (Mathiassen et al. 2006). Unfortunately, despite the growing numbers of research on enterprise agility, there are very few researches that investigate agile IT adoption. As far as we are aware of, there are only two of such researches in the literature namely, Bruque-Cámara et al. (2004) and Hovorka et al. (2006). The lack of empirical study on an important subject such as agile IT adoption limits, to a large extent, the applicability and predictability of the various enterprise agility conceptualizations into the practitioner’s world. This study attempts to fill this identified knowledge gap in enterprise agility literature. To meticulously achieve that, the literature review section will visit the IT adoption literature to see if existing researches on IT adoption can be referenced to inform on the agile IT adoption phenomenon.

The literature on organizational IT adoption has well been studied for over two decades. In the domain of organizational IT adoption, studies have predominately focused on identifying factors/antecedents that influence the adoption decision at organizational level (e.g. Cool et al. 1997; Cooper et al. 1990; DiMaggio et al. 1983; Kim et al. 2006; MacKay et al. 2004; Teo et al. 2003a). As the business environment turns hypercompetitive, IT adoption research has increasingly leaned toward the exploration on the environmental or organizational factors that help a firm to adopt IT more intensely (e.g. Teo et al. 2003b) and more quickly (e.g. Bruque-Cámara et al. 2004). Nonetheless, a number of gaps in the literature can be identified. First, as traditional dominant innovation adoption models are designed specifically to be applied to a particular range of adoption scenarios, when this assumption is violated and these models are forcefully applied into every situation, they tend to produce weak and unstable conclusion (Benbasat et al. 2007). Some of these conclusions include: (1) a situation whereby adoption of IT is subjected to heavy coordination requirement across multiple adopters (Frambach et al. 2002); (2) a situation whereby adoption requires extensive training effort to overcome the high barrier of knowledge due to the complexity of the IT system (Gallivan 2001); and (3) a situation whereby IT adoption happens in a constantly changing IT environment (Benbasat et al. 2007). Second, in summarizing the current stage of IT adoption research, Fichman (2004) ascribes the extant literature on IT adoption to a ‘dominant paradigm’ that focuses on identifying the quantity of the ‘Right Stuff’ (independent variables) such as size & structure, knowledge & resources, management support, compatibility and competitive environment that will influence the quantity of an IT innovation (dependent variables) such as earliness of adoption; frequency of adoption; and extent of implementation. Each of these identified antecedents is assumed to have an independent effect that contributes to the variance explained in the dependent variables (Fichman 2004). Hence, the dominant paradigm does not allow for complex interaction among factors that go beyond simple linear additive (or multiplicative effect) especially in theoretical context that warrants the holistic configuration of factors to explain organization IT adoption (Fichman 2004). Often, organizational IT adoption is treated as a ‘black box’ in these researches. Third, none of the existing IT adoption researches have included independent factors like the urgency, appropriateness, extent and speed of adoption of an IT system together in their research models. Urgency of an IT system’s adoption drives the motivation for the extent and speed of adoption of an appropriate IT system. We advocate that the need to consider all these factors together when conducting IT adoption research is increasingly imperative largely due to the hypercompetitive environment.

The literature review on IT adoption and enterprise agility revealed an inadequate understanding on the development process of agile IT adoption practices within an organization. Agile IT adoption practice is defined as practice that
speedy adoption of that IT innovation (Hovorka et al. 2006). To address this knowledge gap, this study goes beyond treating organizational IT adoption as a single activity or ‘black box’, but rather to treat it as consisting of a set of controlled ‘sensing’ and ‘responding’ activities to explore the inside of the ‘black box’. This study achieves this by looking into the literature on coevolution of organizational control and trust, which is an appropriate starting point because practices within an organization inherently involve some forms of control mechanism to direct resources towards the achievement of organizational goals which in turn, is contingent upon the trust an organization placed on its stakeholders.

Extant literature about organizational control has generally converged in defining organizational control as ‘encompassing all attempts to ensure that individuals in an organization act in a manner that is consistent with meeting the organization’s goals and objectives’ (Eisenhardt 1985; Kirsch 1997; Ouchi 1980). Literature on organizational control proposes and elaborates many of these mechanisms and modes, which can address varying control issues within an organization (e.g. Choudhury et al. 2003; Nidumolu et al. 2003-4). In synthesizing the literature of organization control to be applied to the context of system development process, Kirsch (1997) organizes organizational control in the literature into two modes: (1) formal control mode; and (2) informal control mode. Under the formal control mode, behavior and outcome controls are derived from Ouchi (1980) and Eisenhardt (1985). According to Kirsch (1997), behavior control is defined as the act of setting a set of specific rules and procedures that aligns the behavior of the controllee (i.e. people that are being ‘controlled’) to whatever is deemed desirable in meeting the organization’s objective. In contrast to that, outcome control is the act of setting goal that is desirable in meeting the organization’s objective and a reward is given to the controllee who meets it. Under the informal mode of control, clan and self controls are identified. Clan control looks at the dissemination of desired value, belief and philosophy of the organization by socializing the individuals to a common set of norms and values within a clan (e.g. Birnberg et al. 1988; Kohli et al. 2004). Appropriate behaviors that are in line with the norms and values are rewarded and those that are not are punished (Ouchi 1979). Finally, self control focuses on individual and looks for mechanism that identifies and provides the conducive environment that rewards and encourages highly motivated individual to exercise self-control in the best interest of meeting the organization’s objective (Kirsch 1997).

The need to undertake control measure by the controller on the controllee inherently implies a perception of risk (i.e. there is a possibility that the controllee may deviate from the organization’s objective during execution) in the operating context. This perception of risk is moderated by the amount of trust that exists between the controller and controllee (Inkpen et al. 2004). It is important to note that the concept of controller and controllee is not necessarily applicable to just individual but can be extended to joint venture between companies and IT outsourcing projects for instance (e.g. Choudhury et al. 2003; Inkpen et al. 2004; Rustagi et al. 2008). The exploration on joint venture and trust configuration, when examining agile IT adoption practices, falls in line with the definition of enterprise agility because enterprise agility is concerned with the economic of scope (Dove 2001) which mandated response to be not just effective towards the changing environment but also to stay productive at the same time (Mathiassen et al. 2006). Outsourcing and joint venture are two examples of viable and effective mechanisms which help to achieve ‘economic of scope’ in enterprise agility. In the context of joint venture between companies, Inkpen & Currall (2004) define joint venture trust as a decision of one party to have faith in the other party, despite the risk of experiencing negative outcome if one party is untrustworthy. When a perceived risk by one party exceeds the amount of trust it has with the other party, this discrepancy will be bridged via the implementation of control mechanism which will help to lower the perceived risk to an extent where trust can take over (Schoorman et al. 2007). Collectively, the coevolution of organization control and trust suggests that it is most likely the fundamental ingredient on which agile adoption practices can be derived. This is because successful IT adoption within an organization is frequently made possible by the combination of IT and IT complementary organization capability to form routine and practice (Overby et al. 2006; Sambamurthy et al. 2003). In summary, we believe the identified gaps in the extant enterprise agility and IT adoption literature on agile IT adoption practices can best be filled through the application of our proposed theoretical lens (i.e. coevolution of organizational control and trust).

Research Methodology

This study adopts the case research methodology to investigate the identified research questions presented earlier for a number of reasons. First, the main research question concerns with “how” agile IT adoption practices are developed within an organization (Walsham 1995). Second, we are interested to uncover the complex and multi-faceted relationships and interplay of an organization’s resources, capabilities, controls and trust to create agile IT
adoption practices within an organizational context (Pentland 1999). The case study on the IT implementations in Terminal 3 of Beijing Capital International Airport (BCIA) was chosen for the following number of reasons. First, the scale of the Terminal 3’s IT projects is way bigger than what the Airport IT Management Department has previously encountered. Second, the project has to be ready for the 2008 Olympic Games – an ambitious deadline of around 2 years to completion. Third, it was a successful agile adoption of the IT systems in Terminal 3 by all stakeholders (e.g. airlines, custom, airport shops etc.).

Access to case site was first negotiated and gained in June 2009. Subsequently, the study adopts a single embedded case design where six major systems and two terminal command centres that are crucial to the success of the entire Terminal 3 project were identified. Our single embedded case design is best illustrated in Yin (2009), pp. 46, Figure 2.4. This study focuses on a single case study to understand how agile IT adoption practices are developed in Beijing Capital International Airport Company Limited. Hence, the unit of analysis of the case study is at the organization level. Each IT system implementation chosen for the study is regarded as an embedded case within this single case study. The focus of each embedded case is to look at how agile IT adoption practices are developed within that IT implementation. Therefore, the unit of analysis of each embedded case is at project level. Data obtained from all embedded cases are combined to provide empirical evidence to demonstrate how agile IT adoption practices are developed at organization level. In total, a series of 9 face-to-face group interviews (which include 2 to 6 key project team members) plus 1 individual off-site preliminary interview were conducted for the duration of 120-180 minutes on average for each interview (See Appendix A). All interviewees are carefully selected based on the critical role that they played in ensuring the successful implementation of the Terminal 3 IT systems. The content of the interviews were digitally recorded and transcribed for subsequent data analysis. The error of recall of interviewee may give rise to data validity and reliability issues (Glick et al. 1990). To mitigate this risk, the questions asked during the interview were open-ended and tailored specifically to the role of the person to be interviewed (Tan et al. 2009). To avoid losing our research focus where the intended unit of analysis is at organization level (Yin 2009, pp. 52), break-out sessions participated only by the research team were conducted between interviews to ensure the data collected conforms to our intended unit of analysis.

The theory-building process, as prescribed by Eisenhardt (1989), is consulted to guide the development of this study and the process is described as follow. Before the start of the study, certain relationships between our phenomena (i.e. agile IT adoption) and theoretical lens (i.e. coevolution of organizational control and trust) were predicted. These have contributed to a set of initial themes which forms our theoretical lens that serves as a ‘sensitizing device’ (Klein et al. 1999) to guide the data collection. Data collected are coded and arranged into the identified set of themes and a preliminary theoretical model is proposed. Data analysis was performed at the same time as data collection activities were being conducted to take full advantage of the flexibility of adopting the case methodology (Eisenhardt 1989). The data analysis work followed an iterative process of moving back and forth between empirical data, the theoretical lens, relevant literature, and the proposed model until ‘theoretical saturation’ is reached (Eisenhardt 1989). With every completed group interview, the collected data was used to validate and refine the initial predicted model repeatedly. This process helps to enhance the construct validity of our study. In addition, due to the single embedded case design, each completed group interview also helps to further strengthen the external validity of our study especially when the collected empirical evidences support our emerging theoretical model. This achieves the effect of ‘analytic generalization’ as advocated by Yin (2009). To manage the extensive amount of data collected during the interviews, a combination of a narrative strategy and a visual mapping strategy is adopted (Langley 1999). A series of diagrams capturing the essence of our theoretical ideas are derived through this process. These were presented to the respective stakeholders at Beijing Capital International Airport (BCIA) IT department for validation of our interpretation of the data and the emerging data model.

To ensure high reliability of our empirical data, data that had been uncovered from one system implementation group were validated against another system implementation group in another interview to allow for data triangulation (Dube et al. 2003; Yin 2009). In addition, all interviews are conducted by multiple case researchers. Triangulation of observations of the data obtained on-site has been achieved through iterative data validation and consolidation from multiple observers until a congruent and coherent theme that can explain the data emerges. This process of triangulation of observation is attuned to the best case study practice advocated in positivism (e.g. Dube et al. 2003); soft positivism (e.g. Madill et al. 2000); and interpretivism (e.g. Klein et al. 1999) philosophy. Data collected from the interviews were also corroborated with the business documents, published articles and books, information from the corporate website, and notes from direct observation. All these measurements were implemented to ensure that every data collected could be supported by at least two data sources. In total, four out of
the six IT system projects and two command centres were identified as being representative of the entire Terminal 3 IT implementation project.

Case Description

Airport terminal’s main revenue streams can be broadly classified into aeronautical (from airlines) and non-aeronautical (from passengers) streams. In recent years, the industry has become highly competitive with every airport terminal company looking into ways to improve its services and its terminal’s capacity. The aim is to become the ‘travel’ hub for airlines and passengers in its region. This is also the company’s vision of the state-owned Beijing Capital International Airport (BCIA) Company Limited that manages the main airport of Beijing, China. The main airport of Beijing owned by BCIA consists of three terminals namely, Terminal 1, 2 and 3. Terminal 1 was built in 1990 occupying around 90,000 m\(^2\). Terminal 2 is 3.7 times larger (336,000 m\(^2\)) than Terminal 1 and was completed in 1999 to take over Terminal 1 while it was closed for refurbishment. Terminal 1 reopened in 2004 at about the same time where the construction of Terminal 3 began. Constructed specially for the 2008 Olympics Games, Terminal 3 occupies a colossal space of 986,000 m\(^2\). When completed in March 2008, Terminal 3 was the largest airport terminal in the world.

“Capital airport is China’s first gate to the world. During the period of the Olympics, it takes on the responsibility and honor of being the first customer contact point for athletes and VIPs from all over the world … the impression that the airport leaves on the visitors represents the hospitality and congeniality of the country …” Mr. Hu Jintao, Chinese President (Translated from the book “The 52nd Gold Medal”).

To achieve the goal of seamless customer touch points across all facets of airport operation in Terminal 3 laid down by President Hu, IT became the imperative enabling tool. The IT department of BCIA has been the key driving force behind the planning and management of all IT projects, day-to-day terminal operations and IT personnel (in-house and outsource staff) in the existing terminal 1 and 2. Hence, it is not surprising that the department is given the important responsibility to manage the entire Terminal 3 IT projects implementation. Table 1 provides a brief description of the four representative systems analyzed in this paper. In Appendix A, details of interviewees of each project, including those projects that are not selected for this study, are presented.

<table>
<thead>
<tr>
<th>System Name</th>
<th>Brief System Background</th>
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<tbody>
<tr>
<td>Airport Operation Database (AODB)</td>
<td>The ‘core hub’ that allows information captured within other systems in the airport to be seamlessly stored, analyzed and shared to ensure the smooth running of all aspects of its operations (a.k.a the ‘heart’ of the airport operations).</td>
</tr>
<tr>
<td>Airport Departure System</td>
<td>System that manages the entire process of checking in and boarding the passengers and their luggage which all airlines in Terminal 3 are required to use.</td>
</tr>
<tr>
<td>Airport Security System</td>
<td>System that handles all forms of security-related processing within Terminal 3. Security system of the airport can be classified into 5 levels of security checks (Airport-int 2009). Due to the huge number of country leaders and foreign visitors involved during the Olympic Games in 2008, the highest level of security 5 was mandated in Terminal 3.</td>
</tr>
<tr>
<td>Airport Data Centre System</td>
<td>System that facilitates the billing for services rendered in Terminal 3 by the BCIA. From BCIA’s perspective, this system demands one of the highest priorities because it deals with the company’s revenue generating activity.</td>
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Airport Operation Database (AODB)

Right in the beginning of 1999 when the first AODB (developed by Motorola) was put into use in Terminal 2, the IT department already faced significant challenge in learning the right way to maintain and use it. Over the years, they continued to acquire valuable knowledge about AODB through the constant interaction with vendors like Motorola and through usage and experimentation during operation. As a result, the IT department developed its own set of standard operating procedures that laid the foundation for the future administration and maintenance of AODB in all its airport terminals.
“From 2000 to 2002, we came up with a maintenance standard operation procedure handbook. Till today, our maintenance strategy is dependent on this handbook.” –Deputy Manager, IT Department

In 2004, frequent hardware failures occurred that brought down the AODB in Terminal 1 and 2. The downtime highlighted the dependency of terminal operations and AODB and the need to closely monitor both. Two command centres, namely Terminal Operational Command Centre (TOCC); and System Operational Command Centre (SOCC) were established in late 2007 and all the existing AODB system and terminal operations especially in Terminal 3 were being subsumed under these two command centres.

The implementation of a new AODB system in Terminal 3 started in 2006 and was delivered in early 2008. Several key challenges were presented: (1) the new AODB was an off-the-shelf system that differed significantly from the customized AODB built for Terminal 1 and 2; and (2) the information systems in the Airport Transport Control (ATC) which AODB draws its information from were also undergoing upgrade which led to many uncertainties on how the two systems should interface. The heavy investment in IT staff training by IT department paid off. Some of the key initiatives that are still in place today are: (1) the encouragement of the leaders for the IT staff to build up their knowledge on AODB since 1999; and (2) the cultivation of a strong learning and sharing environment that facilitates the exchange of knowledge across generations of AODB administrator (currently at its fourth generation).

“… our IT department had a very strong learning culture … In 2000, I took the lead with a few other colleagues to look into system backup and business continuity in-depth study (for the AODB) … during that time, we didn’t leverage upon outside help and we did all the research on our own … we invented many system maintenance strategies.” –Deputy Manager, IT Department

This strong learning and sharing environment encourages desirable behaviors such as selfless sharing of valuable knowledge and proactive problem solving with ‘no-blame’ culture. The selfless sharing of knowledge is exemplified through the informal mentor-apprentice relationships in the IT department, whereby the past AODB administrator serves as mentor to the new AODB administrator.

“We have an unofficial master-apprenticeship mechanism and a backup mechanism … if the apprentice is good at work, the master will have opportunity to do other things and can also be promoted. This serves as a big motivation for the master (to coach the apprentice).” – Chief Engineer (1st Generation AODB Administrator), IT Department

Leaders of the IT department place great trust into the hands of the highly experienced AODB administrators to drive the Terminal 3 project. In comparison, while the vendor was not expected to perform as well as the IT department staff, they were highly trusted in their ability to deliver quality IT solution largely due to the close working relationships that had been established during the AODB implementations for Terminal 1 and 2.

“Because of our in-depth knowledge of T2’s (Terminal 2) business operation, we can easily make a comparison between T2 and T3 (Terminal 3) and highlight the weakness and strength of T2’s system (AODB system), then we can use this knowledge to inform the vendors to improve their system by absorbing T2’s strength and eliminating its weakness. In this way, our T3 design (of AODB) can be more aligned with our most ideal maintenance process which was not possible in the past (in T2 AODB).” – Business Process Lead, AODB System Project

Airport Departure System

The development work of the airport departure system of Terminal 3 started in 2006 and was completed in early 2008. To achieve wide spread IT adoption by partners of BCIA (i.e. all the airlines), the IT department adopted a number of key strategies: (1) Inclusion of the highly experienced staff of all the airlines to ensure accurate depiction of each airline’s requirement in the tender specification; (2) Assignment of several senior experts (all having over 10 years of experience, including those who were involved in the development of Terminal 1 and 2’s departure systems) from the IT department to the project; and (3) Collaboration with a vendor that had more than 50 years of airport departure system implementation experience. As a result, the IT department was able to reap a number of key benefits: (1) Ability to draft out very accurate and detailed business requirements needed for the system implementation, which in turns kept any subsequent changes at bay; (2) Alignment of shared goals to serve passengers between the airlines and IT staff that encouraged selfless contribution to this common end; and (3) Development of strong trusting relationships among IT and airlines staff. However, the same level of trust appeared to be lacking between the IT department and the vendor, largely because customized development work was done.
overseas, the software used was proprietary and only local members, who were less experienced, of the vendor were available onsite for installation and configuration.

“If you have a chance to read the requirement submitted (for the departure system) by each airline, you will be surprised to realize how deep into the future they have predicted for the airline industry to go into development and the needs of their passengers ... Because our customers are airlines, the requirement gathered from them are all very accurate in predicting the eventual use” – Technical Lead, Departure System Project

“They (vendor) guard their technical knowledge strictly ... and because their technology is proprietary and not open-sourced ... we honestly feel that this is not a healthy development into our future relationship” – Technical Lead, Departure System Project

A series of training was conducted by the IT department to impart important information pertaining to BCIA’s culture, practices, work attitudes and standards to the vendor before implementation commenced. This was to ensure that the vendor got a clear interpretation of the tender’s expectation and was able to assimilate seamlessly into the BCIA’s culture and working norms.

“We provide training to their (vendor) project management team to impart knowledge about our company’s management philosophy, procedure and specific thing to take note of when it comes to system requirement. The objective is to ensure that they can reach up to the same standard as our internal IT staff and to align their way of thinking with ours.” – Technical Lead, Departure System Project

To mitigate the risk of low trust level of vendor, the ‘Backward Planning’ (interpreted as setting hard deadline for project and planning backward to set milestones) methodology was adopted to communicate expected deliverables and their deadlines. A weekly meeting was held to track the development progress with major stakeholders and vendors. On a daily basis, a more rigorous schedule of workload was drafted and the local members of the vendor were expected to follow and complete them accordingly. Some members of the IT department staff were stationed beside the vendors to ensure conformance of the daily schedule and to ensure the quality of the task completed.

Airport Security System

The tender for the implementation of this system was awarded in October 2005 and the system went live on March 2008. The requirement to achieve maximum security at level 5 (see Airport-int 2009) posed significant risk to the system implementation process mainly because the scale of the implementation was unprecedented then in the world in 2008. Many unknowns existed and a large number of stakeholders were involved in this project (such as customs department, airlines, ground staff etc.). To mitigate this risk, significant amount of time was spent before October 2005 visiting many vendors around the world to acquire their knowledge in the implementation of security system.

“As far as security is concerned, this system is first of its kind in China ... In April 2005 before the beginning of the tender, we did a number of visit and research on a number of airports ... we involved the design unit in T2 (Terminal 2) to consolidate our findings into the tender specification for the security system in T3 (Terminal 3).” – Project Manager, Security System Project

While the system implementation posed huge potential risk, it did not faze the members of the staff involved because: (1) they were happy to be associated with the ‘novel’ of the level 5 security system in the world; and (2) they relish in their national pride of having been proven to achieve something seemingly impossible, at all cost no less, through the collective determination of multiple stakeholders.

“The success of this project relies on our common working attitude. This doesn’t just apply to us (IT Department) but the vendor as well. One of our vendor member’s wife was giving birth during that time, he chose to stay onsite.” – Project Manager, Security System Project

The overall lack of experiences in implementing a system at this level of security raises questions about the skill set of everyone involved. This resulted in a low trust environment where tight control measures have to be put in place. To ensure proper conformance of the system requirement, a separate audit team was formed to inspect all the project deliverables. The implementation of the system can only proceed after the approval of the audit team. In addition, the IT department also mandated the staff involved to stay onsite during the entire system development period.
Frequent site inspection and weekly meeting were conducted to instill the sense of urgency and to get things done right the first time. To ensure no opportunism behavior of the vendors and staff, a joint responsibility deposit was imposed on them, which mandated the timely completion of task or risk losing portion or all of the deposit. In addition, payments to the vendors were done in a ‘milestone’ fashion, i.e. they only got paid when the audit team certified that they have met all the requirements of that milestone.

“Our company adopts an outcome driven control, that is to say if you achieve your target, you will be given monetary reward, if you don’t, money is deducted… once we established the target, everyone will come up with the ‘responsibility’ deposit, you don’t hit it (target) we deduct money from the deposit. You complete it, we give you reward.” – Project Manager, Security System Project

The leaders in the IT department have led by example. They held progress meeting on Saturday and conducted inspection at night to instill the discipline of working round the clock. In addition, the Chinese believed in encouragement slogan. Many were placed around the premises to motivate all the stakeholders to answer to the higher calling of their work. For example, one of the slogans in Chinese posted at the canteen translating to the effect of: “If you are afraid of death, don’t become a communist. If you are afraid of hard work, don’t take up system development work of T3!”

**Data Centre System**

The implementation of the data centre system started at late 2007 and was delivered within six months in March 2008. As the main purpose of this system was to provide a single authoritative source of bill calculation for all the internal stakeholders of BCIA, it must be precise and error-free. This was not easily achievable. The IT department was aware of the difficulty involved in getting buy-ins from internal stakeholders, so one of its most well-respected IT staff within the airport was assigned as the project manager. Through close coordination and many intense negotiations with all the stakeholders, the BCIA project manager was able to keep the implementation effort moving. To further accelerate the development of the system, the BCIA project manager leveraged upon his close working relationship with the local partners at the Company CX (A large multi-national company) to start work on the project before the signing of the tender document was finalized. To ensure a tight control on changes, a rigorous change management process was implemented. Despite all these preventative measures imposed to get the project completed on time, the project manager still faced a number of difficult challenges including: (1) coping with the withdrawal of CX from the tender before the actual signing of the tender document. This was a crisis especially since the local vendor of CX had already committed their resources into this project. The quick thinking project manager managed to resolve the situation by convincing the local vendor to absorb the staff deployed onsite by CX, so as to minimize disruption; (2) coping with three unforeseen change requests during the development of the system. If they were mandated to complete before the Olympics, these changes would cause the system schedule to overrun. The project manager mitigated the situation by convincing the stakeholders to defer the changes after the 2008 Olympics after some intense negotiations; and (3) coping with the request to subsume the two functionalities embedded within the Terminal Operation Database system and the Company's ERP System into the new system. This would disrupt the established information flow and power structure within an organization derived from these two systems. Leveraging upon his respectable status and given complete authority by the management, the project manager managed to navigate an extremely delicate change process which enabled the smooth transition of the multiple stakeholders from their familiar interfaces to this new system.

“During the system development process, we have been given a lot of authority to control many decisions concerning payment and operational data which include daily operation report … from our angle, this makes a lot of our work easier to implement” – Project Manager, Data Centre System Project

The project manager was able to overcome these challenges because of the following measures: (1) Constant and persistent communication about the accounting regulatory requirements that BCIA needs to conform to and the key advantages and improvements which the new system could provide; (2) Weekly meeting to trace the progress and report it back to the stakeholders; and (3) Verified payment to the vendor only when a milestone was completed and signed off by him. Furthermore, due to the project manager’s willingness to engage the local vendor despite the withdrawal of the main potential contractor (CX), the vendor’s project manager was willing to give something in return to the project manager’s trust. For example, he was very proactive in reporting the status of the project and
IT Project Management and Outsourcing

was flexible to take up ad hoc work of a smaller scale not specified within the initial terms of contract. He did these jobs at no extra cost to BCIA.

“... The core team (vendor team) comprises of team members that possess in-depth business domain knowledge and strong technical skills and experiences in this area (development of Data Centre) ... you don’t need to explain things in detail to them (vendor) ... if we have another vendor, the pressure on us would be really great and we will probably have to do OT everyday” – Project Manager, Data Centre System Project

Comparatively, the internal partners (such as airlines and shop owners) were much less ‘cooperative’ with the IT department’s project manager than the vendor. Consequently, the trust level of these partners is low.

“If you don’t have professionals to control the process of this project, the project risk would be high. If you let the users (partners) control the process, you will face the challenge of frequently changing requirements ... because they (partners) represent their own interest.” – Project Manager, Data Centre System Project

Discussion

Within Case Analysis

Every system that is being analyzed in this study exhibits two common elements. First, all these systems in accordance to BCIA’s Terminal 3 project plan must be delivered in full within a timeline of around 2 years to be on time for the 2008 Olympics Games. This sets the stage for the urgency of the IT department to ensure agile IT adoption across its organization. Second, all the systems require close coordination across multiple stakeholders and are large scale in implementation. As a result, its implementation details are highly complicated. These two elements conspire to create an environment where the perceived impact of failure (i.e. losing reputation as a country) is extremely high if agile IT adoption is not achieved.

The data analysis of the four systems also reveals several common patterns in the development process of agile IT adoption practices within each IT system implementation. First, two dominant organization capabilities are identified to be highly salient in the data for each system implementation. To ensure close corroboration of inductively derived data with the literature, these organization capabilities are being grouped together and the literature scans for construct that can best capture their essences. Second, two dominant control mechanisms contingent upon the trust relationships among staff, partners and/or vendors are also highly salient in each system implementation. The same process of corroborating the findings with literature follows and a ‘control’ construct is derived for each pair of identified control mechanisms. In cases where no literature support is found, the data analysis process allows a new theme to be created which is akin to the process of theory development as advocated by Eisenhardt (1989). Table 2 shows the organization capabilities of AODB System and Figure 1 shows the inductively derived model for the AODB System.

<table>
<thead>
<tr>
<th>Table 2: Identified Organization Capabilities in AODB System Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability Reconfiguration Capability (Lavie 2006)</td>
</tr>
<tr>
<td>Capability substitution</td>
</tr>
<tr>
<td>Capability evolution</td>
</tr>
<tr>
<td>Capability transformation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Absorptive Capacity Capability (Lichtenthaler 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploratory learning</td>
</tr>
<tr>
<td>Exploitative learning</td>
</tr>
</tbody>
</table>
Transformative learning associates with processes to protect and keep the assimilated knowledge ‘alive’ (See description on the identified control mechanisms).

**Resource Fluidity Capability (Doz et al. 2008)**

We posit that the above two capabilities combined to give rise to resource fluidity capability which is defined as an organization’s “internal capability to reconfigure business systems and redeploy resources rapidly (capability reconfiguration), based on business processes for operations and resource allocation, people management approaches, and mechanisms and incentives for collaboration that make business models and activity system transformation faster and easier (enabled through the learning processes of absorptive capacity)”

**Development Model of Preemptive-based Agile Adoption Practices (AODB System)**

<table>
<thead>
<tr>
<th>Triggers</th>
<th>Resource Introspections</th>
<th>Transformation Agents</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project High Complexity</td>
<td>Capability Reconfiguration Establishment of 2 Command Centers to replace old systems and terminal operations</td>
<td>Perceived Risks as Catalyst</td>
<td>Preemptive-based Agile Adoption Practices (Airport Operation Database System)</td>
</tr>
<tr>
<td>Perceived High Risks</td>
<td>Capability Substitution</td>
<td>Transformative Learning Control</td>
<td></td>
</tr>
<tr>
<td>Project Completion Urgency</td>
<td>Capability Evolution Constant experimental of AODB system management processes</td>
<td>Informal Clan Control Strong learning culture advocated by leaders. Strong knowledge sharing culture. Group-initiated knowledge capturing of SOP.</td>
<td></td>
</tr>
<tr>
<td>Absorptive Capacity</td>
<td>Capability Transformation Absorb vendor’s knowledge and integrate with existing know-how to create new AODB infrastructure in Terminal 3</td>
<td>Informal Self Control Empowerment by leader to foster creativity at work. Informal self-initiated mentoring/apprenticeship mechanisms.</td>
<td></td>
</tr>
<tr>
<td>Exploratory Learning Developed through constant interactions with multiple vendors and overseas onsite trips</td>
<td>Trust Vendors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploitative Learning Continuous knowledge application as market opportunities arise in existing terminals</td>
<td>Staff</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Two forms of control mechanisms, namely informal clan control; and informal self control from Kirsch (1997) contingent upon the high trust on its staff and vendor were clearly administered during the system implementation. Together, these control mechanisms can be deemed as transformative learning controls (refers to the definition of transformative control above). When the trust level of stakeholders is very high within a system implementation project, informal control mechanisms are commonly preferred over formal control mechanisms (Rustagi et al. 2008). It is noted in the case data that IT staff frequently exercised their initiatives to proactively preempt problems during system implementation, largely attributed to this high level of trust and the appropriate use of informal control mechanisms. We, therefore, posit that the IT department used these two control mechanisms to transform two of its existing capabilities into a ‘preemptive-based’ practice that led to the agile adoption of AODB system across BCIA. Table 3 shows the organization capabilities of Airport Departure System and Figure 2 shows the inductively derived model for the Airport Departure System.

**Table 3: Identified Organization Capabilities in Airport Departure System Implementation**

| IS Planning Capability (Wade et al. 2004) | The ability to anticipate future changes & growth, to choose IT platforms that can accommodate this change (Feeny et al. 1998), & to effectively manage the resulting technology change and growth (Mata et al. 1995). |
Behavioral Conditioning Capability
Capability of an organization to influence its stakeholders to exercise the appropriate behaviors during task execution.

<table>
<thead>
<tr>
<th>Capability</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acculturation’s assimilating processes</td>
<td>The ability to make vendors willingly give up their own organization’s culture so as to adopt the culture and norms of BCIA (Adapted from Nahavandi et al. 1988).</td>
</tr>
<tr>
<td>IT-based co-creation of value</td>
<td>The ability to co-create business value with multiple parties through the appropriate use of IT (Adapted from Kohli et al. 2008)</td>
</tr>
</tbody>
</table>

System Capabilities (Van Den Bosch et al. 1999)
We posit that the above two capabilities allow a high degree of behavior to be programmed (enabled through Behavioral Conditioning Capability) or documented down in written format in advance of their execution (enabled through IS Planning capability) which is analogous with the definition of ‘system capabilities’.

### Development Model of Precision-based Agile Adoption Practices (Airport Departure System)

<table>
<thead>
<tr>
<th>Triggers</th>
<th>Resource Introspections</th>
<th>Transformation Agents</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project High Complexity</td>
<td>IS Planning</td>
<td>Ex-post Deterrents Control</td>
<td>Precision-based Agile Adoption Practices</td>
</tr>
<tr>
<td>Perceived High Risks</td>
<td></td>
<td>Formal Outcome Control</td>
<td>(Airport Departure System)</td>
</tr>
<tr>
<td>Project Completion Urgency</td>
<td></td>
<td>Formal Behavioral Control</td>
<td>Agile adoption practices that allow organization to accurately ‘sense’ the system requirements before development while keeping future changes to a minimum. Due to the tight control of changes, it led to lesser surprises to stakeholders which in turns led to faster adoption of the system.</td>
</tr>
</tbody>
</table>

**Figure 2: Airport Departure System - Precision-based Agile IT Adoption Practices**

The development of the Airport Departure System was perceived as involving high risk by the IT department (because they don’t trust the vendor) especially when the development work was done oversea (which the IT department had no control over). To mitigate these risks, the IT department exercised two strong formal control mechanisms on the local members of the overseas vendor, i.e. formal outcome control and formal behavior control mentioned in Kirsch (1997). These two control mechanisms fit into the ex-post deterrents control definition: control which aims to minimize the opportunism tendency, through structural safeguard during the management of alliance in the literature of joint venture (Das et al. 1998). With high trust in the ability of partners (such as airlines) to work with the IT staff in an ‘IT-enabled co-creation of value’ way, strong IS planning capabilities to derive precise system requirements and ex-post deterrent formal controls over the vendors to ensure absolute conformance during implementation, the IT department was able to derive precision-based agile IT adoption practices. These practices allow the BCIA’s IT department to ‘sense’ the requirements before implementation in absolute precision with almost no alteration to specifications during implementation. Table 4 shows the organization capabilities of Airport Security System and Figure 3 shows the inductively derived model for the Airport Security System.
Table 4: Identified Organization Capabilities in Airport Security System Implementation

<table>
<thead>
<tr>
<th>Shared Ideology Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attractive identity</td>
</tr>
<tr>
<td>The motivation of being associated with working on a cause that adds significant value to one’s worth as perceived by others.</td>
</tr>
<tr>
<td>Collective reality interpretations</td>
</tr>
<tr>
<td>An interpretation made through group consensus (often unspoken) of what the reality is like.</td>
</tr>
</tbody>
</table>

Knowledge Integration Capability
The ability to fuse knowledge across the organization or outside of the organization together and use it effectively

Socialization Capabilities (Van Den Bosch et al. 1999)
We posit that the shared ideology and knowledge integration capability fit the definition of ‘socialization capabilities’ which is defined as the ability of a firm to produce a shared ideology that offers members an attractive identity as well as collective interpretation of reality which give rises to social and knowledge integration.

Figure 3: Airport Security System - Adeptness-based Agile Adoption Practices
In the context of trust of partners and vendor, our findings reveal that there is very little trust of both of their ability to come up with an appropriate solution that can ensure the risk can be effectively mitigated. As a result, the IT department adopts a combination of control mechanisms namely, formal behavior control and informal clan control, to transform the socialization capabilities into 'adaptness-based' agile IT adoption practices. These practices allow the IT department to become highly proficient and efficient in responding to uncertainties in both system requirements and its manpower resource allocation capabilities that lead to eventual agile adoption of the security system across BCIA. The two control mechanisms can be deemed as a form of ‘ownership control’ which is defined as control that allows the creation of equity ownership in a joint venture so that vendor, partners and IT department are bind together closely for a common goal and value (Inkpen et al. 2004). Table 5 shows the
organization capabilities of Data Centre System and Figure 4 shows the inductively derived model for the Data Centre System.

### Table 5: Identified Organization Capabilities in Data Centre System Implementation

<table>
<thead>
<tr>
<th>Stakeholder Management</th>
<th>The firm’s ability to manage linkages between IS function and stakeholders outside the firm (Wade et al. 2004).</th>
</tr>
</thead>
<tbody>
<tr>
<td>External relation management (Wade et al. 2004)</td>
<td>‘This capability represents processes of integration and alignment between the IS function and other functional areas or department of the firms’ (Wade et al. 2004).</td>
</tr>
<tr>
<td>IS-business partnerships (Wade et al. 2004)</td>
<td>‘This capability represents processes of integration and alignment between the IS function and other functional areas or department of the firms’ (Wade et al. 2004).</td>
</tr>
</tbody>
</table>

**IT change management Capability (Bharadwaj 2000)**

The ability of IS managers to understand how technologies can and should be used, as well as how to motivate and manage IS personnel through the change process.

**Coordination Capabilities (Van Den Bosch et al. 1999)**

We posit that the above two capabilities combined to form ‘coordination capabilities’ which are defined as capabilities of which an organization leverages upon the relations between members of a group (enabled through stakeholder management) for knowledge absorption through lateral way of coordination (enabled through IS change management capability).

### Development Model of Improvement-based Agile Adoption Practices (Airport Data Centre System)

<table>
<thead>
<tr>
<th>Triggers</th>
<th>Resource Introspections</th>
<th>Transformation Agents</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project High Complexity</td>
<td>Coordination Capabilities</td>
<td>Perceived Risks as Catalyst</td>
<td>Improvement-based Agile Adoption Practices (Airport Data Centre System)</td>
</tr>
<tr>
<td>Perceived High Risks</td>
<td>Stakeholder Management</td>
<td>Influential Peer Concertive Control</td>
<td>Agile adoption practices that allow organization to quickly address system defects and/or manage disruptive changes during system implementation. This is achieved through enhanced coordination capabilities that ensure the accurate alignment of IT system implementation with organization’s objectives which set the foundation for rapid adoption of that IT system.</td>
</tr>
<tr>
<td>Project Completion Urgency</td>
<td>IS Change Management</td>
<td>Formal Outcome Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weekly progress tracking meeting. Payment to vendor by phases and only upon satisfactory delivery of project deliverables.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Informal Self Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete freehand to vendor on handling implementation details. Started the project with vendors even before the contract was signed. Vendor self-imposed reporting routines to update status of project. Vendor took on extra duties without payment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trust</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vendors High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partners Low</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4: Data Centre System - Improvement-based Agile IT Adoption Practices

It is clear in the analysis of the case data that complete trusting relationships exist between the BCIA IT department and the vendor. The same, however, cannot be said about the stakeholders involved (i.e. airlines, shop owners and etc.) mainly due to monetary transactions that the system must perform. From the perspective of perceived risks, the
timeline (within 6 months) to get this work completed is significantly shorter. These consolidations of factors result in BCIA IT department adopting two control mechanisms namely formal outcome and informal self control. These implemented control mechanisms (i.e. formal outcome control and informal self control) fits the definition of concertive control which is defined as control that is executed through influential personnel upon a self-managed work group and is achieved when the self-managed work group reaches a consensus on how to shape their behaviors according to a set of core values (Kohli et al. 2004). In the case of data centre implementation, there exist two self-managed work groups: (1) the BCIA IT team and its various stakeholders; and (2) the BCIA IT team and vendor. The locus of control is shifted from the BCIA management to these two self-managed work groups to impose their specific control mechanisms to ensure the successful fulfillment of the requirements. The BCIA IT and the vendor project manager play the role of influential personnel that translates the necessary core values of BCIA management into the implementation of the project to ensure conformance of desired behaviors. We, therefore, grouped the two control mechanisms used as influential peer concertive control. The end result is the development of improvement-based IT agile adoption practices which are similar to agile improvement practices which are defined as practices that build up an organization agility to response by enhancing coordination and alignment with other initiatives (Börjesson et al. 2006).

Cross Case Analysis

These identified agile IT adoption practices, like in the literature of enterprise agility (e.g. Overby et al. 2006; Sambamurthy et al. 2003), can be distinctly divided into two components namely, sensing practices and responding practices. The overarching inductively derived model is shown in Figure 5 and the definition of these practices summarized in Table 6.
is responsible in accurately detecting opportunities for appropriate introduction of IT innovation into an organization which consequently reduces the resistance that are evident in many large scale cross organization system implementation (Lapointe et al. 2005).

Enhance an organization’s ability to arrange its assets, knowledge, capabilities and relationships to mitigate all the unforeseen circumstances that occurred during system implementation to keep the project aligned with business objectives of BCIA.

Conclusion

Theoretical and Practical Implications

The models derived inductively in this study seek to address the two research questions identified earlier in this paper namely: (1) How are agile adoption practices developed within an organization? (2) What types of agile adoption practices can be developed in an organization? In our study, we have presented several models detailing how agile IT adoption practices can be developed within an organization. In total, we have identified four distinct types of agile IT adoption practices that can be developed. By showing the way in which specific organization capabilities that can be transformed into agile adoption practices through the appropriate use of organizational control mechanisms contingent upon trust of its stakeholders, this study makes several important theoretical contributions.

First, it demonstrates the specific ‘innovation configuration’ (Fichman 2004) that needs to be put in place so that agile IT adoption can occur. This fills the gaps as advocated by many adoption researchers and answer to the call to look beyond the dominant IT adoption model (e.g. Benbasat et al. 2007; Fichman 2004; Frambach et al. 2002). Besides this, the study highlights the increasing importance of the urgency of agile adoption of an IT system in a hypercompetitive environment. It addresses the knowledge gap of not considering urgency, speed, extend and appropriateness of IT adoption in totality in organization IT adoption research. Together, these two contributions enhance our understanding on IT adoption and provide insights to practitioners on ways in which they can enable agile IT adoption in an increasingly ‘flat’, globalized and hypercompetitive world.

Second, the study addresses the lack of empirically validated evidence in extant literature on enterprise agility especially in the area of agile IT adoption (Baskerville et al. 2005). It does this by informing us how we can accelerate the process of IT adoption through the development of agile IT adoption practices which in turns permit an organization to become more agile. From a practical perspective, it offers specific roadmap to guide practitioners in developing enterprise agility within its organization through agile IT adoption practices. Hovorka & Larsen (2006)’s study on agile IT adoption practices is focused primarily in a networked organization structure while this study complements Hovorka & Larsen (2006)’s study through the investigation of agile IT adoption practices within an organization. Together, it provides more holistic understanding of what constitutes agile IT adoption practices and the underlying mechanisms to enable it both within an organization and in a networked environment.

Third, this study contributes to the area of organizational control and trust. The extant literature on organizational control is predominately focused on identifying the various factors that will influence the selection of specific control mechanisms during system development activities. The relationship between trust and control is rarely examined together (e.g. Cardinal et al. 2004; Choudhury et al. 2003; Kirsch 1997; Kirsch 2004; Kohli et al. 2004; Nidumolu et al. 2003-4). As far as we know, the only study that combined the trust and control in the control literature is done by Rustagi et al. (2008). Yet, we know that control mechanisms are often intertwined with trust especially in a joint venture relationship with each affecting and being affected by each other (Das et al. 1998). Answering to the call of Inkpen & Currall (2004), this study provides empirical evidence to demonstrate the effect of control mechanisms and trust together in the development of agile IT adoption practices.

Limitations and Future Research

Like many single case research study, the problem of generalizability or external validity is one of the key limitations as advocated by many researchers (Walsham 2006). Yet, it should be noted that a single case methodology is actually a “typical and legitimate endeavor” in qualitative research (Lee et al. 2003, p.231). While statistical generalization is impossible to achieve with our single embedded case study design, the iteratively analysis between literature and data grounded in the empirical reality of our case study, has yielded significant rich insights and achieved theoretical saturation (Strauss et al. 1990) of which learning from additional data is minimal.
The second limitation of this study is that it focuses on customization of off-the-self systems, which may also limit its generalizability of its findings across other context of application. However, theoretical generalizability of our findings is still a viable option which is consistent with extant literature under the principle of “analytical generalization” (Yin 2009) or “generalizing from description to theory” (Lee et al. 2003, p.235). This is possible due to the employment of the single embedded case design. The analysis of individual embedded case provides a rich set of evidences to support the analysis of another embedded case. For example, it is evident during the first group interview that some forms of control mechanisms are being mashed with existing organization capabilities to form agile IT adoption practices. This provides the necessary foundation for the research team to construct the preliminary theoretical model. This model is then being rigorously validated and continually refined as the team moved from one group interview to another. When empirical data collected in each group interviews corroborates with our theoretical model, we achieve the level of “analytical generalization” as advocated by Yin (2009) where “a previously developed theory is used as a template with which to compare the empirical results of the case study” (Yin 2009, pp. 38). Future research can be focused on validating our propositions made in this study as well as in our models statistically across other context of application so that the understanding of our proposed models can be better refined.

Appendix A

<table>
<thead>
<tr>
<th>Description</th>
<th>Job Title of Interviewees (Role in T3 IT project in Bracket and Bold)</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-site Preliminary</td>
<td>General Manager, Information Dept, Capital Airports Holding Company (BCIA Management)</td>
<td>1</td>
</tr>
<tr>
<td>Individual Interviews</td>
<td>Deputy Manager/Chief Engineer (Project Manager, Western SOCC Project) and Chief Engineer (Project Manager, Data Centre System Project)</td>
<td>2</td>
</tr>
<tr>
<td>Overview Interview</td>
<td>Deputy Manager/Chief Engineer (Project Manager, Western SOCC Project - First generation AODB administrator), Business Manager, Production Control (Business Process Lead, AODB System Project) and Engineer (Technical Lead, AODB &amp; Data Centre System Project - Current AODB administrator)</td>
<td>3</td>
</tr>
<tr>
<td>AODB System Project</td>
<td>Deputy Manager/Chief Engineer (Project Manager, Western SOCC Project), Chief Engineer (Project Manager, Data Centre System Project) and Engineer (Technical Lead, AODB &amp; Data Centre System Project)</td>
<td>3</td>
</tr>
<tr>
<td>Airport Departure</td>
<td>Business Manager, System Services Engineer (Business Process Lead, Flight Display System Project) and Engineer, Eastern SOCC (Technical Lead, Flight Display System Project)</td>
<td>2</td>
</tr>
<tr>
<td>System Project</td>
<td>Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>2</td>
</tr>
<tr>
<td>Airport Security System</td>
<td>Business Manager, IT Services Engineer (Business Process Lead, Western SOCC Project) and Business Manager, IT Services Engineer (Business Process Lead, Western SOCC Project)</td>
<td>3</td>
</tr>
<tr>
<td>Project</td>
<td>Business Manager, System Services Engineer (Business Process Lead, Luggage System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>2</td>
</tr>
<tr>
<td>Airport Data Centre</td>
<td>Business Manager, System Services Engineer (Technical Lead, Luggage System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>2</td>
</tr>
<tr>
<td>Project</td>
<td>Business Manager, System Services Engineer (Technical Lead, Luggage System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>2</td>
</tr>
<tr>
<td>Airport Flight Display</td>
<td>Business Manager, System Services Engineer (Technical Lead, Luggage System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>2</td>
</tr>
<tr>
<td>System Project</td>
<td>Business Manager, System Services Engineer (Technical Lead, Luggage System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>2</td>
</tr>
<tr>
<td>Terminal &amp; System</td>
<td>Business Manager, Western SOCC Project (Project Manager, Western SOCC Project), Business Manager, Western System Operation Control Center (Business Process Lead, Western SOCC Project) and Business Manager, Production Control (Business Lead, AODB System Project)</td>
<td>3</td>
</tr>
<tr>
<td>Command Centres</td>
<td>Business Manager, Western SOCC Project (Project Manager, Western SOCC Project), Business Manager, Western System Operation Control Center (Business Process Lead, Western SOCC Project) and Business Manager, Production Control (Business Lead, AODB System Project)</td>
<td>3</td>
</tr>
<tr>
<td>Final Interviews and</td>
<td>Executive Vice President cum CIO, BCIA (BCIA Management), Manager (BCIA Management), Deputy Manager/Chief Engineer (Project Manager, Western SOCC Project), Chief Engineer (Project Manager, Data Centre System Project), Engineer (Technical Lead, AODB &amp; Data Centre System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>6</td>
</tr>
<tr>
<td>Finding Presentation</td>
<td>Executive Vice President cum CIO, BCIA (BCIA Management), Manager (BCIA Management), Deputy Manager/Chief Engineer (Project Manager, Western SOCC Project), Chief Engineer (Project Manager, Data Centre System Project), Engineer (Technical Lead, AODB &amp; Data Centre System Project) and Business Manager, IT Services Engineer (Business Process Lead, Luggage System Project)</td>
<td>6</td>
</tr>
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References


