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PROCESS MODEL OF GOVERNANCE FOR AGILITY: A HEALTHCARE SYSTEM IMPLEMENTATION IN CHINA

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Abstract

For an organization to sustain in the dynamic environment today, agility has become a key solution in its survival struggle. In attaining agility capability the standard formula for an organization is to achieve high flexibility in responding to stimulus and change. From this perspective, we have found a unique case study in which a hospital has successfully implemented three healthcare IT systems -EMR, HIS and PACS within two months in responding to internal and external challenges. In this case study, 21 informants were interviewed to find how institutional governance for agility influences the progress of Hospital Information Systems (HIS) implementation in ZCH hospital. Data analysis was performed in tandem with collected data, recursively iterating between the empirical data, theoretical lens, and literature, in the mould of building the process model. This process model of governance for agility suggests that an agile HIS implementation is achievable via strategic use of different IT governance models to promote greater use of organizational capabilities in preparing hospitals for change. It has value-added the literature by introducing different IT governance models at different phases of HIS implementation. Practitioners could plan an agile HIS implementation by referring to the model as a systematic roadmap in governing and strategizing hospital resources and capabilities.

Key words: Agility, Governance, Healthcare Information Systems (HIS), Case Study.

1 INTRODUCTION

Healthcare IS is referred to as various IT applications that may include different modules such as registration, electronic medical record systems, and laboratory systems. Aside from its technology complication, it is being challenged by a complicated system (Tan et al., 2005). Reason being, the development of HIS for hospital should not only take into consideration the common management issues but also include specific demands of different functional departments of a hospital together with medical traditions, and regulations (Goldschmidt, 2005) which require great amount of medical knowledge (Tan et al., 2005). A way to overcome these challenges would depend on the governance of a hospital which was claimed to be an important barrier to HIS development (Lapao, et al., 2009).

The change of expectations in the healthcare industry has reignited the challenge of HIS implementation. Especially, the need to respond readily to the government initiatives has added challenge to hospitals in China. In facing the turbulence of industry pressure, to survive and continue to perform within the government expectation, it is about the speed, which a hospital can respond to market dynamics (Mathiassen and Pries-Heje, 2006). Thus, hospitals have to be agile to respond quickly, resourcefully to adapt, perform and transform (Mathiassen and Pries-Heje, 2006; Sambamurthy, et al., 2003). Given the dynamism of the current healthcare environment, although agility is painted as a solution for maintaining competitiveness in this relatively new paradigm (Mathiassen and Pries-Heje, 2006) but there is a limited recognition within the information systems discipline as to how it could be governed and executed (Van Oosterhout, et al. 2006). In view of this, this study aims to explore the question- how does the agility governance influence the progress of hospital information systems (HIS) implementation?

The focus of the selection is based on the ground that not only the Zhejiang Cancer Hospital (ZCH) possesses the lightning speed in implementing and customizing hospital-wide Information Systems within two months but also its success of having 1100 employees and 136 medical professors in using the full-fledged integrated IS system in treating about 10 thousand patients a year. Thus, there is ground to believe that insightful lessons could be found to unpack the mystery of relationship between governance and agility, and providing actionable prescriptions for practitioners. By doing so, our findings could shed light on the governance for agility in supporting HIS implementation and complementing the existing governance and agility literature for theoretical advancement in a more holistic perspective. An overview of the literature is presented below, followed by an outline of the case study methodology. Analysis of the findings is then presented, based on the case study company. Finally, highlights of the research findings are discussed, followed by the conclusion which draws attention to the theoretical and managerial contributions of this research.

2 THEORETICAL BACKGROUND

2.1 Agile Enterprise

Agile enterprise is a relatively new concept introduced as a solution for organizations in managing dynamic and changing environment (Yusuf et al., 1999) based on their efficient and effective (Seo and La Paz, 2008) sensing and responding abilities (Bradley and Nolan, 1998, Weill et al., 2002). When change is detected, an agile organization would be able to react accordingly with the capability to change with nimble, quick successions in responding and adapting gracefully to the expected and unexpected events in their environment (Mathiassen and Pries-Heje, 2006). Sensing is regarded as the intellectual ability to find appropriate things to act on; while responding is referred to the physical ability to act (Dove, 2001) in a way that it may entail the re-alignment of resources, processes and/or organizational objectives (Seo and La Paz 2008) towards anticipated or unexpected change in proper ways and due time by exploiting changes and taking advantage of them as opportunities (Sharifi and Zhang, 2000). However, till today, the matter on how organizations can successfully survive and prosper in an unpredictable, dynamic, and ever-changing environment has been a prevailing topic for a few decades both in industry and academia (Lyytinen and Rose, 2006), especially in the arena in

terms of categorization of large diversity of strategies, techniques, and practices of agile enterprise would require further investigation (Sherehiy et al, 2007).

The agility concept introduced into information systems (IS) research several years ago (Overby et al., 2006), was mainly studied in three general aspects- IS-enabled agility (Tallon, 2008; Sambamurthy et al., 2003; Van Oosterhout, et al., 2006); IT-enabled agility (Fink and Neumann, 2007) and agility enabled-IT (Overby, et al., 2006; Hovoka and Larsen, 2006). Among these studies, there is a lack of study on how to be agile in IT implementation and only a handful of studies were carried out in this area (Hovorka and Larsen, 2006). In view of this, there is a pressing need for empirically validated model to crystallize the types of agility required in different stages of IT implementation.

By upholding the understanding of enterprise agility based on the relationship between adoption/diffusion of IT and enterprise agility without questioning the influence of IT governance, as in who plan, manage and call for the change would downplay the essential role in delivering superior agility (Tallon, 2008). Especially, the unique traits of enterprise agility are recognized to be salient to competing in turbulent conditions that require high attention and imagination of managers (Tan et al., 2009). For this reason, we are interested to understanding how agility is governed by managers as by far within the IS discipline, it remains as a niche area which requires more research (Van Oosterhout, et al., 2005).

In general, the lack of empirical validation and the general lack of knowledge on how to be agile in IT implementation are the theoretically knowledge gap of this study. In particular, the lack of understanding on how agile capability is governed, nurtured and leveraged in delivering superior agile IT implementation remains as the 'black box'. To address the identified gaps, we begin with a review of IT governance, which is an appropriate start for our inquiry since IT governance is claimed to be the essential role in delivering superior agility (Tallon, 2008), and this research primarily focuses on the IT governance archetype and structure (Weill and Ross, 2005) that underlies the organizational capability for agility (Gallagher and Worrell, 2008)

2.2 IT Governance

The need for IT governance concept emerged over times and eventually became an important issue in the IT arena (De Haes and Grembergen, 2004). Especially IT governance is designed to achieve internal efficiency such as deploying good IT processes and making sure that the means and goals are achieved but rather for insightful decision-making only (Simonsson, et al., 2010). However, disregard of its impact, study suggested that IT governance remains a mystery to key decision makers for most companies (Weill and Ross, 2004). More interestingly, IT governance is often regarded as the weakest link in a corporation's overall governance structure (Huber, 2004). For this reason, IT governance remains an important field of IS/IT study for both practitioners and academics (Brown and Grant, 2005).

In this study, IT governance is defined as "*specifying the decision rights and accountabilities framework to encourage desirable behaviour in using IT*". The definition implies that IT governance involves IT-related decision-making structure and methodologies to plan, organize, and control IT activities (Prasad et al., 2009). This concept is not concerned with the location and distribution of the IT resources alone (Boynton et al., 1992) or the content of the decisions (McManus, 2004) but it is rather a type of mechanism that can ensure organizations to achieve certain IT capabilities (De Haes and Grembergen, 2005). In addition, it is also known as the driver of decision-making process within organizations, which may be affected by the different requirements and scopes from external and internal environments (Xue, et al., 2008). In the sphere of external environment, different degrees of uncertainty requires the adoption of different types of IT governance (Xue et al. 2010). Internally speaking, IT decision rights are usually shared by two groups of people: IT experts and clients (Tiwana and Konsynski, 2010). The gaps between the knowledge of IT experts and clients pose great challenges to the governance pattern of information system development because the IT units generally only have technical knowledge but lack the clients' domain knowledge, and vice versa (Tiwana, 2009). In view of these contingency factors, no single type of IT governance is suitable for all organizations (Sambamurthy and Zmud, 1999).

To better understand this concept, IT governance has been categorized into different archetypes based on the distribution of decision rights, such as centralized, decentralized, federal, and hybrid (Brown and Grant, 2005). Weill and Ross (2004) proposed six IT governance archetypes, excluding those who have input rights to the decision. In comparison, Xue et al. (2008) studied IT governance using a stage-based approach in the context of IT investment decision-making in the healthcare industry. The benefit of a stage-based approach is that different modes of IT governance can be discovered considering different actors and different conditions involved in the process of decision-making (Xue et al. 2008). In view of this, it could be expected that different types of IT governance may be presented in those phases in order to make organizations acquiring the necessary type of ISD agility to deal with the changing situations (Olson and Chervany, 1980). However, research in this direction is still rare. Thus, it would be interesting to study IT governance to understand how organizations adjust and change themselves quickly and appropriately in order to implement the right information systems they need.

3 RESEARCH METHODOLOGY

The case study research methodology was adopted because our research aims to unveil the “how” question (Walsham, 1995) that delves into the process of governing agility which influences the progress of HIS implementation. In addition, IS implementation comprises technological and complex human social components (Tyrell, 2002) by interpreting the understanding of the relevant stakeholders (Klein and Myers, 1999).

A total of 21 interviews were conducted with the president, middle management, internal and external IT support staff, doctors, nurses, vendor HIS director, and vendor IT consultants. All of the face-to-face interviews, lasted about 60 to 120 minutes, were digitally recorded for transcription and notes-taking to capture any salient points for further consideration. The interview questions were exploratory in nature, open-ended and tailored to the role of the informants. Newspaper articles, medical reports, hospital internal publications and website information were used to complement the primary data to form a more complete picture of the facts in establishing triangulation and maintaining a chain of evidence. On-side observations were carried out, where we saw how the systems were used by nurses/staff in accessing the surgery booking, emergency ward, and patient check-in systems to triangulate the efficiency and effectiveness of the system,

Data is analyzed inductively from “the heart of theory-building process” in case studies (Eisenhardt, 1989, p. 539). In view of its criticality, data analysis was performed in tandem with collected data, recursively iterating between the empirical data, the theoretical lens, relevant literature (Eisenhardt, 1989). Later, a visual mapping strategy and a narrative strategy (Langley, 1999) were used to organize the primary and secondary data. From the emergent data, visual maps were compared with the theoretical lens and literature to shape our emerging theoretical ideas. Then, ideas were captured and sketched with the narrative to verify with the relevant stakeholders at ZCH for validation before the completion of the emerging process model. This process would be continued until the theoretical saturation was reached, where it was possible to comprehensively explain the findings of the case study with no additional data possibly collected (Eisenhardt, 1989).

4 CASE STUDY

4.1 Sensing the Need for HIS implementation

Prior the implementation ZCH, one-of-the-top-four cancer specialist hospitals in China externally quoted as a poorest-performing hospital with obsolete HIS by the Zhejiang medical professional board and also internally received countless complaints about its poor IT supports and services, was at the crossroad enduring tremendous pressures to implement agile HIS. The hospital pressure and sense of urgency was further challenged by the change of government 3A healthcare rating. This 3A-hospital certification is the highest-rating standard set in China that includes a comprehensive assessment on the hospital’s medical, administration, equipments, HIT standard, and research performances.

4.2 Phase 1: Responding to change by establishing strategies

Responding to the intense need for change from external and internal pressures, and to regain its recognition and reputation in the industry, way back to April, 2005, ZCH had positioned itself to implementing the primer use of an advanced, integrated HIS technology. Aware of the fact that competitive imitation was rampant in the rapidly-developing hospital industry, ZCH took the initiative to adjust the IT governance structure for decision rights and accountabilities to encourage desirable behaviour to facilitate swift change, in which leadership monarchy was enacted to provide quicker response for decision-making.

Seizing the change, the president responded by restructuring its worst-performing department, the IT department, with new IT governance processes as to what had to be done by whom, when and how. Several seminars were organized by the president to create awareness and prepare users for the upcoming changes. Various HIS-prototype presentations were then demonstrated to the selected hospital representatives along with hundreds of vendor selection surveys issued to users, IT staff and senior management for selection purposes. In the due process, Mediinfo Company was shortlisted as one of the preferred companies based on its experience and reputation in the industry.

However, knowing the time constraint and lack of experience as major obstacles in managing this HIS implementation project, the president and those responsible visited a few hospitals to learn from their success stories. After due consideration, in June 18, 2006, the president made a unilateral call to outsource this IT project to Mediinfo to kick start the project. To strategize for an agile HIS implementation, ZCH introduced monarchy governance to seek opportunities, counter threats, and provide solutions in achieving the hospital goals, as summarized in table 1 below:

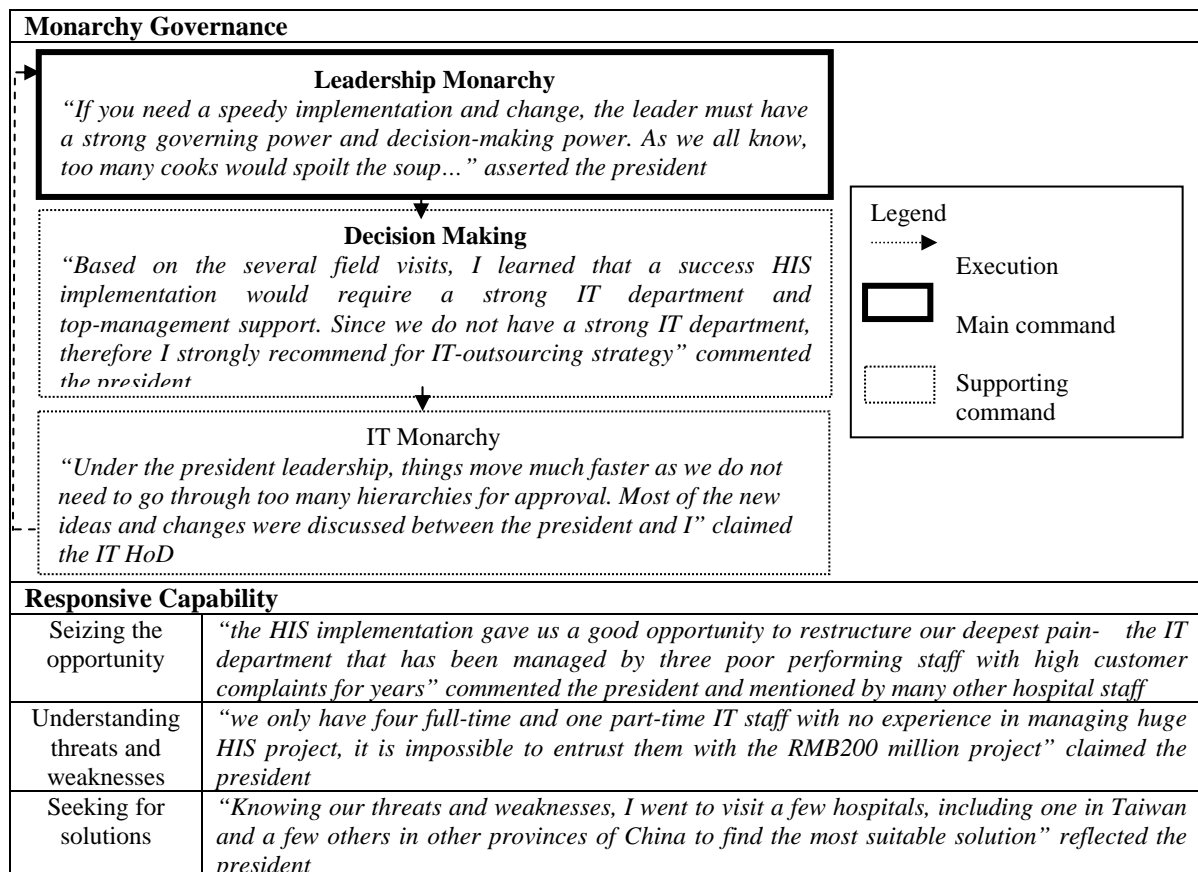


Table 1. Phase I: Responding to change by establishing responsive strategies

4.3 Phase 2: Harmonizing the relational and systems implementation planning

In responding to the government’s implementation of the 3A-rating within two months, ZCH went into high gear. During this time, although the president maintained an active role in directing the

overall process of system migration and commissioning/go-live but, soon he realized that the biggest threat at this moment came from the inability to governing and harmonizing the relational (diversity of stakeholders relationships) and multiple HIS systems implementation planning. Immediately, he reformed the governance structure by positioning the newly-joined vendor project manager (Vendor PM) together with IT HoD in the IT monarchy and granted them with considerable autonomy to respond to areas they deemed important. Empowered by the new governance structure, the Vendor PM gained the confidence to openly discuss and share her expertise and experiences in leading this project. Leveraging on the IT HoD, together both leaders were able to harmonize the tensions between different stakeholders. Within three weeks, a constructive HIS implementation schedule was prepared and approved.

The next challenge was the system integration of Picture Archiving and Communication Systems (PACS) with Mediinfo-HIS and Electronic Medical Record (EMR) to offer a seamless clinical service. But due to intellectual property rights, none of the system representatives was willing to take the initiative to disclose its source code for the integration process to be carried out. After a prolonged stalemate and pressured by time constraint, the president was forced to step in and resolve this issue by issuing the ultimatum to both parties. Eventually, Mediinfo being the main contractor finally agreed to open its HIS source code for EMR to integrate. Clearly, the adoption of relational and system governance had led to a coordinated form of HIS implementation whereby the perspectives of a diverse range of organizational stakeholders were reconciled and integrated. To provide good governance for agility in this phase, ZCH moved beyond simply seizing, understanding and seeking to analysing, encouraging and monitoring the interactions between its members to anticipate and predict possible issues that might delay the progress of phase II, as summarized in table 2.

Relational and Systems Governance			
<p>Leadership Monarchy</p> <p><i>“Adjustment for appropriate governance is crucial in this project, I have to constantly analyze what’s needed by the team, how I could better support them for speedy implementation, especially when the time is running out” asserted the president</i></p>			
<p>IT Monarchy</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> <p style="text-align: center;">IT HoD</p> <p><i>“I see the potential for the integration as it doesn’t make sense to have our medical doctors to key in two sets of data into HIS and EMR. But it is beyond my level to deal with the intellectual property issues. Therefore I feed back to my boss for action.” asserted the IT HoD</i></p> </td> <td style="width: 50%; padding: 5px;"> <p style="text-align: center;">Vendor PM</p> <p><i>“We have done HIS implementation in more than 300 hospitals across China but we have never done integration with EMR. Since the president has stated his point clearly, as the main vendor of this project we have to give in to our customer needs. In the end, we were pleasantly surprised by what we could achieve. The Integration is a breakthrough for all of us” commented the Vendor PM</i></p> </td> </tr> </table>		<p style="text-align: center;">IT HoD</p> <p><i>“I see the potential for the integration as it doesn’t make sense to have our medical doctors to key in two sets of data into HIS and EMR. But it is beyond my level to deal with the intellectual property issues. Therefore I feed back to my boss for action.” asserted the IT HoD</i></p>	<p style="text-align: center;">Vendor PM</p> <p><i>“We have done HIS implementation in more than 300 hospitals across China but we have never done integration with EMR. Since the president has stated his point clearly, as the main vendor of this project we have to give in to our customer needs. In the end, we were pleasantly surprised by what we could achieve. The Integration is a breakthrough for all of us” commented the Vendor PM</i></p>
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<p>Decision Making</p> <p><i>“We are glad that after the president encouragement for communication, we can see the significant improvement in cooperation from all parties. With all parties’ assistance, we are able to schedule and prepare for the one-month HIS big-bang implementation plan” feed backed by IT HoD and Vendor PM.</i></p>			
Harmonizing Capability			
Analysing needs	<i>“I’m very glad to working with this IT HoD because she can always resolve our conflicts by fulfilling our needs. She has played a key role in this project success by harmonizing our working relationships with multiple stakeholders” commented the Vendor PM</i>		
Encouraging communication	<i>“Since there is barely sufficient time for orientation to welcome the newly-joined IT consultants as we have to integrate and implement all systems within one month, therefore the only way is to encourage communication among staff. We tried our best to provide friendly working environment for them, including using our lunch time to create more opportunities to know each other” commented the IT HoD.</i>		
Monitoring interactions	<i>“After monitoring the negotiation among different vendors in the system integration battle and knowing that is going no where, I have to impose my authority to ensure a party will give in for the system integration. It is important for us to have an integrated HIS system but not isolated HIS that couldn’t share information” commented the president.</i>		

Table 2. Phase II: Harmonizing the relational and systems implementation planning

4.4 Phase 3: Manoeuvring resources and implementing systems

The cumulative experiences and harmonized working relationship gained over times have empowered stakeholders the knowledge and networks to swiftly manoeuvre resources to support system go-live within a month. To engage in the highly dynamic working environment, IT HoD and Vendor PM continue to hold due authorities in the handling of the previous phases. Meantime, the president played a supervision and supportive role with minimum intervention.

To ensure success system go-live, IT HoD analysed the hospital daily operation needs before merging her plan with the vendor PM to execute the parallel system migration and talent competency mapping. Without further delay, new talents were pulled from the vendor's headquarters to complement with the existing IT manpower across the organization to support parallel system implementation. That includes the involvement of IBM, the third party consultant. To make sure that the objective of system migration could be successfully carried out within a short span of a few hours, the vendor PM and IT HoD had to pull in all their available resources of about 30 staff to assist IBM consultants. With tremendous efforts and teamwork, they eventually managed to successfully switch on the system for running just as before 6 am, the start of the hospital operating day. After the successful commissioning of the new system, the system testing and maintenance work began throughout the day to smoothen daily hospital operations. To ensure the smooth running of 24-hour operations, key stakeholders (five internal IT staff and six IT consultants) including the IT HoD and Vendor PM had to stay in the hospital's quarters for the critical first-month period. The 24x7 operations systems went on unhindered for the next three weeks until all the systems were fully-integrated and implemented across the entire hospital. The IT HoD and Vendor PM team were on high alert mode for the first-half of the day before calling this project a success and ready for the government 3A-rating on September 21, 2006. The ability for HIS to go-live within a month, ZCH had to govern its limited resources to support parallel system implementation by the mix-and-match talent competency within the diverse range of talents as summarized in table 3.

Resource Governance							
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Bricolage Capability							
Parallel project implementation	<i>"I'm very glad to working with this IT HoD because she can always find ways to get use of the necessary supports to make sure that we have enough manpower to run the parallel project implementation. More importantly, I'm very impressed with the culture of this hospital staff where they are willing to work extra hours including staying back in the hospital. Impressed by them, in the end, I joined them by staying in the hospital for one month without returning home." Commented the Vendor PM</i>						
Talent Competency	<i>"I would only need to bring in a few IT specialist consultants to lead the team. I find our existing IT consultants and the internal IT staff could pick up fairly quickly therefore it has significantly reduced our concern of talent matching issue" commented the Vendor PM.</i>						

Table 3. Phase III: Maneuvering resources for system go-live

5 DISCUSSION

In the ever-going competitive environment and for survival purposes, ZCH was forced to initiate change in implementing a continuous dynamic IT governance structure to provide agile support of the cutting-edge HIS in the hospital. As evident in the case, in the integrating of the different patterns of IT governance across the three phases, a process model of governance for strategic agility in HIS implementation at ZCH (refer to Figure 1) was inductively derived. This model suggests the process of governing for agility at ZCH is an evolutionary process that can be systematically structured into three distinct phases. The following IT governance models, introduced in different stages of HIS implementation, promote an ongoing organizational learning desire and greater use of organizational capabilities to better prepare organizations for change (Weill and Ross, 2004).

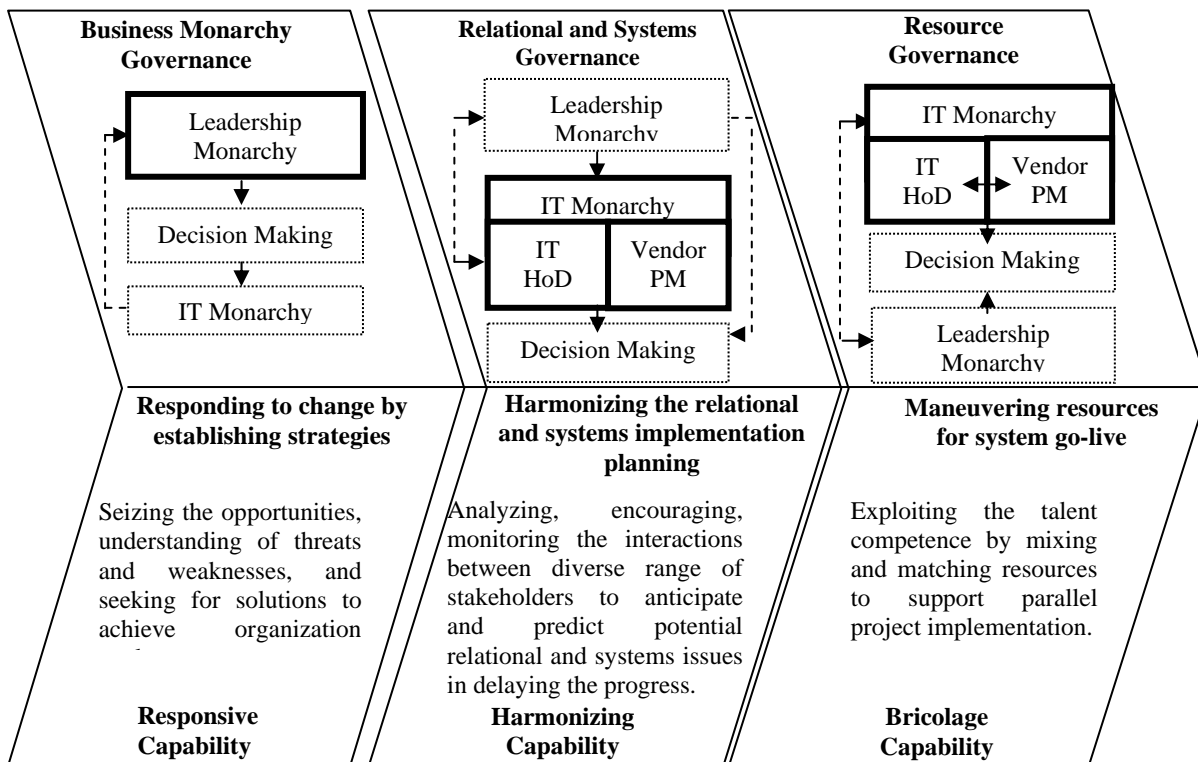


Figure 1. A Process Model of Governing Agility in HIS Implementation

5.1 Phase 1: Responding to change by establishing strategies

To swiftly respond to the need for HIS systems within two months, business monarchy governance was introduced in contingent to the contextual influence (Xue, et al., 2008) to spearhead the project with responsive capability: (1) seizing the opportunities, (2) seeking for solutions to achieve organization goals, and (3) understanding threats and weaknesses. Performing in a demanding environment where changes are required within a short time frame, business monarchy governance (Woolley and Hobbs, 2008) was evidently crucial to the ZCH. This business monarchy was governed by the hospital president who makes all the IT-related decisions for the hospital (Weill and Ross, 2004) to streamline internal efficiency to respond to the external environment.

Firstly, seizing the government hospital ranking as opportunities to upgrade the hospital's healthcare information systems, the president utilizes the opportunity to reset its goals and missions, revamp its internal structures including introducing a new IT monarchy to make available organizational resources for instantiating change (Haeckel, 1999). The IT monarchy is governed by the IT HoD who is accountable to the decision rights in the planning, executing and managing of IT (Weill and Ross,

2004) as evident in the case. Secondly, the newly-defined decision-making structures have enabled ZCH key authorities to better understand the threats and weaknesses before deciding on their healthcare IS implementation strategy. In the case of ZCH, with the help of IT monarchy, the president compared its current hospital status with the lessons learned from the several field visits to its counterparts. Lastly, strategic outsourcing was adopted by the president in order to decrease risks and speed up implementation (Quinn and Hillmer, 1995) to launch this HIS initiative. In summary, the centralized control- business monarchy has governed ZCH with strategic aims and appropriate hospital risk management (Lainhart, 2000) in responding to the changing hospital conditions, with no time wasted.

5.2 Phase 2: Harmonizing the Relational and Systems Implementation Planning

In the second phase, soon after establishing strategies for the HIS implementation, the outsourcing vendor engaged several IT consultant teams to launch the project. However, the involvement of the newly-joined IT consultants with different organizational backgrounds and work styles has added tension and difficulty of getting all the participants to work in harmony (Kaplan and Harris-Salamone, 2009). In contingent to this context, the relational and system governance strategy was introduced to harmonize the tensions between stakeholders (Henderson and Venkatraman, 1993). This new IT governance strategy has restructured the IT monarchy by not only incorporating the vendor PM into the group of IT executive, but also delegating more decision-making powers to the IT monarchy. As a result, agility is achieved when the relational and system governance enable the IT and hospital executives to collaborate and communicate effectively (Weill and Ross, 2004) in deciding how to implement the systems (Brown and Magill, 1994).

Learning from this case study, three harmonizing capabilities were identified: (1) analysing needs, (2) encouraging communication, and (3) monitoring interactions in supporting the agile system implementation. Firstly, the newly-introduced governance structure has empowered the IT HoD to quickly analyse the various stakeholders' anticipated and unanticipated needs. Then resourcefully apply the existing or new relationships to harmonize various stakeholders so that they would adapt to the impacts of such changes (Mathiassen and Pries-Heje, 2006). Secondly, the management action by encouraging communication between various stakeholders has played a key role in harmonizing the working relationship that leads to agile (Weill, et al., 2002) and effective means in achieving system planning and integration (Gallagher and Worrell, 2008) as evident in the case study. Lastly, monitoring interactions is another critical capability in harmonizing the working relationships between various stakeholders. The constant monitoring allows the president to intervene by executing his power to speed up the prolonged stalemate due to intellectual property rights disputes between subcontractors to integrating HIS and EMR.

5.3 Phase 3: Maneuvering Resources for System Go-live

In the last phase, after spending nearly three weeks dealing with relational and systems integration disputes, tension builds up as the government 3A rating due date is less than five weeks away. To speed up the project, resource governance strategy was executed to provide more decision-making powers and flexibility to IT HoD and Vendor PM so that they could effectively mix and match resources to response to change and uncertainty. With this new IT governance strategy, the president played a supportive role with minimum involvement. As evident from the case, this well-designed and well-understood resource governance has enabled organizational agility to response properly to the dynamic environment by exploiting resources and taking advantages of changes (Sharifi and Zhang, 2000) so as to have HIS go-live on schedule.

The organizational agility is realized based on the bricolage capabilities in exploiting and mix-matching resources in supporting the: (1) parallel project implementation, (2) talent competency. Firstly, in the context where time is the main concern, parallel project implementation plan was executed where staff not only had to multitask by juggling different projects at the same time but also work-around-the-clock. The spirit of strong dedication and collaboration between internal and external ZCH staff members was well proven based on their 24x7 support. More interestingly, the key

stakeholders, in the process of work, stayed in the hospital quarters for a month without returning home. Secondly, appropriate mix-and-match talent competency between the stakeholders is crucial to ensure successful parallel project implementation. Fortunately, the harmonized working relationship has enabled the IT HoD to provide Vendor PM with the necessary resource support (Prewitt, 2004) in improving operation efficiency, and enhancing the strategic parallel project implementation to achieving the agile implementation of HIS (Overby et al., 2006).

6 CONCLUSION

6.1 Limitation

No research is flawless. To understand the phenomenon, this study applies theories developed in a Western context to China, using a uniquely Chinese context to further substantiate and extend these theories (Tsui et al, 2004). This case study has some unique Chinese management characteristics around the paternalism concept (Martinsons & Westwood, 1997). That is, the president has a father figure image, with strong personal power, especially in his leadership style, by serving as a mentor and role model (Silin, 1976). The ZCH employees not only pay him high respect and personal loyalty (Westwood and Chan, 1995) but also appear to be rather cooperative and supportive of him. Also, we cannot rule out the possibility that this successful agile implementation might be partially influenced by the Chinese culture. According to Martinson and Westwood (1997), the Chinese have a high level of tolerance of uncertainty. Thus, their situation-accepting attitude seems to trigger a behavioural tendency to look at ways to quickly resolve problems in order to adapt to IT implementation. This adaptability means a general attitude that accepts change as inevitable and tries to make the best of it, thus, in this case the president was able to successfully govern the implementation of an integrated system in just 12 weeks and three days.

6.2 Theoretical and Practical Implications

Initiated by our research questions, this study has made several important theoretical contributions. Firstly, the inductively-derived process model of governing agility in HIS implementation has bridged the literature gaps between HIS, IT governance and agility. As shown in this model, the introduction of appropriate IT governance models triggers different types of agilities to effectively respond to hospital needs at the various stages of HIS implementation. Hence this study contributes to a more holistic perspective of HIS implementation literature as successful agile HIS implementation knowledge has been rare due to the complexities and difficulties of its implementation (Kaplan and Harris-Salamone, 2009).

Secondly, this study value added to the literature claim on the possibility of introducing different IT governance models at different phases of system implementation proposed by Olson and Chervany (1980). From the knowledge-added perspective, the introduction of different IT governance models reflects the organization's response capability in planning for management actions and policies so that it provides organizations with elasticity to respond to changes and become more agile (Weill, et al., 2002). In addition, this study advances the state of existing literature and knowledge by providing specific and testable propositions of attaining governance of agility that are grounded on the empirical reality of a real-world organization.

Thirdly, this study has contributed to the gap by proposing the need of governance for agility. Few studies found that firms' inability to become agile is mainly due to the internal factors (Hackbarth and Kettinger, 2004; Van Oosterhout, et al., 2006). For which this study claims that internal factors would be resolved with appropriate governance, as effective models of IT governance are essential for delivering superior agility (Tallon, 2008). Thus, this study advances the state of knowledge by making a conceptual distinction between the different models of IT governance derived from different organizational capabilities to give rise to agile HIS implementation.

In terms of managerial implications, this study provides a comprehensive and empirically-supported process model that identified the crucial phases of HIS implementation and provided important

indications on how different models of IT governance could inspire agility at different levels of HIS implementation. In particular, practitioners could use this model as a detailed roadmap to identify the appropriate remedial actions, so that they could make most of the efforts and resources in succeeding their HIS implementation to the fullest potential.

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