REALIZING THE BUSINESS VALUE OF INTERORGANIZATIONAL SYSTEMS: THE CASE OF BOOKNET, CORENET AND LAWNET IN SINGAPORE

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I am on a long academic journey.

One phase of the journey has now been completed, which has culminated in the writing of this thesis.

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Finally, while I pack up my bags and embark on a new uncharted phase in this journey, I would like to end on a philosophical note with this (liberating) quote from Bertrand Russell:

"The life of Man, viewed outwardly, is but a small thing in comparison with the forces of Nature. The slave is doomed to worship Time and Fate and Death, because they are greater than anything he finds in himself, and because all his thoughts are of things which they devour. But, great as they are, to think of them greatly, to feel their passionless splendour, is greater still. And such thought makes us free men; we no longer bow before the inevitable in Oriental subjection, but we absorb it, and make it a part of ourselves. To abandon the struggle for private happiness, to expel all eagerness of temporary desire, to burn with passion for eternal things -- this is emancipation, and this is the free man's worship…"

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SUMMARY

In recent years, businesses have increasingly been leveraging the use of the Internet in the implementation of interorganizational systems (IOS) to support more extensive communications and greater cooperation with other members of the supply chain.

At the same time, governments worldwide have been following the lead of businesses in seeking to put the Internet to innovative use – not only in their interactions with citizens but also with businesses. Specifically, some governments today purposefully "intervene" to improve the efficiency and productivity of selected industry clusters, thus paving the way for the local companies in these industries to be more competitive globally. One way of accomplishing this objective is through facilitating the implementation of industry-wide interorganizational systems to streamline information flows among businesses and/or between businesses and government agencies.

Against this backdrop, one example of a country with an advanced "interventionist" agenda and a successful track record is Singapore. Over the years, government agencies in the country have initiated and facilitated many government-to-business (G2B) and business-to-business (B2B) projects such as TradeNet, EDIMAN and EDITRANS to improve the efficiency and productivity of the industries concerned. Such actions require a delicate balancing act of encouraging cooperation while preserving competition in the respective industries – indeed, striking a balance between competition and cooperation may be vital to the survival of firms in today's global economy.

This tension between competition and cooperation within the context of the government's facilitative role has been little studied in IOS literature and thus provides the underlying motivation for this research. In this regard, the purpose of this study is to examine how governments can successfully facilitate the adoption and implementation of interorganizational systems (B2B and G2B) within particular industries.

I begin with a literature review of three major areas of research disciplines that constitute the theoretical bases for this study: diffusion of innovations (DOI), business value of information technology (IT) and change. Based on these theoretical foundations, a preliminary conceptual framework is developed to guide the early empirical work. Through the lens of this perspective, an interpretivist study is then conducted of three government-initiated industry-wide interorganizational system implementations in Singapore: the discontinued BookNet versus the relatively more successful CoreNet and LawNet projects. But what is it about the implementation of these systems that causes a particular project to be relatively more successful than others?

The study's analysis of the three projects in Singapore offers several insights into the nature of challenges that government agencies face and the actions that they can take in leveraging such implementations. First, it enables a deeper understanding of how institutional leadership can be orchestrated to facilitate the implementation of such projects. Second, it explains how the effective exercise of such institutional leadership can be complemented with purposeful stakeholder cooptation to reduce the

risks of failure and maximize the level of realized value. Third, for shared institutional leadership and purposeful stakeholder cooptation to be complementary in their impact on the realization of business value from such implementations, there is a need for interorganizational sensemaking to facilitate convergence between the two change trajectories: that of the lead government agencies and the affected firms within the respective industries. In this regard, such convergence may be highly dependent on the dominant sensemaking style adopted by the institutional leadership and on appropriately combining, pacing and timing various change intervention actions, as the project progresses.

Chapter 1

Introduction

Interorganizational systems (IOS) are IT-based systems that link two or more organizations, and which facilitate the exchange of products, services and/or information (Bakos 1991). Providing transaction processing and/or task support (Benjamin et al. 1990), such systems may be implemented using one-to-one or hub-and-spoke approaches (Markus et al. 2002). While traditional Electronic Data Interchange (EDI) has been around for decades, the advent of the Internet and associated web-based technologies has the potential to facilitate much greater integration among organizations.

Against this backdrop, the Giga Information Group forecasts that the EDI market will grow from US$1.8 billion in 2001 to US$2.1 billion in 2006, and will continue to account for the majority of all computerized business-to-business transactions (Trombly 2002). However, traditional value added networks (VANs) are expected to be progressively replaced by Internet-based channels – while VAN-based EDI traffic growth is currently flat, Internet-based EDI transactions have been growing recently at an annual rate of 50 percent to 60 percent (Bednarz 2004). Indeed, Internet-based EDI is fast playing an important role in the changing business-to-business (B2B) electronic landscape, with its potential to enable smaller companies to climb onboard the EDI bandwagon while building on the strengths of traditional EDI (Angeles 2000). For example, Wal-Mart (a long-time user of traditional EDI) has thrown its weight behind Internet-based EDI with a requirement that all its suppliers use the

Internet to communicate with it via the AS2 security protocol (Bednarz 2004; Harreld 2002; Whiting 2002b; Zimmerman 2003).

Concurrent with such developments, XML is increasingly playing a complementary role to EDI due to its capabilities to similarly support data interchange between companies (Angeles 2000). More recently, XML-based Web Services is being touted as the next-generation EDI with its promise to increase interoperability while lowering the costs of software integration and data-sharing with partners (Gosain 2003; Graham et al. 2003). Similar to EDI however, such XML-based data interchange is also contingent on the use of mutually-agreed vocabularies – in fact, XML-based glossaries have been springing up in many industry segments based on the promise of facilitating more seamless data exchange within each of these industries (Trombly 2002).

In this regard, an AMR survey of the U.S. manufacturing sector a few years ago showed that 36% of companies were using traditional EDI for the majority of their B2B transactions, with 25% for Internet-based EDI and 15% for XML (Bernstein 2002). This co-existence is expected to continue in the years ahead, although a gradual shift away from traditional EDI and towards Internet-based EDI, XML and Web Services is expected (Bernstein 2002; Whiting 2002b). Collectively, these newer Internet-based technologies (with their open standards, lower costs and widespread availability) hold the promise of facilitating more extensive communications, richer information exchanges and greater cooperation among members of the supply chain (Hart and Saunders 1998; Kalakota and Whinston 1997; Riggins and Rhee 1998, 1999).

1.1 From B2B to G2B

Increasingly, more and more businesses have therefore been leveraging the use of the Internet in the implementation of interorganizational systems with key business partners (Scheier 2003; Zuckerman 2004). While high telecommunications costs and restrictive proprietary protocols have previously complicated bilateral business document exchange in the traditional EDI environment, the advent of the Internet and associated web-based technologies is accelerating the B2B momentum.

At the same time, many governments worldwide have followed the lead of businesses by venturing into electronic government and seeking to put the Internet to innovative use in the governance of citizens and businesses. Indeed, government facilitation in the domain of IT-based innovation has witnessed a marked growth over the years (King et al. 1994). For example, while the United States is the clear leader on many fronts of e-business readiness, more and more countries are recognizing the importance of building an e-business infrastructure – prominent examples include Ireland and Singapore (Sarkar and El Sawy 2003).

In recent years, Ireland has been described as the Celtic Tiger for its outstanding economic growth – specifically, it has become a hotbed of software activity due in large part to the Irish government's efforts to industrialize the country (Heavin and Fitzgerald 2004; Sarkar and El Sawy 2003). It is now an excellent example of how the move to an information-based economy can be facilitated by strategic government efforts and of how a national e-business infrastructure strategy requires decisive investments that leverage on national strengths and address country-specific challenges (Heavin and Fitzgerald 2004).

Singapore, of course, has a long-standing reputation as one of the best places in the world to conduct business (Sarkar and El Sawy 2003). Since the late 1980s, the Singapore government has been building capabilities in e-business starting with the launch of the National IT Plan to leverage on networking technologies like EDI and ISDN (Chan and Al-Hawamdeh 2002; Tan and Yong 2003). Since then, government agencies in Singapore have initiated and facilitated many business-to-business (B2B) and government-to-business (G2B) projects which have helped to improve the efficiency and productivity of the target industries (Teo et al. 1997; Teo et al. 1994). Examples include EDIMAN, EDITRANS and TradeNet – the latter was the world's first nationwide electronic trade documentation system that allows the trading community to submit permit applications electronically to government bodies, and receive approvals expeditiously (Gwee and Tan 2002; Teo et al. 1997; Sarker and El Sawy 2003).

1.2 Competitive Advantage of Nations

Meanwhile, the debate over the sources of national wealth and prosperity has continued to rage (Tan and Toh 1998). In the modern globalized economy, this debate has evolved into the search for the economic system, institutions, policies and the proper role of the government that can sustain international competitiveness and generate economic growth over the long term. Porter (1996) notes that such competitiveness is "the degree to which a nation can, under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously maintaining or expanding the real incomes of its citizens".

Specifically, it includes the ability of businesses, groups of businesses, and the country's economy as a whole to sustain future growth relative to that of rival countries (Tan and Toh 1998).

Indeed, competitive advantage of nations (as a home base for companies) is fast becoming an issue of great interest and importance in this age of globalization and pitch battles for world trade. Porter (1990) argues that such competitive advantage is facilitated by a home base with 'demanding buyers, stringent needs and able competitors', one that satisfies all four points of Porter's national 'diamond' – factor conditions, demand conditions, related and supporting industries, and company strategy, structure and rivalry. Favorable conditions in these factors may yield sustainable competitive advantage for a firm based in that particular country, because determinants such as education, industry networks and social structures are less permeable across national boundaries and thus country-specific. In this regard, the move of the hard disk drive industry from Silicon Valley to Singapore in the 1990s is a good case in point which demonstrates how localization can still be a powerful competitive weapon in a world of increasing globalization and how firm-level strategy can co-evolve with purposeful government policy (McKendrick et al. 2000). Specifically, disk drive manufacturing thrived in Singapore during that decade not only because of the lower costs but also because the government welcomed the American firms, developed training programs for the industry and encouraged vibrant networks of suppliers to emerge. The resulting tight geographic clustering of suppliers and producers dramatically shortened the time to market, thus enabling the American disk drive makers to continue to be able to compete with other low-cost Asian manufacturers.

Indeed, there is renewed attention in strategy literature that governments can significantly impact the competitiveness of firms (Ring et al. 2005). The traditional portrait of many governments worldwide – "that of a massive bureaucratic machinery operating at high cost, agencies delivering inefficiently, unresponsive officials shirking accountability" – is gradually giving way to a series of initiatives as part of recent wave of public sector reform (Yong and Lim 2003). Clearly, the world is rapidly changing - today, it has been argued that government officials and business executives will have no choice but to learn from each other. More pointedly, leaders in both domains will have to reinvent themselves to create something altogether new (Kellerman 1999). Using Singapore as an example again, there is currently a conscious effort by the government to redirect energies to turning regulators and bureaucrats into facilitators in the new economy so that they can work more synergistically with business executives. This effort is symbolized in the recent flurry of reconstituted, renamed agencies such as: Trade Development Board to International Enterprise (IE), National Science and Technology Board to Agency for Science, Technology and Research (A*STAR), and Productivity and Standards Board to Standards, Productivity and Innovation Board (SPRING) (Low 2003).

This is not surprising because major studies of policy-making have empirically demonstrated that networks of actors across agencies and the private sector are more central to policymaking than formalized governance structures alone (Fountain 2001). Indeed, public-private partnerships are starting to blossom. In this regard, sociologists and anthropologists have long studied social networks of individuals, but the systematic investigation of interorganizational networks is a more recent development

– particularly between businesses and government agencies. The possible ability of such actors across public and private organizations to coordinate activities, to develop a form of governance that is neither market-driven nor hierarchical, and to pursue complex joint initiatives presents an interesting study that may trigger a new paradigm in management thinking (Fountain 2001).

Against this backdrop, some governments today purposefully "intervene" to improve the efficiency and productivity of selected industry clusters, so as to pave the way for the local companies in these industries to be more competitive globally (Porter 1990, 1998; Chaudhri and Samson 2000). This is often done through facilitating a process of large-scale planned change involving a delicate balancing act of encouraging cooperation while preserving competition in the respective industries (e.g., Chaudhri and Samson 2000) – in fact, striking a balance between competition and cooperation may be vital to the survival of firms in today's global economy (Brandenburger and Nalebuff 1996; Lado et al. 1997). One way of accomplishing this objective is through facilitating the implementation of industry-wide interorganizational systems to streamline information flows among businesses and/or between businesses and government agencies (e.g., Loebecke et al. 1999). This tension between competition and cooperation within the context of the government's facilitative role in effecting large-scale planned change within a particular industry has been little studied in IOS literature and thus provides the underlying motivation for this research.

1.3 Research Questions and Potential Contributions

As such, the purpose of this thesis is to answer the following two questions:

- How can government agencies successfully initiate and facilitate the realization of business value from the implementation of interorganizational systems within particular industries?
- Are there discernable patterns of interaction between the government agencies and the targeted firms during the process of such large-scale planned change, and if so, what impact do such interactions have on outcomes?

In this study, the firms involved are thus viewed as purposive competitors cum collaborators within a wider economic system that is being subject to a process of IOS-based planned change led by government agencies. This research is novel in seeking to take a modest step forward towards development of a theory of planned change in the area of governmental IOS-based facilitation to raise the overall productivity of particular industries. It aims to make the following contributions:

- Provide a comprehensive understanding of the longitudinal processes and interorganizational dynamics involved in such large-scale planned change
- Contribute towards theory building in this niche IOS research area
- Provide insights, recommendations and lessons learnt for government agencies to formulate appropriate policies, strategies and tactics for successful facilitation
- Prove insights and lessons learnt for industry players that may be asked to participate in similar future initiatives

1.4 Structure of the Thesis

In this chapter, we have highlighted how some governments worldwide are purposefully “intervening" to improve the efficiency and productivity of selected industry clusters through facilitating the implementation of industry-wide B2B and/or G2B interorganizational systems. To reiterate, this is a complex process of large-scale planned change based on diffusion and institutionalization of the IOS technology with the objective of achieving certain outcomes within a particular target industry. But what is it about the implementation of these systems that may cause some projects to be relatively more successful than others? It is with this question in mind that we propose a study that focuses on the process of realizing business value from such implementations.

In this regard, three distinct but overlapping streams of literature frame our preliminary conceptualization. Firstly, the literature on diffusion of innovations (Rogers 2003) is selected because it offers insights about the process through which an IT system is communicated through certain channels over time and among members of the social system. Next, the literature on business value of IT contributes insights about the processes associated with the realization of benefits from IT investments in general and IOS investments in particular. Finally, the literature on planned change provides ideas about the varied actions that can be taken to facilitate such a complex large-scale change process.

The subsequent chapters of the thesis are organized as follows:

Chapter 2: Presents a literature review of the phenomenon of interest (implementation of IOS and governmental intervention) and the aforementioned three major areas of research disciplines that constitute the theoretical bases for this study. Based on these theoretical foundations, a preliminary conceptual framework is developed to provide a starting point to guide the early empirical work.

Chapter 3: Presents the research methodology that was adopted for the study. It includes a justification for the choice of an interpretivist approach, an explanation of the role of theory in this research and a description of the conduct of the empirical work.

Chapter 4: Presents the background setting of three government-initiated industry-wide interorganizational projects in Singapore: BookNet, CoreNet and LawNet.

Chapter 5-7: Presents and interprets the findings for each of these projects through the lens of the preliminary conceptual framework developed in Chapter 2.

Chapter 8: Frames the in-depth analysis of the findings based on Dunphy's (1996) five elements of a change theory to aid in understanding the process of realizing business value from such implementations.

Chapter 9: Summarizes the contributions and limitations of the study and discusses the resulting implications for research, practice and methods.

Chapter 2

Literature Review

This chapter begins by presenting a literature review of the phenomenon in question: implementation of interorganizational systems and governmental intervention. This is then followed by review of the three major areas of research disciplines that constitute the theoretical bases for this study: diffusion/assimilation of IT, business value of IT and planned change. The objective of this review is to position the current study with respect to extant research in these areas while introducing theory which could be relevant to the phenomenon in question. Based on this review, a preliminary conceptual framework is developed. The chapter ends with a description of how this framework will be used to explore three critical dimensions of government-initiated IOS-based planned change within a particular industry.

2.1 Implementation of IOS and Governmental intervention

While many organizations recognize the promise and potential of interorganizational systems in facilitating them to work more closely with key business partners, the process of implementation is fraught with difficulties. While internal contingencies are obviously important considerations, IOS implementations also require all the different parties to first agree to participate and then sustain the use of the system. While there have been some classic cases of success (e.g., Feder 1991), the IOS literature also has many documented cases of mixed results and limited payoffs due to partner resistance and/or lack of cooperative relationships (e.g., Webster 1995; Clemons and Row 1993).

To elaborate, IOS implementations typically involve substantial internal effort for development with significant implications for the organization as a whole, and as a result many organizational factors can be expected to influence the process. For example, top management support and proactive technological orientation have been found to be important internal factors that will motivate and facilitate an organization to implement an IOS with its business partners (Chwelos et al. 2001; Grover 1993; Iacovou et al. 1995; Premkumar and Ramamurthy 1995; Premkumar et al. 1997).

Because implementation of IOS requires the close cooperation and coordination between independent organizations, the relationship between them is obviously an important consideration. Indeed, many past studies suggest that socio-political forces play an important role in this process (Chwelos et al. 2001; Hart and Estrin 1991; Hart and Saunders 1997; Iacovou et al. 1995; Premkumar et al. 1997; Reekers and Smithson 1995; Saunders and Clark 1992). For example, Subramani (2004) recently highlights the importance of the role of relation-specific assets in the dynamics of value creation and value retention in IT-enabled supply chain implementations.

Finally, Teo et al. (2003) propose the use of institutional theory (DiMaggio and Powell 1983; Haunschild and Miner 1997; Meyer and Rowan 1977) for studying organizational predisposition towards such systems. This theory posits that such predisposition could be attributed to mimetic pressures (imitating what others in the industry are doing); to coercive pressures (exercised by dominant organizations including regulatory bodies); and to normative pressures (diffused through professional, trade and relational networks). For example, governments can act as an

"initiator" in pushing a particular industry towards implementation of innovative, mutually beneficial B2B interorganizational systems. Such pressure may take the initial form of a government-to-business (G2B) initiative to demonstrate the value of such systems in helping to simplify regulatory processes (while ensuring legal compliance) and make two-way interactions quicker and easier through electronic filing and statistical reporting (Yong and Lim 2003). However, there are also many hurdles involved in such G2B initiatives, including lack of IT expertise in the public and/or private sector, lack of support from elected officials, issues related to determining appropriate fees for online transactions, lack of collaboration among government departments, difficulty in justifying a return on investment, issues regarding privacy and security, lack of financial resources and resistance to change from the industry (Reddick 2004).

Clearly, a high degree of leadership and resourcefulness is required in such governmental interventions. The implementation of industry-wide B2B and/or G2B interorganizational systems is often a politically sensitive, emotionally charged and publicly visible issue, thus requiring strong leadership to help coordinate and take into account the needs of the various stakeholders involved. For such large-scale IOS-based planned change to be effective, strong institutional leadership is needed to offer a guiding hand to a change process that would otherwise "be more readily subject to the accidents of circumstance and history", while recognizing that such a complex process would necessarily involve interdependent policy and program issues (Selznick 1957). Ideally, the net result is that a cultural context is created which fosters ongoing innovation (Van de Ven 1986).

In this regard, a variety of change intervention actions are available to the institutional leadership in facilitating the process - for example, Kanungo (2002) uses Habermas' (1984) typology of change actions (instrumental, strategic, communicative and discursive) to examine the sustainability of rural IT interventions in India. Instrumental actions depend on authority and status, while strategic actions attempt to influence the behavior of the stakeholders involved but simultaneously recognize that they (the stakeholders) may behave otherwise. Communicative actions try to achieve a mutual understanding while discursive actions are concerned with achieving or restoring agreement among the different parties.

In short, government agencies may have to function both as an "initiator" and a "reactor" continuously engaged in two-way interactions with private sector organizations (Yong and Lim 2003). An appropriate degree of reciprocity (Hahn 2004; Polonsky et al. 2002; Scott and Lane 2000; Neilsen and Rao 1987) and sensemaking (Bartunek et al. 1999; Griffith 1999; Gioia and Chittipeddi 1991; Maitlis 2005; Weick 1995) in leadership-stakeholder interactions between the government agencies and the organizations involved may therefore be critical to ensure the successful implementation of industry-wide interorganizational systems. In this regard, it is important to avoid the tendency to over-simplify sensemaking and individual agency which is typical of many top-down conceptions of planned change (Kuhn and Corman 2003).

2.2 Diffusion and Assimilation of IT

In the Information Systems (IS) arena, there is a vast literature stream on studies of diffusion and assimilation of IT innovations. Diffusion is the "process by which a technology spreads across a population of organizations" while assimilation is the "process within organizations stretching from the initial awareness of the innovation to the potentially formal adoption and full-scale deployment" (Fichman 2000). While it is clear that the processes of diffusion and assimilation rarely unfold in a systematic fashion, yet many IS studies have used stage models and factor research approaches to understand this phenomenon - such approaches have a strong focus on time-ordering of discrete events and identifying the conditions necessary for certain outcomes to occur (Gallivan 2001).

In the organizational context for example, Kwon and Zmud (1987) note the functional parallels between internal IS implementations and diffusion of technological innovations (Rogers 2003), and propose a stage model of IS implementation based on Lewin's (1952) change model. Building on Kwon and Zmud's work, Cooper and Zmud (1990) followed by developing a six-stage model (initiation, adoption, adaptation, acceptance, routinization and infusion) which has since been widely accepted by IS researchers.

Similarly, IOS is a technological innovation and it is therefore not surprising that innovation diffusion theory has also provided a theoretical foundation for many past studies in this area. In this regard, IOS researchers have been studying the factors influencing the various discrete stages of the diffusion process. For example, many researchers have focused on adoption intention (e.g., Chwelos et al. 2001) and

adoption (e.g., Iacovou et al. 1995; Hart and Saunders 1997; Premkumar and Ramamurthy 1995; Premkumar et al. 1997). Other researchers (e.g., Hart and Saunders 1997, 1998; Crook and Kumar 1998; Massetti and Zmud 1996) have focused on "extent of use" (by initiator and/or adopter), which has a strong parallel with studies focusing on "internal" and/or "external" diffusion (e.g, Premkumar et al. 1994; Ramamurthy et al. 1999). Yet other studies have focused on the critical success factors influencing the realization of value from such implementations using concepts like "implementation success" (Premkumar et al. 1994), "organizational performance" (Ramamurthy et al. 1999), "impact" (Iacovou et al. 1995) and "strategic payoff" (Chatfield and Yetton 2000).

At the more macro level, e-government implementations have often also been conceptualized in terms of stage models. For example, Watson and Mundy's (2001) stage model of e-government implementation (initiation, infusion and customization) has been widely cited in IS literature, with other researchers building on it to explain localized phenomena (eg., Ke and Wei 2004). Other similar models of e-government growth include the four-stage model (cataloguing, transaction, vertical integration and horizontal integration) of Layne and Lee (2001) and the five-stage model (information dissemination, two-way communication, online transactions, integration and participation) of Hiller and Belanger (2001).

However, stage models and the factor research approaches have long been criticized in IS literature (Larsen and Myers 1999; Myers 1994). One reason is that stage models often do not capture the realities of many organizations in which the assimilation process often occurs with a top management decision (or mandate) to

adopt the innovation, followed by actual implementation which includes individual adoption by users who have to make the necessary adjustments for using it to perform their jobs (Zaltman et al. 1973). This process may become even more complex if additional, intermediate levels are involved and managerial interventions then become an important consideration (Gallivan 2001). In a similar vein, the factor research approach tends to view the IS implementation as a static process instead of a dynamic phenomenon, while ignoring the relationship among the factors that impact the different stages (Ginzberg 1981; Lucas 1981). Together, both the stage models and the factor approaches tend to have an underlying mechanistic view of information systems implementation and overlook the interaction between the posited factors and other elements in the social and organizational context (Nandhakumar 1996).

In the IOS arena, there has been similar criticism of the use of such approaches to understand the IOS phenomenon especially due to the higher level of uncertainty as well as potentially richer opportunities involved (as compared to internal IS implementations). This is because the IOS has to be accepted at the interorganizational (both the initiating firm and participating partner must adopt and cooperate) as well as the organizational levels (the individuals within both the initiating and participating firms must use and ideally leverage the system).

To capture the essence of such dynamics, Fichman (2000) coins the term "linked adoption" to refer to the joint IOS adoption decisions that have to be made among two or more firms. In this regard, there is also the possibility of an "assimilation gap" in which different firms may have adopted the IOS within the organization but the levels of deployment may vary greatly between these firms (Fichman and Kemerer 1999).

In some firms for example, there may be varying degrees of internal resistance at various levels of the organization to the technology being introduced, thereby creating a major barrier to usage (Chircu and Kauffman 2000). In the context of organizational adoption of the IOS technology, all such individual (and group-level) adoption issues are possible barriers as they limit the overall value of the technology being adopted at the organizational level. In turn, this means that even if all the partners involved in an IOS implementation are willing to adopt the system being initiated by a particular firm, the extent of implementation and use may vary widely between different adopting partners due to internal contingencies. Also importantly, such coupled systems would usually need to be internally integrated with the back-end IT systems in both the firm and partner organizations for maximum mutual beneficial impact. Indeed, studies have shown that the effectiveness of the IOS implementation is largely determined by its level of integration with work processes and other computer applications (Iacovou et al. 1995; Premkumar and Ramamurthy 1995; Hart and Saunders 1997).

Considering that such business-to-business process integration as well as internal back-end systems integration continue to be key issues facing companies today (Markus 2000), a processual approach may thus be of great help in facilitating a deeper understanding of the complex longitudinal dynamics involved in IOS implementations (Kurnia and Johnston 2000). Specifically, processual analysis is preoccupied with describing, analyzing and explaining the what, why and how of some sequence of individual and collective actions. The driving assumption behind process thinking (which makes it particularly appropriate for the study of IOS dynamics) is that social reality is a dynamic process which occurs rather than merely

exists. The overriding aim of the process analyst is therefore to "catch this reality in flight" (Pettigrew 1997). Not surprisingly, processual approaches have become increasingly popular in the analysis of technological and organizational change (Dawson 1994; Thomas 1994), especially when such changes are very much intertwined with each other as is the case of many IOS implementations today – for full beneficial impact, there is typically a need for business process reengineering as well as back-end systems integration on the part of all the parties involved (Riggins and Mukhopadhyay 1994).

2.3 Business Value of IT

Over the years, progress has been made in establishing frameworks for assessing the value of firm-level IT investments (Barua and Mukhopadhyay 2000) For example, in the early 1980s, the first stream of IT business value research focused on assessing the contribution of IT investments to performance metrics such as return on investment (ROI) and market share. Since then, such research has taken various forms (economics-based, process-oriented and stochastic production frontier studies). While many studies in the past have focused on establishing a linkage between IT investments and business performance (Brynjolfsson 1993), researchers today have been attempting to obtain a deeper understanding of the interactions between IT and other (*internal*) organizational factors and how such interactions determine the contribution of IT to business performance. In this area, perhaps the most notable work has been done by Barua and associates (Barua and Mukhopadhyay 2000, Barua and Whinston 1998, Barua et al. 1996), and they coin the term "business value

complementarity" (BVC) to refer to the value synergy among the "combination of factors, objects, processes, people and technologies" (Barua and Whinston 1998). More recently, Melville, Kraemer and Gurbaxani (2004) attempt to re-focus this debate by arguing that while IT is valuable, the extent of impact is dependent upon internal and *external* factors, including complementary organizational resources of the firm and its trading partners, as well as the competitive and macro environment.

Against this backdrop, it is important to note that most business value of IT studies in the 1990s had focused on firms' investments in vendor- or technology-specific applications, a situation that characterized the proprietary state of the IT industry at that time. With the emergence of e-commerce and the Internet-related technologies in the business world since the mid-1990s, there is a compelling need to renew such research especially in the IOS arena, where the Internet is rapidly and increasingly being used for electronic connections between organizations (both governments and businesses alike). For example, while there is a wealth of research based on traditional EDI technologies (e.g., Riggins and Mukhopadhyay 1994; Mukhopadhyay et al. 1995), studies addressing how business value can be created through Net-enabled value chain activities have only emerged in recent years (e.g., Wheeler 2002; Barua et al. 2004).

Moreover, there is also a need to shift current research focus away from excessive reliance on "isolated input-output black-box approaches" that has been characteristic of many past business value of IT studies (Chan 2000). In this regard, the process-oriented model may be particularly important to explain the longitudinal process through which firms invest financial resources, develop technology assets, use

information technology and finally improve firm performance (Soh and Markus 1995). It is also interesting to note that many past studies tend to use IT infrastructure or IT competence as the starting point for research with focus on the management, conversion and use of IT resources for competitive advantage (e.g., Lucas 1993; Markus and Soh 1993; Grabowski and Lee 1993; Beath, Goodhue and Ross 1994; Soh and Markus 1995; Sambamurthy et al. 2003; Zhu and Xu 2004; Barua et al. 2004). In contrast, very few studies have noted that the process of maximizing IT value is dependent in the first place on the organization's recognition of the possibly very different business value opportunities of various IT configurations. This is important because empirical evidence in business strategy research has long demonstrated organizations' tendencies towards "local search", which is defined as the organizational behavior in searching for strategic solutions in areas that are closely linked to their current expertise or knowledge (Rosenkopf and Nerkar 2001).

For example, to have the knowledge of the business value of IOS (instead of just internal IT implementations), the organization needs to have the alertness and ability to span both technological (from IT to IOS) and organizational (from intra- to inter-) boundaries in its path-dependent exploration (Rosenkopf and Nerkar 2001). Therefore, if the organization has the tendency towards local search in that it is unable to span either boundary, then it is likely that the IOS opportunities may be missed. However, even if the organization is able to recognize the IOS opportunities, leveraging such investments for business value may still be a long meandering process. The reasons for this can come from within and without. For example, anecdotal evidence suggests that many organizations can get mired for years in talking to IT vendors and "testing the waters" with business partners while doing

exploratory after exploratory studies to ascertain the business value of the project before finally moving on to obtain budget allocation and other necessary resources. Beyond obvious bounded rationality considerations (Simon 1997), this exploratory process may specifically be "colored" by the managers' experience with existing internal IT use within the organization and the perceived impact of such use on organizational performance (Ragowsky et al. 2000). Yet, this early process has a critical impact on the eventual realization of value, as such value may be prematurely preempted (if assessment of the project's benefits turns out to be too pessimistic), unduly circumscribed (if implementation turns out to be too narrow in scope) or even mistakenly facilitated (if the assessment turns out to be too optimistic). Once the organization commits to the IOS implementation, prior research has shown that there are certain contingencies that may facilitate the process while others may inhibit the realization of value. In this regard, researchers use the terms "facilitators" and "inhibitors" to refer to those factors that either positively or negatively influence the ability of an organization to leverage information technologies for business value (King and Teo 1994, 1996). For example, lack of readiness (in terms of financial and IT resources) of key partners may delay or even cause the IOS project to be aborted (e.g., Iacovou et al. 1995; Chwelos et al. 2001), while many other barriers (both organizational and interorganizational) may subsequently cause the implementation – even if it gets off the ground - to be less than successful (Cavaye 1995).

In this regard, related work by Kauffman and associates (Kauffman and Weill 1989; Chircu and Kauffman 2000; Davern and Kauffman 2000) is particularly notable for its longitudinal focus on the value realization process that starts with the firm's discovery of the IT investment's *potential value* (via a "valuation process") and which

culminates with its conversion into *realized value* (via a "conversion process"). Discovering *potential value* involves working down from the market level of analysis to the individual user and business process levels. Converting that *potential value* into *realized value* requires careful IT planning and execution to ensure that "the implementation and associated business-process design efforts handle the conversion contingencies that can arise". In short, such a longitudinal focus may help to shed greater light on the decision-making, implementation and usage process that has to take place before the business value of IT can be fully realized (Zhu and Xu 2004). However, since this stream of research is largely focused on internal IS implementation within organizations, it does not pay due consideration to the IOS-unique process during which the initiating firm attempts to obtain the agreement of its partners to participate. This process of obtaining such an agreement (before implementation can even begin) can be very problematic as demonstrated in many past IOS studies (e.g., Iacovou et al. 1995; Chwelos et al. 2001; Hart and Sauders 1997, 1998; Premkumar and Ramamurthy 1995; Premkumar et al. 1997).

2.4 Planned Change

For decades, scholars in the organizational field have borrowed many concepts, metaphors and theories from other disciplines ranging from child development to evolutionary biology in the quest to understand why and how organizations change (Van de Ven and Poole 1995). Although there is a vast empirical literature in the area of organizational change, the field is however at an early stage of theoretical development with no one, all-embracing, widely-accepted theory – in fact, scholars

continue to lament that the literature has been largely atheoretical and fragmented (Dunphy 1996; Huy 2001). Against this backdrop, several "opposing" perspectives of the nature of change have long commanded the attention of organization theorists.

According to Gersick (1991), one perspective at the firm level is that of Darwin's model of evolution as "a slow stream of small mutations, gradually shaped by environmental selection into novel forms" – in other words, this is the concept of incremental, cumulative change. On the other hand, an "opposing" perspective conceptualizes change as a punctuated equilibrium: "an altercation between long periods when stable infrastructures permit only incremental adaptations, and brief periods of revolutionary upheaval". Specifically, the punctuated equilibrium perspective (e.g., Miller and Friesen 1984; Tushman and Romanelli 1985) focuses on radical, discontinuous changes in formal structures or systems of beliefs while the continuous change perspective (e.g., Weick and Quinn 1999; Tsoukas 1996) focuses on work processes and social relationships. According to the latter perspective, productive changes in work processes and social practices are often driven by daily improvisations and small improvements rather than happening as part of an overnight upheaval.

In the same vein, two other "opposing" theories of the nature of change have also dominated organizational literature: strategic change vs. socio-technical systems change (Dunphy 1996). The strategic change approach sees the formulation of the change initiative as the function of senior management whose task is to analyze the external environment and create a winning competitive business strategy (e.g., Kotter and Heskett 1992). Therefore, its major concern is on aligning the workforce to the

strategy and to involve the workers in translating this business strategy (and its associated IT strategy, if any) into coordinated action (Dunphy 1996). On the other hand, the premise of socio-technical systems theory is that introduction of new technologies invariably changes the social system, and changes in the social system invariably impacts technical systems (Whyte 1997). Technological change is therefore viewed in terms of human and political dimensions, requiring a holistic rather than technocratic approach to organizational adaptation to new technologies (Garson 2000). As such, this approach is strongly committed to placing the change initiative with key groups within the workforce itself. Its major concern therefore centers on creating interventions which involve the workforce, provide the knowledge and skills to ensure they make informed decisions, and build a negotiated consensus on the direction and pace of change.

At the macro industry/societal level, several "opposing" perspectives have similarly engaged the attention of theorists regarding the specific impact of IT on long-term change: decentralization/democratization vs. dystopian theory and sociotechnical systems vs. global integration theory (Garson 2000).

The decentralization/democratization theory is the leading theoretical perspective of the impact of IT at the macro level and it emphasizes the progressive potential of IT in government, business, education, the home and almost all spheres of life – in short, a new industrial revolution (e.g., Negroponte 1995). On the other hand, dystopian theory predicts a future of widening informational inequality and consequently of widening organizational and political inequality, thus effectively providing a counter-balance to the enthusiasm of the former theory (e.g., Castells 1996, 1997, 1998).

Sociotechnical perspective tends to emphasize the involvement of the grass roots (Howley 1998), and its research agenda for public administration is therefore implementation-focused, seeking to establish the correlation between implementation success and the integration of social, political and economic factors with technological ones (Trist and Murray 1990). Four attributes of such a perspective are (1) reliance on small "action groups" in a bottom-up, user-oriented process of design specification; (2) skills development as an organizational objective; (3) structuring the reward system to encourage participation in implementation; and (4) introduction of new technologies under a facilitative (as opposed to command-driven) leadership (Garson 2000).

On the other hand, the focus of global integration theory is on national and international public policies towards IT, looking at the interrelationship among users of the marketplace to foster technological development and national strategies for comparative advantage (Garson 2000). It is also based on the belief that market forces alone will not lead to equality of information opportunity but rather may be expected to reflect or even accentuate existing socioeconomic inequalities – as such, affirmative actions are advocated to give priority to information have-nots (Garson 2000). This highlighting of the need for proactive government information policies conforms closely to the real-world politics and processes of various national and international governmental bodies (Garson 2000).

Against this backdrop of "opposing" theoretical perspectives, a number of prescriptions have been proposed over the years to help organizations implement

planned change and they are often based on the theorist's perspective of the nature of change (episodic vs. continuous; socio-technical vs. strategic; decentralization/democratization vs. dystopian; socio-technical vs. global integration). Consequently, some of these proposed methods of change are more assertive in nature (e.g., to quickly force changes in formal structures through strategic action) while others are more empathetic (e.g., to gradually change systems of beliefs through mutual involvement and participation). Examples include proactive government policies to address imbalances through affirmative interventions, top-down imposed comprehensive organizational change, work process analysis, redesign and reengineering, quality management, participative experiential learning and workplace redesign.

In short, the contrasting theories of change at both organizational and national levels have implications for the choice of change methods – an area which needs to be more fully explored (Dunphy and Stace 1988; Huy 2001). Indeed, there is increasing attention towards the question of when and how organizations of various types can successfully steer through changing environments (Gersick 1994). For example, there is a need for greater understanding of how governments can effectively manage the exploitation of IT at the macro level, considering the greater multitude of considerations (relative to the internal organization context) that must inevitably constrain such actions (Fountain 2001; Yong and Lim 2003).

2.5 A Priori Conceptual Framework

From the above review of the three sets of literature, three critical issues emerge.

First, while one way to provide a process view of IT-enabled change in organizations is to depict it as happening in discrete stages, such "rigid" stage models have long been criticized - in fact, they may be especially inadequate for the purpose of this research due to the higher level of complexity involved in the B2B and G2B interorganizational relationships being studied. In particular, there may be complex and rich intervening processes taking place between each of the discrete stages in such IOS implementations. More importantly, while the discrete stages (and the factors influencing them) have been extensively studied in IOS literature, the corresponding intervening processes have received much less attention. Secondly, while recent research on business value of IT have begun to consider net-enabled value issues, it is clear that there is a need to consider the value of IOS investments both in ex-ante project selection and ex-post investment evaluation (Davern and Kauffman 2000). In particular, there is a need to understand the longitudinal process of realizing IOS business value from ex-ante to ex-post, since the dynamics of such a process is likely to be very different from internal IT implementations. Finally, while a number of prescriptions have been proposed over the years to help organizations implement planned change (e.g., Beer et al. 1990), there is a need for greater understanding of the appropriate intervention actions that can be taken by government agencies in initiating and facilitating IOS-based industry-wide change. This is pertinent considering the myriad considerations that must inevitably come into play for such interventions.

Based on the foregoing literature review and discussion, a preliminary conceptual framework is developed as per Figure 2.1 to provide a starting point for guiding the early stages of the empirical work in this study. The framework begins with the process of "discovering value" on the part of lead government agencies at the macro industry level - either through a technology push or through a business pull (Davern and Kauffman 2000). The former occurs when "a technology solution is discovered that can address a previously undiscovered business problem or opportunity" while the latter occurs when "a business problem or opportunity is the first thing to be identified, and only then is the impetus provided for the development of a technology-based solution" (Davern and Kauffman 2000). Specifically, the government agencies concerned must first have the "boundary-spanning knowledge" (Rosenkopf and Nerkar 2001) that IT has value not only internally with organizations but also among businesses and/or between government agencies and businesses within a particular industry. This "boundary-spanning knowledge" is posited to trigger a "valuation process" (Chircu and Kauffman 2000) at the tactical level, during which the government agencies concerned evaluate the costs and benefits of implementing alternative configurations of such systems. The outcome of this process is a broad specification of what the potential value will be in the given industry (Chircu and Kauffman 2000; Davern and Kauffman 2000). In this regard, "IOS decision" refers to the situation where the government agencies make an initial funding decision on the adoption of a tentative IOS configuration with broad project scope/timeframe identified (Chwelos et al. 2001).

Concurrent with this decision-making step, a "constructing value proposition" process is posited to be set in motion at the macro industry level. Generally, it involves

careful IT planning to obtain industry buy-in through advancing a value proposition that the benefits of pooling resources, competencies and strategies together would accrue to the industry as a whole and that such competitive advantages (and disadvantages) have to be viewed against the backdrop of national interests and global competition. Specifically, it involves a "creation process" at the tactical/operational level during the government agencies attempt to secure the participation of the firms within the industry through obtaining feedback to fine-tune the proposed implementation, persuasion, incentives, seeking mutual understanding, appeal to authority and/or coercive tactics (Iacovou et al. 1995). In this regard, "multilateral adoption" refers to buy-in decisions progressively being made by these targeted firms to materially participate in the implementation (Cooper and Zmud 1990).

Once multilateral adoption begins to take place, the process of "realizing value" is posited to be triggered into motion at the macro industry level. Generally, it involves converting potential value into realized value by leveraging opportunities and overcoming contingencies as they arise during the implementation (Chircu and Kauffman 2000; Davern and Kauffman 2000). Specifically, it involves a "conversion/use process" (Chircu and Kauffman 2000) at the operational level that corresponds to the continuum that spans Cooper and Zmud's (1990) stages of adaptation, acceptance and routinization within the industry. In this regard, "institutionalized assimilation" refers to the situation which is characterized by the extent to which the IOS is used in a comprehensive and integrated manner to support work processes (Iacovou et al. 1995; Premkumar and Ramamurthy 1995), and the degree of interfacing with other system applications within the industry as a whole.

The extent of such assimilation over time is posited to be determined by the outcome of the "conversion/use process".

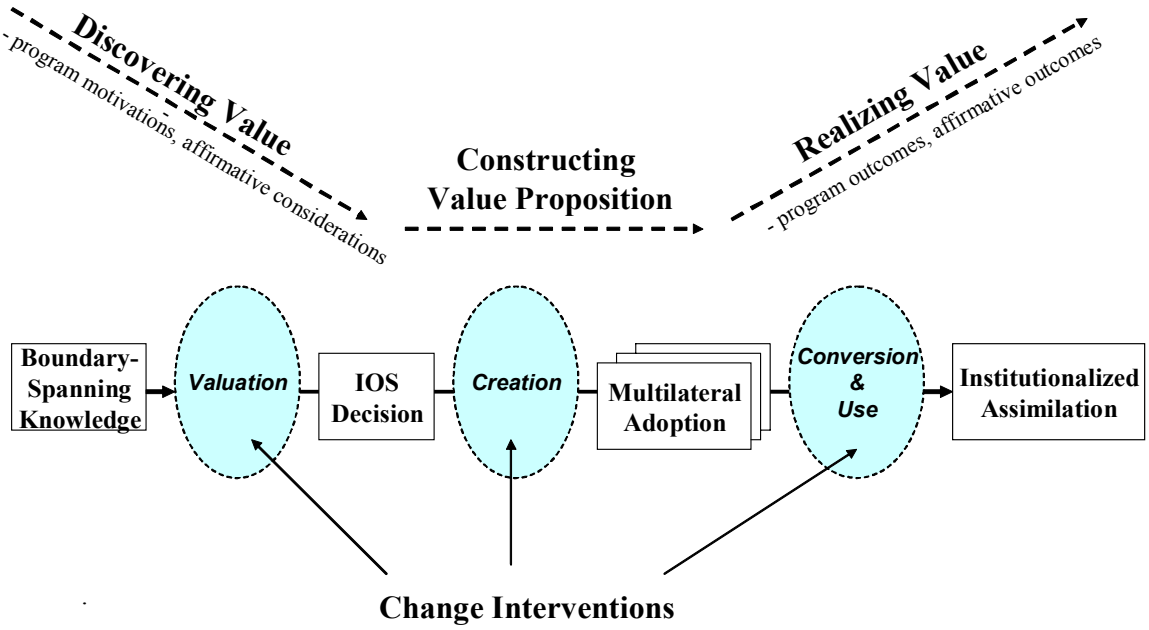
To facilitate this value realization process, a variety of change interventions may be employed by government agencies. In this regard, government programs typically have a dual purpose – one is to make the governmental processes more efficient while the other is to service the public (citizens and businesses) (Tan and Yong 2003). Adam Smith (1937) describes three essential "duties" for government: "firstly, the duty of protecting the society from violence and invasion…; "secondly, the duty … of establishing an exact administration of justice; and thirdly, the duty of erecting and maintaining public works and certain public institutions, which it can never be for the interest of any individual, or small number of individuals, to erect or maintain" (Hillman and Keim 1995). While the ideal is that government interventions should have the effect of benefiting the industry as a whole, the reality is that the benefits of such actions are often enjoyed disproportionately (Olson 1982). For example, the use of IT in small and medium-sized enterprises is typically significantly lower than large corporations, as the former usually have limited access to information and advice which in turn makes them hesitant to make investments in advanced technologies (Papazafeiropoulou and Pouloudi 2004). The challenge for governments is therefore to carefully balance between the realization of program outcomes vis-a-vis ensuring a somewhat level playing field for all companies (large and small alike). As such, the valuation process is posited to be motivated by program benefits and moderated by affirmative considerations, while the conversion process is posited to involve the appraisal of both program outcomes and affirmative outcomes (Garson 2000). In this way, the framework also captures the government's obligation to fulfill its social

welfare function which is contingent on efficiency, equity, social and environmental considerations (Chaudhri and Samson 2000).

To summarize, the framework posits the existence of intervening processes ("valuation", "creation" and "conversion/use") in between each of the discrete stages ("boundary-spanning knowledge", "IOS decision", "multilateral adoption" and "institutionalized assimilation"). In this study, the focus will be on understanding the change dynamics of each of these three processes: valuation, creation and conversion/use. The skeletal framework is intentionally sparse to leave room for further conceptual development – new conceptual elements derived inductively from the data will be presented as the case is described and analyzed (Denis et al. 2000).

Through the lens of this conceptual framework, this study will explore three critical dimensions of government-initiated IOS-based planned change within a particular industry: content, context and process (Pettigrew 1990). Content refers to formal structures, systems of shared beliefs, work processes and social relationships among other work elements (Huy 2001). Context refers to "a nested arrangement of structures and processes where the subjective interpretations of actors perceiving, comprehending, learning and remembering help shape process" (Pettigrew 1990). Temporal interconnectedness of these three dimensions is also important to reveal the patterns, causes, and movements from continuity to change and vice versa. To thus locate change in past, present and future time, this study will collect longitudinal data which will allow the present to be explored in relation to the past and the emerging future (Pettigrew 1990).

Figure 2.1 A Priori Conceptual Framework



Chapter 3

Research Methodology

In the IS discipline, the case for a plurality of theories rather than a single, all-embracing theory to guide research is quite well understood. In the IOS field specifically, it has been similarly acknowledged that there is a need to use appropriate theories from a variety of fields: from economics and complexity theory, to the social studies of science and technology (Ciborra et al. 2000). This is due to the well-known complexity of IOS phenomena – in this regard, positivist, interpretivist and critical paradigms (Orlikowski and Baroudi 1991) may bring complementary strengths to the study of IOS implementation dynamics (Somasundaram and Karlsbjerg 2003).

This research is located within the interpretivist paradigm wherein a naturalistic mode of inquiry was used to induce insights through interpretive means (Lincoln and Guba 1985). This paradigm seeks scientific explanations of human behavior and is based on the belief that social reality is emergent, subjectively created and objectified through human interactions that are grounded in social and historical practices (Chua 1986). In this study, such an epistemological stance is used as a basis for drawing inferences from three cases (of BookNet, CoreNet and LawNet in Singapore). The validity of such an extrapolation depends not on the representativeness of such cases in a statistical sense (Craig Smith 1989), but on the plausibility and cogency of the logical reasoning used in describing the case findings, and in drawing implications from those findings (Walsham 1993, 1995, 2002).

This chapter begins with an overview of the philosophical bases of IS research before elaborating on the choice of the interpretivist approach for this study. It concludes with an explanation of the role of theory in this research and a description of the conduct of the empirical work.

3.1 Philosophical Bases of IS Research

All research (whether quantitative or qualitative) is based on some underlying philosophical assumptions (Avison and Myers 2005). A key pertinent assumption is that which relates to the underlying epistemology that guides the research – in other words, assumptions about knowledge and how it can be obtained (Hirschheim 1992). For qualitative research, the basic epistemological assumptions are positivist, interpretive or critical (Orlikowski and Baroudi 1991) while only the positivist epistemology is applicable to quantitative research (Straub et al. 2005).

At the heart of positivism is the view that the world has an objective reality that can be captured and translated into testable hypotheses, usually in the form of statistical or other numerical analyses. Positivism embraces the ontological position of realism, which is that "an apprehendable reality is assumed to exist, driven by immutable natural laws and mechanism" (Guba and Lincoln 1994). The original inspiration for this came from the scientific epistemology of logical positivism - this "pure" positivist view has since largely given way to post-positivism which is based on the concept of 'critical realism' (that there is a real world out there independent of our perception of it and that the objective of science is to try and understand it). Inherent in this view is the recognition that observations and measurements are inherently imperfect and

hence the need to measure the phenomena in many different ways (Straub et al. 2005). An important challenge for qualitative researchers working within the positivist tradition is to articulate rules or bases for deciding "associations" and for determining how results and findings fit with preliminary propositions (Gephart 2004).

Critical research assumes that social reality is historically constituted and that it is produced and reproduced by people. Although critical researchers recognize that people can consciously act to change their social and economic circumstances, they (the researchers) contend that the people's ability to do so is constrained by various forms of social, cultural and political domination. The main task of critical research is therefore one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light (Avison and Myers 2005). In so doing, critical researchers seek to transform the social order and allow emancipation from unwanted structures of domination (Gephart 2004). However, qualitative researchers operating within this tradition typically do not share common philosophical standards for the evaluation of their theories – this ambiguity of evaluation is problematic when compared with positivism's relatively unambiguous criteria for what constitutes valid knowledge (Chua 1986; Orlikowski and Baroudi 1991).

On the other hand, interpretivism takes the ontological position of relativism which is that reality is a subjective construction of the mind. It is thus based on the assumption that access to reality is only through social constructions such as language, consciousness and shared meanings (Avison and Myers 2005). Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them and interpretive methods of research in IS are "aimed at producing an

understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham 2002). In this way, the focus of interpretivism differs from the focus on variables and hypothesis falsification used in positivism (Gephart 2004).

3.2 Choice of the Interpretivist approach

As in many other fields, a certain positivist-interpretivist tension has permeated the IS discipline for much of the past decade (Prus 1996; Walsham 1995; Orlikowski and Baroudi 1991). For more than 400 years, the "received view" of science is that of positivism (transformed over the years into post-positivism) which focuses on efforts to verify or falsify a priori hypotheses, usually stated as quantitative propositions (Guba and Lincoln 1994). Its proponents argue that the purpose of any science is to offer causal explanations of social, behavioral and physical phenomena. The positivist viewpoint has been challenged in many quarters over time (post-positivism was in response to some of these criticisms), and in fact, the development of interpretivist approaches has emerged somewhat concurrently with the critique of positivism (Prus 1996). Interpretivism is an alternative inquiry paradigm based on the view that the human sciences are fundamentally different in nature and purpose from the natural sciences. From the interpretivist point of view, what distinguishes human action from the movement of physical objects is that there is meaning in human action and to find that meaning, one is required to interpret in a particular way what the actors are doing (Schwandt 2000). In recent years, this paradigm has been gaining increasing attention as a legitimate alternative for the conduct of IS research, despite the continuing dominance of positivism (Walsham 1995; Lee 1991). Looking into

the future, it remains to be seen whether the proponents of the respective paradigms will look for common ground or find ways in which to distinguish their form of inquiry from others (Lincoln and Guba 2000). This process is still ongoing but there is concern that a situation will arise when differences are essentialized into dichotomies and then one side of the dichotomy is privileged over the other (Van Maanen 1998).

To reiterate, positivist approaches tend to assume that people can be studied using methods similar to those used to study physical objects in natural sciences (Prus 1996; Lee 1991). On the other hand, interpretivism takes the alternative position that people and the physical and social artifacts that they create, are fundamentally different from the physical reality in natural science (Lee 1991). As such, interpretivists argue that social science cannot be adequately studied using the scientific methods of natural science, and instead requires a methodology that is attentive to the differences between people and other objects (Prus 1996; Lee 1991). Importantly, this alternative inquiry mode requires focus on procedural adequacy and credibility (Garud and Kumaraswamy 2005) and the employment of methods that allow the interpretivists to step outside their historical frames of reference (Schwandt 2000).

In this regard, various guidelines have been suggested over the years for judging the merit of interpretivist work and for conducting such empirical studies. For example, Klein and Myers (1999) propose a set of seven principles for the conduct and evaluation of interpretive field research: hermeneutic circle, contextualization, interaction between researchers and subjects, abstraction and generalization, dialogical reasoning, multiple interpretations and suspicion. Importantly, they (Klein

and Myers) explain that these principles are not "bureacractic rules of conduct" although they are to some extent interdependent. In a similar vein, Golden-Biddle and Locke (1993) describe three broad criteria for judging the merit of ethnographic texts (and by extrapolation – that of the underlying research project). Furthermore, they (Golden-Biddle and Lock) consider that these criteria can be applied for any qualitative work, "especially that in the interpretive tradition which seeks to understand members' views of their realities" (Walsham and Sahay 1999).

Considering that the focus of this study is on the complex, intertwined set of social and political interactions between government agencies and firms in the implementation of interorganizational systems, the choice of an interpretivist perspective is particularly appropriate. The coarse-grained quantitative and positivist approaches may be suited to testing hypotheses about the antecedents and outcomes of such projects, but are poorly suited to exploring the interactional processes through which the various parties adjust to the situational dynamics (Denis et al. 2000). As this research is a longitudinal field study, the use of such an interpretivist approach has implications for the research design, particularly for the role of theory and the actual conduct of empirical work in order to ensure the trustworthiness of the study.

3.3 Research Design

In this longitudinal study (2001-2005), the focus is on the government-initiated BookNet, CoreNet and LawNet IOS projects in Singapore that were started in the 1990s. While the BookNet project had since been discontinued, the ongoing CoreNet

and LawNet projects have been gaining momentum over the years, particularly since 2002.

Following Pettigrew's (1990, 1997) guidelines for longitudinal field studies and processual research, I was duly cognizant of the need to be clear about the research objectives, to come to terms with time (while exploring the content, context and process of change), to make explicit the theory of method, to make explicit the meta-level analytical framework, to identify analytical themes which cut across the data and to use techniques of data reduction and display.

In line with the interpretive epistemological stance (Avison and Myers 2005; Craig Smith 1989; Orlikoswki and Baroudi 1991; Walsham 1995), the primary data collection sources for this study were in-depth interviews, on-site observations and documentary evidence (minutes of meetings, strategy documents, internal memos, reports and company newsletters). Secondary sources include newspaper and website articles.

The aim of this triangulated approach is to gather different types of data which can be used as cross-checks and to draw on the particular and different strengths of the various data collection methods (Pettigrew 1990). Interviews can provide rich data but the weakness is that they may also be staged occasions lacking in factual detail. Documents can provide facts but are subject to dangers of selective retention and contextual misinterpretation. By providing access to group interactions, direct on-site observation complements the other two data collection sources by providing the researcher with possible discrepancies between what is stated during interviews and in

the documents vis-à-vis what the people actually do. In this longitudinal field study, data collection is concerned with observation and verification as iterative processes – "one observes, follows themes and trails, identifies patterns, have those patterns disconfirmed or verified by further data, and the process moves on" (Pettigrew 1990).

For BookNet, the data collection period was from August 2001 to May 2004 and involved 23 interviewees as per Appendix A (organization names and job titles have been changed for confidentiality reasons). For CoreNet, the corresponding period was from February 2002 to May 2005 and involved 16 interviewees. For LawNet, the period was from January 2004 to June 2005 and involved 33 interviewees. In all three cases, relevant documents were accumulated on an ongoing basis and periodic on-site visits were made to observe the systems being supported and/or used. For each project, open-ended semi-structured interview questionnaires were first developed and evolved over time, as the data collection efforts became increasingly more focused. Appendix B has examples of key questions asked and they largely revolve around the following themes:

- What is happening here?
- Who are involved in making it happen? Who are affected?
- When did it happen?
- Why is it happening?
- How has it come to happen this way?

Finally, interim papers related to the eventual final thesis were given to key informants at various times for their review and comments as follows: Deputy General Manager of RTA, Operations Director of Publisher-YES and Sales Director

of Publisher-NO (for BookNet); two Project Managers of Building and Construction Authority (for CoreNet); and Assistant Director and Business Development Manager of Singapore Academy of Law (for LawNet). Factual inaccuracies were corrected based on the ongoing feedback received.

3.3.1 Role of Theory

A key question for researchers in any tradition, regardless of philosophical stance, concerns the role of theory in their research (Walsham 2002). Eisenhardt (1989) discusses this issue in the context of organizational research, and identifies three distinct uses of theory: as an initial guide to design and data collection; as part of an iterative process of data collection and analysis; and as a final product of the research.

In this study, a preliminary conceptual lens was developed to scope and guide the analysis of the valuation, creation and conversion/use processes. The interpretive analysis is therefore an inductive process, guided and couched within this conceptual framework (Orlikowski and Baroudi 1991). The emphasis is not on "fitting" the data to the framework but rather on seeking to interpret events and actions as encountered in the field research. The resulting implications of the case findings are therefore meant as starting (theoretical) points for future investigation to be taken up by interested researchers. Towards this end, the conduct of empirical work is structured to facilitate such theoretical development (as described in the next section).

To elaborate, each of the processes (valuation, creation and conversion/use) is a sequence of events that describes how things change over time (Van De Ven 1992). Using this as the working definition, this study is therefore concerned with the

analysis of the sequence of individual and collective events, actions and activities unfolding over time in context (Pettigrew 1997). Relevant data include that which is *processual* (an emphasis on action over time); *comparative* (a range of studies to throw up similarities and contrasts); *pluralist* (describe and analyze the often competing versions of reality seen by different actors); *historical* (take into account the historical evolution of ideas and actions for change as well as the constraints within which decision makers operate); and *contextual* (examine the reciprocal relations between process and contexts at different levels of analysis) (Pettigrew 1990).

In this way, the interpretive analysis of the valuation, creation and conversion/use processes would allow for investigation of the ways in which people in the different organizations create structured patterns of interaction over time. Such analysis would help in producing a (theoretical) understanding of the trajectory course of the phenomenon under study as it evolves over time and the actions/interactions contributing to its evolution (Garrety and Badham 2000).

3.3.2 Conduct of empirical work

To deal with the potentially huge amount of data expected to be collected, analytic strategies were used from the beginning of this study, which included regularly reviewing and developing ideas as the research progresses. In fact, analysis pervaded all phases of the research process – as I did the data collection, recorded the data on fieldnotes and transcripts, coded the contents of these and other collected documents, detected pervasive patterns in the data, generated themes and developed relationships

between them. Such ongoing analysis, in turn, directed further data collection by raising new questions.

In this regard, the fieldwork process was facilitated by the adaptation of the constant comparative technique from grounded theory. Specifically, the use of constant comparative analysis provided an analytic edge by placing analysis at the forefront from the inception of the research. In adapting this technique for this study, I draw largely on the work of Werner and Schoepfle (1987), Charmaz and Mitchell (2001), Emerson et al. (1995) and Locke (2001). In particular, the techniques of *open coding*, *comparing* and *initial memo-making* related to the constant comparative method helped in moving from descriptive to more focused interviews and observations (Werner and Schoepfle 1987), while the techniques of *focused coding*, *integrating categories* (and their properties) and *integrative memo-making* helped in the development of concepts and the final conceptual framework.

Open coding (Emerson et al. 1995) was used as the first step in developing conceptual categories, because it raised analytic questions about the data. Subsequent data collection and coding provided ongoing checks on previous codes. By constantly engaging with and asking questions of the data (in addition to engaging with the subjects), I began to create the correspondence between experience and social-scientific portrayals of them (Charmaz and Mitchell 2001).

Comparing occurred in tandem with coding and was critical to creating conceptual categories. Data incidents were compared with other data incidents, and also with the evolving conceptual categories. I was thus always moving from examination of data

incidents to create categories and back to data incidents again to test and refine categories (Locke 2001).

At the same time, writing initial memos (Emerson et al. 1995) during the initial reading of interview transcripts or fieldnotes helped to capture an idea that was sparked by a particular incident. When subsequently developing categories, the constant comparative process gave birth to emergent themes. *Initial memo-making* provided me with the analytic space to play with these ideas and to check their utility by constantly going back and forth between these memos and observations in the field.

I then moved towards theoretical development by conducting fieldwork with the aim of *integrating categories* through fuller development of conceptual categories and their relationships. At this point, there was a slight shift in the coding and comparative activities. Firstly, conceptual categories were further articulated so that they accounted for both similarity and variation in the exemplifying data incidents (Locke 2001). This was done through the use of *focused coding* (Emerson et al. 1995). Rather than focusing on comparing data incidents to each other, efforts were now focused on comparing data incidents to conceptual categories and thinking about their properties or dimensions.

In order to arrange categories so that they begin to add up to a conceptual 'whole' (a conceptual framework or a set of coherent, emergent themes), the conceptual elements were compared in order to clarify the relationships between the categories and their properties. At this stage, *integrative memo-making* (Emerson et al. 1995)

supported my efforts to articulate the significance of the categories and to begin working out the relationships between the analytic elements (Locke 2001).

As categories and their relationships were developed, the use of the comparative process helped in finalizing the boundaries of conceptual development at two levels. At the level of the framework, I made decisions about "conceptual reduction", thereby choosing what to include and what to ignore when composing a particular story from the data. At the level of the categories, this conceptual reduction helped me to focus on the more relevant and robust categories, and to drop less central categories from the framework (Locke 2001). Memos produced at earlier stages offered the theoretical substance for the final account, in terms of providing both the content for the categories and a way to frame the written presentation (Locke 2001).

In short, Werner and Schoepfle's (1987) typology of observation processes ("descriptive observation", "focused observation" and "selective observation") was used to facilitate the progress of this longitudinal study, with the help of the above coding and data analysis techniques. By using the constant comparative method and active coding in particular, I could see and connect actions and contexts early in the study, because constant comparisons led me to compare data with data (and with emerging categories) from the beginning of data collection, instead of waiting till all the data are in. Subsequently, ongoing coding and constant comparing enabled me to see how categories were connected in a larger, overall framework (Charmaz and Mitchell 2001).

At this time, it is important to reiterate that I did not try to incorporate all aspects of grounded theory – in fact, I had a much more modest aim: that of incorporating the idea of constant comparisons as an enlightening approach to assist me during the process of interpretive analysis (Urquhart 2001). Beyond this, it was not my ambition to engage the various key tenets of the grounded theory domain – an area that over the years, has developed into two distinct variants, one favored by Glaser, the other by Strauss, the co-originators of the method (Melia 1996). Indeed, there has been much controversy over these key tenets, with Glaser objecting strongly to many ideas in the book written by Anselm Strauss and Juliet Corbin in 1990 (Urquhart 2001). At the same time, this book and its subsequent revised edition (Strauss and Corbin 1990, 1998) have become key readings for many PhD students aspiring to do grounded theory studies. Particularly worrying is that in the midst of such uncertainty, there is anecdotal evidence that the widespread use of grounded theory methods today includes many specious claims of its use. More importantly and in the context of this research, the aforementioned controversy obscures what is a fairly simple and useful idea for coding data: that of constant comparison (Urquhart 2001). This is especially unfortunate because the basic premise of this method of data analysis is compatible with much of qualitative research (Merriam 1998):

> "*Using constant comparison method gets the analyst to the desired 'conceptual power', with ease and joy. Categories emerge upon comparison and properties emerge upon more comparison. And that is all there is to it (Glaser 1992, p.43)"*

Chapter 4

Case Background

This chapter presents the background industry setting of three government-initiated industry-wide interorganizational projects in Singapore: BookNet, CoreNet and LawNet. The Singapore government's national IT initiatives dating to the early 1980s are first described to help in understanding the circumstances surrounding the inception of the three projects. The then-prevailing and present conditions of the respective industries (book industry, construction industry and legal sector) are described next.

4.1 Singapore

Globally, Singapore is well known for its government's interventionist approach in developing its economy and for its successful track record since gaining independence in 1965 (Lam 2000). However, the years since 1997 have seen several unforeseen economic downturns. Singapore was first hit by a recession caused by the 1997-1998 Asian financial crisis. The economy then picked up but in 2001, it decelerated to a halt as a result of the global economic slowdown and the September 11th incident. In 2003, the economy was again hit by the SARS outbreak in the region. Since 2004, the economic prospects have been improving for Singapore with ongoing firm measures by the government to cut business costs and improve competitiveness. For example, the country attained second- and third-place world ranking for competitiveness in 2004 and 2005 respectively, up from a commendable fifth-place ranking in 2002 (IMD 2005).

In the IT arena, Singapore has similarly been garnering many accolades including a recent first-place ranking as the world's most successful economy in exploiting infocomm developments (WEF 2005) and a consistent second-place ranking in e-government maturity over the years (Accenture 2005). Again, much of the credit belongs to the government's interventionist role with the National Computer Board (NCB), now known as the Infocomm Development Authority of Singapore (IDA) playing an important role in many nation-wide and industry-wide IT initiatives.

In this regard, it is important to note that these recent IT accolades are the result of more than two decades of hard work beginning with the Civil Service Computerization Plan (1981-1985) and the National IT plan (1986-1991). The former plan had its primary focus on computerizing the major functions in every government ministry while the latter plan's emphasis was on extending these newly computerized systems to private sector companies, businessmen and professionals through electronic data interchange (EDI) networks (Hioe 2001). Specifically, a key thrust then was to enable the electronic exchange of structured documents between the industry and various government agencies. Notable successes as a result of this initiative include TradeNet and PortNet among others. PortNet speeded up port documentation, communications and operations while the implementation of TradeNet drastically cut down the processing time of customs documentation (Tan and Yong 2003).

The National IT Plan was subsequently replaced by IT2000: "Singapore - the intelligent island" (1992-2000) and Infocomm21: "Singapore – the Infocomm

Capital" (2000-2003). The IT2000 plan had the "vision of transforming Singapore into a global center for science and technology, a high value-added and competitive location for production and also a critical node in global networks of commerce, communication and information" (Sing and Zhong 2001). Besides resulting in the creation of Singapore ONE - the world's first nationwide broadband network (Chan and Al-Hawamdeh 2002), one major objective was to further leverage the nation-wide information infrastructure established under the earlier master plan to boost the productivity in selected industries. In 2000, the Infocomm21 plan was implemented in response to dramatic changes in the global technology and economic landscape that were taking place in the late 1990s. Two of its key thrusts were to create one of the world's leading e-governments and to continue increasing the competitiveness of Singapore businesses through the strategic deployment of IT (Tan and Yong 2003).

The current "Connected Singapore" initiative (2003-2006) was forged to help Singapore make the leap towards becoming one of the world's premier information and communications technology capitals. It seeks to further the implementation of its "many agencies, one government" concept (with three key outcomes: delighted customers, connected citizens and networked government) while encouraging a new era of industry-government partnership (with the government playing more of a supporting role and the industry driving the development of IT-based initiatives) (Tan and Yong 2003). In the works is the government's fifth and most significant initiative to date (iN2015: "Intelligent Nation 2015") which will look ten years into the future, and identify new possibilities and opportunities for Singapore's industries, economy and society (IDA 2005). In particular, several key economic sectors have been identified as areas of opportunity where information technologies may be exploited to

provide a competitive edge: education & learning, financial services, healthcare & biomedical sciences, logistics & high-tech manufacturing, digital media & entertainment, and tourism, hospitality & retail.

Based on this historical backdrop, it is clear that Singapore is a country in the forefront of the new economy, with its recognition of the crucial role that information technology has played and will continue to play in driving economic growth and in sharpening its global competitive edge. In this study, the focus is on BookNet, CoreNet and LawNet which were projects started up as part of this massive drive over the years to fully exploit the potential of IT in the respective industries: book industry, construction industry and the legal sector.

4.2 The Book Industry

In Singapore, there are over 900 book retailers and 200 book publishers and distributors. In addition, there are also over 100 libraries, including the National Library Board and its branches. Some of the major factors that have driven the growth of the book market in the past were a high literacy rate; good command of the English language; growing affluence; increasing cultivation of reading habits; and various government initiatives in the education sector (Publishers Association 2002). In the 1990s, there were two significant events that impacted the industry.

Firstly, the book industry got a boost from the launch of the Library 2000 initiative in 1994 to establish an adaptive public library system with a network of borderless libraries linking all publicly funded libraries within Singapore to overseas libraries

and information services through computer networking (MITA 1994). The key intent was to expand Singapore's capacity to learn faster and apply the knowledge better than other nations. At the time of the study, it was found that Singaporeans read only 16.5 books a year as compared to their American counterparts, who read three times as many. As a result of this initiative, library membership reached 1.76 million in 1999 – a 10 per cent increase from 1998 – with almost one in every two Singaporeans being a member (Publishers Association 2002).

However, in 1998, the Asian currency crisis led to a minor recession in Singapore. According to the Operations Director of a major book publisher, "*publishers in general faced falling sales and compounding the problem, we were seeing increasing customer returns --- bookstores were returning unsold books to us*". The book retailers were also "*facing a similar crunch in trying to maintain cash flow*". Fortunately, the recession was relatively short-lived - in fact, the economy experienced a quick turnaround with growth of 5.4% the following year.

Over the years however, there is evidence of industry consolidation on the retailing side. Smaller booksellers have been gradually retreating to the sidelines, and are being replaced by bigger players from overseas. These foreign players (Borders and Kinokuniya) and major local chains (Times, MPH and Popular) now account for some 70-80 percent of the total retail market in books. Small retailers are surviving by focusing on niche areas such as medical and Asian books. There are a number of independent bookshops in the local neighborhoods and markets that double up as newsagents and stationers (Publishers Association 2002).

On the publishing side, there are mainly two categories of book publishers in Singapore, namely the textbook publishers and the general book publishers. With its high-quality printing facilities and sophisticated satellite telecommunications, Singapore has over the years become the regional headquarters for a number of large publishing companies (such as Pearson and McGraw-Hill) whose activities range from marketing and distribution to reprinting, translation and adaptation (LePoer 1991). For the textbook segment however, the market size has not been growing and is not expected to grow in the long term because of the continuing shrinking population of school going children. In the case of the general publishers, the market is diverse – however, most of the books in this segment have a short print run because of the size of the market unless they are also meant for the regional market (Tan 2005). The general publishing market has also not been growing due to the several economic downturns since the late 1990s – the only topics that seem to hold the ground are the books on management, information books for investors and books for career management (Tan 2005). This is because in Singapore, adult books are still usually bought for the purpose of self-improvement, not for pleasure (Publishers Association 2002).

Finally, as a result of some disagreement between the locally-owned and foreign-owned businesses in the past, there are two publishing associations in Singapore. The Singapore Book Publishers Association (SBPA) is the original trade body and has 56 members consisting mainly of book distributors, direct sales operators and smaller local publishers. The Singapore Publishers Association (PA(S)) has 25 members consisting mainly of the major local publishers and subsidiaries of major international publishers. Perhaps because of this divided representation, both of these associations

"are largely introspective and as such, are not regarded as being very effective …" (Publishers Association 2002). Again, perhaps because of the representation issue, a committee member from one of the two associations had this self-conscious response when approached for information:

> "*Sad to say, we do not have any statistics on the book publishing industry in Singapore ...*"

Indeed, a foreign-based publisher bemoans the state of affairs in the local publishing industry with the following plaintive comment, when similarly approached:

> "*There is little authoritative information on the local industry. This relates in part to the incredible fragmentation of our trade associations: publishers are members of any one, several, or none of the following: Publishers Association in the UK, Publishers' Association (Singapore), Singapore Book Publishers' Association, Association of American Publishers. Ludicrous, for an island of only 4 million people*".

It was against this industry backdrop that the BookNet project was started in late 1996 but "died a natural death" about two years later. The central EDI server was disconnected in 1999. In the subsequent years after its discontinuation, two key players also ceased using the internal Retailer system (that was installed as part of the BookNet project).

4.3 The Construction Industry

The construction industry is one of the pillars of the domestic economy, employing 10.3% of the total labor force in 2004 (Ministry of Manpower 2005). Just before the 1985 recession, the construction sector's share of GDP recorded a peak of 13.2% (Toh 1998). It has since reduced substantially to 8.2% in 1996 and to 4.3% in 2004

(Ministry of Manpower 2005; Toh 1998) due to the several economic downturns as mentioned earlier. Particularly severe was the Asian financial crisis in 1997/1998 which had especially great impact on the construction industry. After a prolonged period in the doldrums, total construction demand is finally expected to recover in 2005 (BCA 2004) – in fact, there are tentative signs that the industry is bottoming out with employment turning around in the first quarter with 1,500 new jobs created, its first quarterly gain in four and a half years (BT 2005; ST 2005b).

Underlying the government's concern about the state of the industry in the late 1990s, a Construction 21 blueprint was launched in October 1999 with the aim of addressing the inefficiencies of the industry and to align it with the other sectors of the economy as Singapore transits to a knowledge economy:

> *"The Construction 21 (C21) study is a comprehensive effort to restructure the industry and weed out inefficient practices... One of the key C21 recommendations is to transform the image of the construction industry - from 'dirty, demanding and dangerous' to 'professional, productive and progressive."*
>
> *- Minister for National Development, Sep 1999*

This blueprint was the result of a joint effort of two ministries: Manpower and National Development. The steering committee was chaired by Permanent Secretary (Manpower) with the Deputy Secretary (National Development) as the Deputy Chairman. Its four working groups comprised representatives from major industry players including developers, architects, engineers, consultants, contractors and regulatory bodies. One of C21's key recommendations was to develop a technologically-advanced and competitive industry which is able to deliver high quality buildings and infrastructure – in this regard, the widespread use of IT in the

industry was deemed to be instrumental in achieving this vision. The Building and Construction Authority (BCA) was appointed as the industry champion to initiate, drive and coordinate the implementation details across the entire construction value chain (Ministry of Manpower 1999). BCA is a statutory board in Singapore and its primary role is to develop and regulate Singapore's building and construction industry.

In 2000, a survey was done by BCA to assess the level of IT readiness in the Singapore construction industry. The results indicated that companies were slow to adopt use of the Internet. The survey suggested that with the push from the government, the companies seemed more receptive towards IT and did acknowledge its importance. Unfortunately, they seemed to be paying mere lip service, as the level of IT investments within the companies had not grown in the two years since the last survey in 1998. In fact, overall awareness of government grants decreased while IT investments continued to amount to less than 5% of the typical firm's overall expenditure:

> *"Construction industry in Singapore is well known to be the lowest IT-savvy… Right now, construction companies are not very willing to spend extra money. Even $50 is still expensive for them. It is a bad time for the construction industry…"*
>
> *- BCA's project manager A*

A subsequent independent industry survey in 2002 revealed that although the Internet had been adopted by most of the responding firms by then, much information is still exchanged by traditional means (Chan and Leung 2003). Email was the most common electronic means of exchanging information, but it was not suitable for the transfer of huge graphic data files that are typical in this industry. The development of web-based collaboration was still very much in a stage of infancy – while many of

the respondents recognized the benefits involved, they also had many concerns which reflected the need to continue pushing for a mind-set change in the industry.

It was against this industry backdrop that the CoreNet project was first "mooted" in 1995 but only gained impetus in 1999 with the first deliverables coming on-stream in late 2001. Meanwhile, this project has been making slow but steady progress in recent years.

4.4 The Legal Sector

In Singapore, judicial power is vested in the judiciary consisting of the Supreme Court and the Subordinate Courts, with the Chief Justice as the head (Magnus 1999, 2004). Judicial independence is ensured constitutionally, statutorily, institutionally and individually (Magnus 2004), with the Judiciary and the Attorney-General as separate organs of state independent of the executive and the legislature (Thian 2004). Being a British colony until 1958, Singapore initially inherited the adversarial court system from the United Kingdom where the judge does not play an active role in the proceedings before him. However, Singapore has since moved away from the strict adversarial approach and the judge now takes a very proactive approach in the conduct of courtroom proceedings (Thian 2004).

From independence till the end of the 1980s, the state of affairs of the Judiciary was less than satisfactory. Being an adversarial system, lawyers were expected to act in the interest of their clients by complying with the Rules of Court, and thereby progress their cases towards trial. The reality, however, was quite different – instead,

there were thousands of cases which were clogged up in the court system. There were also inefficiencies within the judiciary itself - one problem was access to case-related information. Such information was not comprehensive or available in a systematic way. As such, lawyers or members of the public had to come down personally to the court to plough through volumes and volumes of cause books and case files to find the relevant information. This was time-consuming and tedious – for example, a search on the status of a company in a winding-up petition could, for instance, take a few days or in some cases, even weeks (Thian 2004).

When the Chief Justice Yong Pung How was appointed the head of the Judiciary in 1990, significant efforts were immediately initiated to reorganize the Judiciary and in the process, the legal landscape in Singapore was decidedly transformed (Magnus 1999). Initially, the most pressing concern was the massive backlog of cases which had accumulated, some from the early 1980s. Many initiatives were introduced to tackle this problem, including the reform of archaic procedural rules, the lengthening of court hearing hours, the appointment of more Judges and Judicial Commissioners, the setting up of night courts in the Subordinate Courts and the appointment of Justices' Law Clerks to assist the judges in their legal research. Besides these initiatives, a key weapon used to clear the huge backlog was case management. Case management involves the monitoring and managing of cases in the court docket from the time the action is filed to the moment it is finally disposed of by way of a trial, settlement or otherwise. With case management, the pace of litigation is controlled by the courts and not the lawyers or the parties (Thian 2004).

However, an impediment to the effective tracking of the thousands of cases at that time was the non-existence of key information on cases and caseload. The Judiciary could not easily determine the efficiency of the court system. As mentioned, case information was recorded in huge cause books which did not have an easy way of allowing anybody to search for information or to obtain vital data and statistics. This provided the impetus for an overhaul of how the court system recorded, kept and archived all such information to make it more easily accessible. It was this urgent need to develop an effective case management regime which precipitated the greater use of IT in the Judiciary (Thian 2004).

However, it should be noted that the relentless search for greater efficiencies was not without cost – between 1999 and 2001, 624 young lawyers left practice citing long working hours and work stress as reasons for their departure (Ho 2004). Nevertheless, Singapore's efforts at reforming its legal sector are being recognized. The Swiss-based IMD World Competitiveness Yearbook ranked Singapore 1st (for legal framework) and 6th (for justice) in 2003, while the Political and Economic Risks Consultancy (PERC) group gave Singapore the top position in Asia for overall integrity and quality of the legal system in that same year. In fact, Singapore's score surpassed the score for the United States and Australia, thus signifying that foreign investors and businesses are confident of the high standards of the Singapore's judiciary (Ho 2004). This high regard for the legal system has helped Singapore as a whole to move towards its goal, as a country, of being a regional business and services hub.

Refusing to rest on its laurels, the judiciary has been moving rapidly in recent years from tackling operational issues, differential case management, performance measurement and institution of core justice values, to environmental planning, scenario planning and envisioning the courts of the future – with IT as a key component of that strategy (Magnus 1999):

> *"Clearing the backlog of cases was only the first step. After the backlog was cleared, the new focus was on the higher goal of how to make our judiciary a world-class organization. What makes for a world-class court? It not only has to dispense justice swiftly and fairly, but it also has to be able to adapt and respond to the changes in its environment…"*
>
> - *Chief Justice Yong Pung How's comments in Surbordinate Courts Annual Report 2000*

> *"This is the Subordinate Courts's 10th Workplan. You have turned the corner to be a world class judiciary. Although this is an enviable position, it is not enough. We cannot rest on our laurels as the primus inter pares or the best of the best judiciaries… Over the next three years, we will lead from the future and build upon the foundation of excellence which you have achieved in the past decade… In order to provide the best possible public service, the Subordinate Courts must continue to modernize judicial administration practices. Advanced information technology efforts should promote greater efficiency, economy and convenience to the public. These include the best case management practices and systems, voice response systems, document imaging systems, records management retrieval systems and speedy access to both local and foreign cases and legal literature…"*
>
> *- Chief Justice Yong Pung How's address to the Subordinate Courts at the 2001 Workplan Seminar*

It was against this industry backdrop that the LawNet project evolved from its original knowledge repository focus in the early 1990s to its current ambitious vision of developing a "total and integrated electronic litigation system".

Chapter 5

BookNet

This chapter presents and interprets the findings of the study related to BookNet through the lens of the conceptual framework developed in Chapter 2. The aims, objectives and key players of the project are first identified. The organizational and interorganizational dynamics during each of the following processes are then described: valuation, creation and conversion/use. Finally, process interventions are highlighted.

5.1 A "Discontinued" Project

Established in 1993 as part of the Singapore government's Retail Sector Development Plan, RTA's (not its real name) primary role is to modernize and increase the productivity of small and medium enterprises (SMEs) in the retail industry. In this regard, one of the main charters of RTA is to promote and improve the trading capabilities of the retail communities. Over the years, it has conducted seminars, training courses, briefings and consultancy projects for SMEs. For example, it is currently one of the key parties involved in a government scheme to help bail out ailing small businesses. Under this scheme, each shopowner in a public housing estate will receive S$60,000 if he/she decides to close shop and leave, and when fully implemented, the scheme aims to shrink the pool of more than 15,000 neighborhood stores by 25% (ST 2005a).

In late 1996, the since-discontinued BookNet project was initiated by RTA and supported by ITA (the then-IT arm of the Singapore government – not its real name). Overall, the project had the purpose of improving coordination of routine business activities within the industry through electronic networks. More specifically, the primary objectives of BookNet were as follows (iCommerce 1997):

- To help the book community to reduce business cost of performing EDI transactions by using the Internet as the network infrastructure.
- To help the book community to increase business operation efficiency by providing applications facilitating an automated work flow (both between and within companies).
- To facilitate e-commerce for trade-based and consumer-based transactions.

The BookNet system consisted of 3 components:

- An (internal) Retailer system comprising Point-of-Sales software, inventory management, order processing, purchase order, sales analysis, accounts payable, accounts receivable, general ledger and electronic commerce gateway
- An on-line product catalog displaying the catalogs of participating publishers to allow retailers and libraries to browse, search and download product information into their inventory master-file
- An EDI server hosted by a software vendor allowing the book trading community to transact business electronically

Upon initiation of BookNet, a technical EDI pilot was immediately started and involved Publisher-YES, Publisher-NO, Retailer-LT and Retailer-PO. Publisher-YES and Publisher-NO (not their real names) are leading players in the book publishing industry in Singapore, and are especially dominant in the academic and professional segments of the local book market. These two American-based companies have set up their Asian headquarters and their regional distribution centers in Singapore. On the other hand, Retailer-PO and Retailer-LT (not their real names) are small retailers focusing on niche segments of the market.

In early 1997, the fledgling BookNet project was featured in a television series called Singapore@Work initiated by the government to highlight how SMEs in certain industries were applying IT innovatively in their businesses (IDA 1997). Meanwhile, the project went through many rounds of requirements gathering and system specifications (involving representatives from a total of 16 selected publishers and retailers – both big and small companies). Following the completion of the technical pilot and a subsequent official launch in late 1997, the BookNet project was discontinued (about a year after the launch) due largely to lack of concrete follow-up interest during and immediately after the launch event. The EDI server was disconnected in 1999. In 2001 and 2004 respectively, Retailer-PO and Retailer-LT subsequently discontinued use of the internal Retailer system (that was installed as part of BookNet).

In view of the well-known tenacity of Singapore's government-linked agencies in pursuing long-term objectives to eventual fruition, the lack of staying power of the

BookNet project (in spite of strong government-linked facilitation) deserves close attention.

5.2 Valuation Process: *Discovering Value*

Since 1993, RTA has been in the front-line to push the SME retailers to use IT to upgrade and modernize their operations. Motivated by the success of industry-wide projects like TradeNet, RTA started a highly-visible ShopNet project in 1994/1995 for mini-supermarkets and provision shops in the public housing neighborhoods to connect to wholesalers and suppliers. The Deputy General Manager of RTA explained:

> *"We push a lot in IT on small retailers to upgrade and modernize ... IT is the only way to survive, besides franchising ... ShopNet was a way to kick-start the use of IT for small retailers"*

RTA's strategy was to encourage the SMEs to do internal computerization (especially for inventory tracking) based on the argument that this would be needed for the necessary external integration to wholesalers and suppliers as part of the highly-publicized ShopNet project. It was hoped that with better reporting, the mini-supermarkets and the provision shops could be as efficient as the bigger supermarkets.

Buoyed by the initial positive reception to ShopNet (about 200 retailers and a few wholesalers were willing to be involved) and the advantages of the then-emerging Internet-based EDI technology, RTA then obtained government funding in late 1996 to start a similar BookNet project in the book industry in Singapore. This industry-wide project had the aim of improving the competitiveness and trading capabilities of

the book community in general, by helping the companies (publishers and retailers – both big as well as small firms) to set up an Internet-based EDI infrastructure focusing on online catalogs and electronic procurement capabilities (quotations, purchase orders, invoices, credit/debit notes and dispatch advice). It was also envisaged that the government-linked libraries in Singapore would eventually be involved in the setup, with mutual benefits for both the public and private sector organizations.

Specifically, the expected benefits of the project included increased data usage efficiency (integration between external documents such as purchase orders and the in-house systems), reduced data entry cost (man-hour costs and costs due to data errors), prompt information delivery (instantly updated electronic catalog), universal catalog (common specifications to facilitate search), faster turnaround time (electronic integration instead of postal mail) and the possibility of regional expansion (Internet-based system was expected to be able to facilitate doing business in other countries without physical presence).

5.3 Creation Process: *Constructing Value Proposition*

The project started on a high note and struck the right chord with the industry. The Deputy General Manager of RTA described the general positive reaction on the ground when the idea was first floated within the industry:

> *"In bookstores, there are thousands of book titles… The general perception is that there is a need [for a project similar to ShopNet]… Even the publishers say so…"*

A steering committee was immediately formed and tasked with the objective of arriving at a common consensus on implementing the project in such a way that would yield maximum benefits for the industry as a whole. At the same time, an IT consulting company was also appointed to support the process as follows:

- conduct a detailed study of the needs and requirements of the book retailing industry based on input from a selection of both big and small book retailers
- conduct a detailed study of EDI requirements based on input from a selection of book publishing companies
- design and develop the entire system according to the requirements gathered
- implement the entire system at the pilot sites and upon successful pilot implementation, package and market the system to the book industry

Altogether, sixteen companies (including publishers and retailers – both large and small companies) were selected to participate in the steering committee, but only two publishers (Publisher-YES and Publisher-NO) and two small retailers (Retailer-PO and Retailer-LT) were selected for the technical EDI pilot. The EDI pilot phase was planned for a period of nine months, including the aforementioned requirements definition and systems design phases. After a successful live run of three months at the pilot sites, the plan was that the EDI system would be launched officially and the IT consulting company would then begin to market the product. Meanwhile, several small retailers (in addition to Retailer-PO and Retailer-LT) were also selected to

participate in implementing the internal Retailer system in preparation for the official launch of the EDI product.

When the top management at Publisher-YES and Publisher-NO was contacted by RTA and ITA, they immediately agreed to take on the role as leading firms in the technical pilot so as to attract the book retailers (especially the bigger ones) to participate. When told of the magnitude of the project such as the investment by the government of up to S$1 million, the special government funding schemes for the smaller book retailers and the potential involvement of all the big as well as small players in the industry, their response was immediate and as expected:

"*If we do not come out and adopt it, the competitors may do it!*".

Both Publishers were also convinced then of the potential benefits involved (as expounded by RTA and ITA) and felt that their initial share of the pilot project costs could be easily recouped once the project goes live. For example, the Operations Director of one of the publishers spoke excitedly about how his company "*saw tremendous advantages in terms of future savings, as we could expand the system to beyond Singapore*". While a little less enthused, even the technology-oriented MIS Managers of the respective publishing companies also echoed the same business refrain:

"*ROI looked OK… Key customers were expected to come onboard*"

In addition, both Publishers felt that the initial investment needed (cost of hardware, software, consultancy and internal programming effort) was reasonable, and within

their financial resources. This was because the government was funding a large part of the technical pilot. In addition, the e-commerce vendor appointed by RTA and ITA to manage the project was rendering a lot of technical IT help for the necessary external and backend integration. As such, both publishers immediately committed time and budget (for the necessary hardware, software and consultancy) for involvement in BookNet, in anticipation of the major retailers linking up with them eventually. In this regard, both Publishers had the impression that all the major book retailers would definitely come onboard as the project had very visible government commitment and backing, in terms of organizational, financial and technological support. In fact, the then-Operations Director of Publisher-NO remarked that both Publishers had no qualms in giving their company-confidential lists of top ten customers to RTA, because "*RTA seemed to imply that it would persuade the major book retailers to join the project - in fact, at the initial project kickoff meetings involving the publishers and the book retailers, the retailers seemed very positive*".

Besides the two publishers, two small retailers (Retailer-PO and Retailer-LT) were also selected for the technical pilot. Similarly, these small retailers were enthusiastic. Besides wholeheartedly subscribing to RTA's vision for the industry *("there is common good for the industry, if it gets off the ground"*), Retailer-PO saw specific advantages in the online ordering capabilities of BookNet – in fact, its Director called RTA to register the company's interest in participating in the pilot after reading about the project in the newspapers. In contrast, Retailer-LT was contacted by RTA as it had previously participated in some university's research program on online web sites. Its Managing Director immediately responded positively to the offer to

participate in the pilot, when told of BookNet's promise of seamless internal and external integration: "*very attractive – can hardly say no!*"

Both Retailers-PO and –LT also felt pressure when agreeing to participate, partly also because BookNet promised the pioneer use of a then state-of-the-art Internet-based EDI infrastructure for "e-commerce" (the latter term was over-hyped at that time): *"A lot of talk then about e-commerce!"*

While Retailers-PO and –LT are small companies, participation in the technical pilot was not a problem due to the availability of government funding and technical assistance:

> *"Without the grant, (it would be) very difficult to do it on our own…. Cost is prohibitive… There was a lot of help from vendors during the pilot. Not possible to do on your own."*

Prior to BookNet, Retailer-LT had engaged in one failed in-house computerization effort and had just commissioned its new internal system at the second attempt. It thus had a working backend IT system and felt that it would thus be in a good position to leverage the external linkages as part of BookNet. Subsequently, it turned out that this retailer also made another major decision to go with the "whole BookNet package" by switching from its just-commissioned system to the "standard" internal Retailer system offered as part of the project (in the belief that this would facilitate the necessary seamless backend integration with external EDI transactions in the future, as per the highly-publicized vision of BookNet). Besides the financial assistance provided for such a move, it appears that this retailer was very encouraged by the hands-on involvement of the government-linked agencies (RTA and ITA) at the technical implementation level:

> *"There was this comfort level. RTA controlled the vendors at all meetings and was always there during meetings between vendors, bookstores and publishers. Minutes describing action items were also produced. Comforting in the light of our bitter experience"*

The project thus went through many rounds of requirements gathering and system specifications (involving representatives from the aforementioned sixteen companies in the steering committee). Some of the subsequent meetings were however not very well attended, as the major retailers were not involved in the systems testing (the technical EDI pilot only involved Publisher-NO, Publisher-YES and the two small retailers). The pilot project and the implementation of the internal Retailer system at several small retailers also turned out to be quite stressful affairs. Indeed, the Deputy General Manager of RTA acknowledged that the "*small book retailers ... encountered many problems*" and attributed the situation to their unrealistic expectations of the work involved, considering their lack of IT background. On the other hand, the owner of a small retailer (which was not involved in the technical EDI pilot but participated in implementing the internal Retailer system) complained that even this internal system was never "100% ready" – although he was still using the system at the time of this study, he claimed that it only delivered 80% of the functionality that was promised. For example, the point-of-sales functionality subsequently turned out not to be Y2K-compliant!

While the "*overall project proved to be more complex than expected*" (as acknowledged by RTA), the pilot system was operational - in fact, right after the official launch, work continued on the next "Part 2" phase of BookNet. In a newspaper article publicizing the project after the operational pilot, the marketing

manager of the appointed IT vendor glossed over the early symptoms of problems and instead chose to focus on the potential benefits of BookNet:

> *"The critical benefit of BookNet is inventory. Shelf space takes up time and money. Bookshops, in order to attain a good bottom line, wants to display new books that customers are likely to buy, instead of letting old unwanted books stay on the shelf for a long time…. BookNet allows booksellers to monitor what books are sold and what books are available because it is a one-stop central electronic library of book catalogs from various publishers…. By enabling suppliers, publishers and bookshops to exchange business documents electronically without paper, BookNet has shortened the time for bookshops to order books from 1 week to 1 day."*

5.4 Conversion/Use Process: *Realizing Value*

During the run-up to the official (public) launch, the BookNet project received much publicity and strong official support. There were concerted efforts to ensure the success of project, including a visit by a nine-member delegation to learn from the experiences of other publishers in Germany and United Kingdom. In fact, the delegation harbored high hopes for the project, as exemplified by the following comment from one of the members when interviewed after the trip:

> "*The study mission proved to be beneficial …. We are confident that BookNet's achievements with EDI capability will soon enable us to take on another level of business in Singapore and outside Singapore*."

Several public seminars were held to promote the system, while articles tracking the project's progress (e.g., "*BookNet ushers a new era for the trade*" and "*Saving time and money: a look at how the book industry is benefiting from e-commerce system BookNet*") regularly appeared in the local newspapers and retail bulletins. With such

strong official support, the project seemed initially destined for success. Indeed, the MIS Manager of Publisher-YES confides that the combination of strong government commitment and tangible government backing for the BookNet project (e.g., special funding schemes for the smaller bookstores) gave the publishers the "*impression that the project had good potential for success*". The project was subsequently launched with quite a bit of fanfare, and with printed brochures promoting the eye-catching and seemingly paradoxical slogan "Less Paper, More Books".

At the official ceremony, the Chief Executive of the government-linked National Library Board launched the project with the following challenge to the industry:

> *"For though the information industry is synonymous with IT, the use of IT to support business processes within the [book] industry is still in the relative dark ages. With BookNet, we will be changing the traditional way, or dare I say the comfortable way, in which the book industry does business. BookNet will harness the power of IT to re-engineer old practices and introduce more efficient processes."*

At the same time, the General Manager of RTA formally announced that BookNet was now ready for widespread adoption in the book and stationery trade, with particular benefits for *small* retailers (RPC 1997):

> *"It is a value-added business tool which can help Singapore SMEs become more competitive. We aim to make it accessible and affordable for SMEs in the business to adopt the system and realize the benefits from IT"*

During this launch event, one of the *major* retailers also echoed the government refrain that BookNet would definitely be helpful (RPC 1997):

> *"... the electronic commerce service on BookNet will reduce manpower and improve productivity. Being able to browse and order books online through the electronic book catalog will be a boon to our operations."*

A follow-up seminar was held several months later to reinforce greater understanding on the implications of electronic commerce for the retail trade. It was organized by RTA, officiated by a senior government official and attended by some 300 people, including representatives from the book retailing sector. During the seminar, the attendees were exhorted "*to be united and use the technology to be more competitive*" (RPC 1998).

However, follow-up response after the official launch was extremely lukewarm and lacking in concrete action, with none of the major retailers willing to take that much-needed symbolic first step forward to link up with the two ready publishers. More pointedly, RTA and ITA could not convince any of these major retailers to take the lead although some of them like Retailer-SG and Retailer-FN had been dutifully participating in the regular meetings coordinated by these government agencies. Retailer-SG and Retailer-FN are among the top five biggest players in the local book retailing scene – the former is a local company while the latter is a foreign-based company. In fact, both of them are ranked by Publisher-YES and Publisher-NO as being among their top 3-4 customers in Singapore.

Specifically, Retailer-SG seemed to be adopting a "wait-and-see" attitude regarding whether the stated BookNet benefits (in theory) could possibly be realized (in practice) – an important distinction - and had in fact indicated that they will take their time to decide whether to come onboard after carefully evaluating the results of the technical pilot ("*we have more pressing problems and IT is just one part of it*…."). Retailer-SG was also going through corporate changes at that time, which aggravated

organizational inertia. More importantly, its Managing Director offered this valuable insight:

> "*We were having a bit of problem developing our own software for internal management information needs and were not ready to say yes. We were still doing back-end systems work which needed a year or much more. The scale of participation needed for BookNet is larger for us than the small retailers – for us to get ready, more preparation and more staff is needed*".

With several retail branches located all over Singapore, Retailer-SG was not prepared to embark on what it then considered as a major and costly undertaking to do both the front-end (point-of-sales systems) and back-end systems integration, which would have been needed to fulfill the ideals and promise of BookNet. In the same vein, the Retail Director of Retailer-FN clarifies that with just two IT professionals in their company, their local system was and still is heavily dependent on (and integrated with) processing at their foreign parent, and any local IOS project would require significant coordination with their headquarters (which uses different data interchange standards).

Retailers-SG and -FN were of course never under significant pressure to adopt, as RTA's main charter had always been to focus on smaller retailers and to help them get their internal systems in place as the first integration step of the BookNet project (the implementation of the Retailer system was an important part of the whole exercise). As such, the initial focus was on the small retailers – for example, the technical pilot involved two small retailers working with two major publishers. It was therefore not surprising that a typical comment from the two major retailers (Retailers-SG and –FN) was:

> "*Those small retailers are not our direct competitors – we don't see the other big retailers in the project. Unless the publishers say that they won't do business (with us) ...*"

Indeed, the Deputy General Manager of RTA acknowledged (with the benefit of hindsight) that a major factor for the quagmire was that the major retailers were not under pressure from each other and *"therefore, they didn't see the need to follow through with the project*".

By the time of the official launch, both the publishers involved in the technical pilot (Publisher-YES and Publisher-NO) were similarly feeling less and less pressure to continue pouring time, money and effort into the project. Indeed, all the industry players realized that the project was starting to lose momentum in the run-up to the official launch, and this situation was further compounded by the fact that after the launch, RTA was clearly having difficulty in convincing any of major book retailers to take the much-needed symbolic first step forward. The MIS Manager of Publisher-NO was a bit more blunt in describing the fast deteriorating situation: "*I think RTA and ITA were aware that the project was going to fail…".* Coincidentally and ill-fatedly so, Publisher-NO's enthusiasm was also rapidly waning after the official launch, as it suddenly found itself in the throes of a big corporate merger with another publisher and there was a growing perception that the BookNet project will no longer be relevant to the new enlarged company. In particular, the expectation of upcoming organizational changes (with strong likelihood of an accompanying IT infrastructure consolidation) cast a cloud of uncertainty over continuing near-term budget and backend system readiness for the project.

About nine months after the official launch of the BookNet project, the Asian currency crisis led to a minor recession in Singapore. Although the recession did impact the book publishers and retailers alike, its impact was relatively short-lived. In fact, the economy experienced a quick turnaround with growth of 5.4% the following year. While the Deputy General Manager of RTA downplayed the significance of the short-lived recession in having a major bearing on the ongoing outcomes of the BookNet project (for example, there was clear lack of concrete commitment on the part of the major book retailers during and immediately after the official launch – all of which happened before onset of the recession), it appeared to have nevertheless weakened RTA's lonely resolve to continue working on an already seemingly intractable interorganizational impasse.

The project was thus subsequently discontinued (culminating with Publisher-NO's decision to discontinue usage of the pilot system in 1999) within about a year due to this lack of concrete follow-up commitment from the major retailing players. The project thus "*died a natural death*", a sentiment that was echoed by many industry players familiar with the unfolding course of events. The "natural death" commentary (mirroring other comments of a similar vein – e.g., "*they stopped calling meetings*…") came from the same exact words of many of the key players who were involved in this project.

In 2001, Retailer-PO also discontinued use of the internal Retailer system (that was installed as part of BookNet) and switched to another system. Meanwhile, Retailer-LT continued to plod along with this system until the owner eventually sold off the business in 2004 (ST 2004).

5.5 Process Interventions

Amidst the rapid unfolding of events as described in the foregoing sections, the strong hand of RTA could be seen. In this regard, institutional leadership in the BookNet project appeared to belong primarily to RTA, with ITA in a secondary technical support role. Specifically, the burden fell upon RTA to dictate the pace, direction and execution of the project, from its original inception to the technical pilot and the official launch. RTA representatives (including even the business development executives) took turns to coordinate and to be present at all the (technical) specification meetings involving the IT vendors, the publishers and retailers. While the Chief Executive of the National Library Board officiated at the launch of BookNet, his agency was not involved in the proceedings leading up to the launch. With lack of symbolic support from a higher authority or a higher cause, RTA eventually proved to be inadequate to the task especially when it ended up having to also perform much of the groundwork. This was further compounded by the fact that RTA's expertise actually lies in working with SMEs rather than large companies.

It is also important to note the nature and extent of involvement of the stakeholders in this project. For example, several major publishers and major retailers were approached at the start of the project as RTA and ITA realized that without their involvement, it would not be possible to arrive at a consensus on industry-standards for data interchange. These big companies possessed the necessary knowledge, expertise and perspective to participate in the business process re-engineering efforts, which the small players lacked. However, BookNet suffered from a number of problems in this regard. Firstly, key industry associations were not co-opted into the

project management structure due to the fragmented nature of the industry (e.g., two publishers' associations were at odds with each other as mentioned previously). In addition, this cooptation was not very effective – while 16 companies (both large and small) were officially in the steering committee, many of the representatives from the big players were very ad-hoc in their attendance during the regularly-scheduled meetings. Besides, only small retailers rather than big retailers were involved in the technical EDI pilot while the (internal) Retailer system component of the project was obviously targeted at helping the small retailers computerize their internal operations in preparation for EDI.

Finally, there was evidence of sensemaking at work during the project. To begin, it is important to reiterate that there was no symbolic anchor at the macro level for the sensemaking activities although in retrospect, the Library 2000 networking initiative (as discussed in Chapter 4) could have been a powerful motivating driver. Instead, sensemaking during the project was focused on painstakingly determining and arriving at a consensus on the requirement specifications for data interchange – however, attendance at the regularly scheduled meetings started to slack as the project progressed. In fact, without a symbolic anchoring vision, some of the big players started to have second thoughts about being engaged in the time-consuming work of coordinating requirement specifications on such a regular basis:

> *"At the initial kickoff, there was positive feedback from the industry but they didn't know the work involved - very intensive, nitty-gritty work. The IT departments in the big companies – the IT Directors – they felt that a lot of work is involved. They were all hoping not to be involved in the project unless their CEOs get excited…"*
>
> *- Deputy General Manager, RTA*

In particular, the Deputy General Manager of RTA recollected how the big retailers felt that they were being asked to do "national service" (in the retailers' words) – an analogy which referred to the situation in Singapore where every young male citizen of the country is required to serve a long 2-year full-time term in the military service for a very nominal monthly wage. This was because one of the key objectives of BookNet was clearly stated as being to help uplift the smaller players in the industry – a theme that was repeatedly highlighted at the start of the project and even during the official launch. Financial incentives and technical assistance schemes were also clearly and obviously targeted at the SME retailers. Indeed, the sole charter of RTA itself is to help SMEs – this disconnect between RTA's limited charter/expertise and its bigger role in BookNet (an industry-wide project that obviously needs to target the big players) proved to be problematic for the agency as it found itself increasingly unable and ill-equipped to respond adequately to the different needs of the big industry players during the course of the implementation.

Chapter 6

CoreNet

This chapter presents and interprets the findings of the study related to CoreNet through the lens of the conceptual framework developed in Chapter 2. The aims, objectives and key players of the project are first identified. The organizational and interorganizational dynamics during each of the following processes are then described: valuation, creation and conversion/use. Finally, process interventions are highlighted.

6.1 Slow but Steady Progress over the Years

CoreNet was conceived as part of the IT2000 master plan aimed to transform Singapore into an intelligent island (Sing and Zhong 2001). The project is led by the Ministry of National Development (MND) and driven by BCA in collaboration with other public and private organizations. Public organizations include government agencies related to the industry while private organizations include all the representative industry associations.

The main objective of CORENET is to achieve major improvements in turnaround time, productivity and quality in the business processes of the construction industry. By building IT infrastructure to facilitate online information and services for the construction industry, CORENET aims at integrating the four processes of the building project life cycle: Design, Procure, Build and Maintain. The vision was one of building a comprehensive network system consisting of a series of IT systems and

services that allows seamless and expedient communication and exchange of information between relevant government agencies and parties involved in the industry. Beyond just an information repository system, CoreNet was envisioned more as an interactive platform that would be capable of providing a high level of automation and integration to many construction and development processes.

Specifically, the focus was on the implementation of G2B electronic services (e-information, e-submission and integrated plan-checking) and G2B/B2B data exchange standards (via private-public sector partnerships to establish commonly accepted means of sharing critical information amongst project stakeholders).

To date, the data exchange standards setting process has been making steady progress. Several national codes of practices have since been published in the areas of Computer-Aided Design (CP83 in 2000-2001), Cost Information Classification (in 1999), Construction Resource Information (in 2002) and Construction Electronic Measurements (in 2002-2003). The use of these IT standards are not yet mandatory, but the very fact that they are gazetted has the effect, for example, of encouraging software vendors to write computer-aided design (CAD) programs that can read or recognize these standards.

Similarly, the G2B projects have been gradually moving forward. The e-information system is a one-stop XML-based electronic access point to latest and multiple information resources so as to reduce the need for hard copy storage space and expensive in-house contents management system for publicly available information. In short, it acts as a central repository for construction and real estate related

information such as codes and regulations, industry statistics, national project listings, contractors listing and performance, product catalogue and Singapore-specific standards. More importantly, the codes and regulations content of e-information system also serves as sub-module to the e-submission system while providing foundation support to the integrated plan-checking systems.

The e-submission system is a one-stop Internet-based portal for building professionals to submit building plans and related applications to its 16 participating government agencies, "anytime and anywhere from their office or home" (Lim 2004). As part of this system, an Electronic Buildable Design Appraisal System (e-BDAS) is available for Qualified Persons (QPs) to compute Buildability Scores directly from softcopy files of 2D CAD drawings. Based on the Code of Practices on Buildable Design, this electronic tool lets architects and engineers consolidate, validate and prepare reports entirely online for submission purposes (BCA 2005).

Currently in the works is an integrated plan-checking system where building and related plans will be automatically checked for structural irregularities and non-compliance of common standards.

6.2 Valuation Process: *Discovering Value*

Under the IT2000 master plan, the construction and real estate industry was recognized as one of the major economic sectors in which IT could be exploited to enhance the competitiveness of the industry. Officially "mooted" by the National Development Minister at the opening ceremony of Baucon Asia 95 (a major annual

regional industry event), the implementation of the CoreNet vision was estimated to cost S$185 million over the next eight years with industry users – such as developers, architects and engineers – bearing about S$40 million of the total cost to acquire the necessary hardware and software and for training and manpower costs (BT 1995; ST 1995a; ST1995b). One key area identified for improvement was that as construction projects involve multiple skills/trades, regulatory approval usually requires clearances from several regulatory bodies. This decentralized approach inevitably involved large amounts of paper documentation. Whilst decentralization of regulation functions had its merits, it also presented challenges in terms of multiple submission points, cross-referencing of clearances, compliance and policy coordination. The idea was that the implementation of an Internet-based e-submission system would thus offer an opportunity to close these gaps whilst retaining the benefits of decentralized yet coordinated regulation through a single customer-to-agency interface (Lim 2004).

However, the translation of this vision into strategic action gained decisive impetus only in 1999 due to a key recommendation from the Construction 21 (C21) blueprint to expedite the fledgling CoreNet initiative as a way to address the industry's continuing woes precipitated by the Asian financial crisis in 1997/1998. At that time, it was acknowledged that the industry faced serious problems such as: low productivity level and negative productivity growth, heavy reliance on a large pool of unskilled labor, and labor intensive and backward construction techniques (Ministry of Manpower 1999). Compounding the situation was that both upstream and downstream activities contributed to the above problems. At the upstream stage, the industry still largely adopted the segregated approach where design is separate from construction considerations, leading to much re-work downstream (which inhibited

labor-saving efforts at the construction stage). Downstream, the availability of a large pool of low cost, unskilled foreign workers had retarded efforts to raise the productivity of contractors such as adopting much-needed labor-saving techniques and upgrading the skills of workers. In fact, in the five years prior to the launch of C21, the productivity level of the industry had dropped by more than 13%, with productivity growth being negative since 1995.

In terms of work processes, a building project typically involves several organizations at various stages of the building cycle. In the planning and design phase, the main work flow is between the owners, consultants and architects. As the project moves into the construction phase, the process subsequently involves general contractors, engineers and suppliers. Throughout these phases, the various organizations are required to coordinate building information and exchange documents frequently. However, the industry as a whole has been deeply entrenched in traditional unproductive and time-consuming work practices. For example, many organizations have adopted different CAD environments, with no standard drawing format. As such, a conversion process is usually required to convert external documents into an acceptable format for internal use. A Vice-President of a software vendor to the construction industry succinctly summed up the situation at that time as follows:

> "*The construction industry is complex. The current practices are paper intensive. Minor modification takes a long time and it is very difficult to track workflow and share information… let alone cross team collaboration and communication… To improve productivity, quality and margins, we need to reduce design and construction conflicts* ".

6.3 Creation Process: *Constructing Value Proposition*

From the start, both public and private organizations were mobilized in keeping with the government's recognition of the need to involve the industry in the exploration and implementation process:

> *"The success of the technology masterplan for the local building and construction industry hinges on greater dialogue and cooperation on the part of the various construction disciplines as they migrate towards a shared paradigm…" (IDA 1996)*

The participating government agencies included BCA, Housing & Development Board (HDB), Urban Redevelopment Authority (URA), Ministry of Environment (ENV), National Parks Board (Nparks), Public Utilities Board (PUB) and Fire & Safety Bureau (FSB). Professional bodies like Singapore Institute of Surveyors and Valuers (SISV), Singapore Institute of Architects (SIA) and Real Estate Developers' Association of Singapore (REDAS) were also enlisted into the project. In general, architects, engineers, property developers, quantity surveyors, valuers, property managers, contractors, property consultants and other parties directly or indirectly involved in the real estate development processes, were targeted to be the main users of this network (Sing and Zhong 2001).

A demonstration project was first started to develop the world's first computer software for checking building plans (called "BP Expert"). This software was meant to serve as an example to the construction industry of how advanced use of IT could help the industry and was a precursor of the Integrated Plans Checking system that was envisioned. Besides architectural designs, the vision was to develop similar plan checking systems in various government agencies responsible for checking other

building plan types covering structural plans, fire codes, sewage, development control, car parks and roads. The BP Expert software – developed at a cost of S$6.7 million – was eventually launched on 7 October 1997. Prior to the launch, six private sector architectural firms participated as pilot sites to ensure that the system conforms to local design and drafting practices. CAD vendors were also involved to ensure that their software support the requirements of BP Expert. The use of the software dramatically cut the time taken to approve architectural designs, while being able to automatically highlight areas that do not conform to regulations. The software was distributed by BCA at a greatly subsidized rate of S$250 each to encourage the private firms to experiment with its use. Previously, hard copies of the building plans had to be submitted to the Building Control Division and various other authorities to be checked manually. With the software, these plans could be submitted on recordable compact discs for approval (ST 1997a).

In 1998, a landmark memorandum of understanding (MOU) was signed between CIDB (now known as BCA), NCB (now known as IDA), PSB (now known as SPRING), and the Singapore Chapter of the International Alliance of Interoperability (IAI) to jointly sponsor the development of a set of common standards for restructuring computer-aided design and information of building projects and to adopt them as national standards. Co-signing as supporters to the MOU were presidents of the eight professional bodies representing the Singapore construction industry: the Association of Consulting Engineers (ACES), the Institution of Engineers (IES), REDAS, SIA, Singapore Contractors Association Limited (SCAL), the Singapore Institute of Building Ltd (SIBL), SISV and the Society of Project Managers (SPM). All signatories committed to actively participate in the project to improve the process

of data exchange, including the adoption of common standards such as layering convention, the use of symbols and classification of data among developers, architects, engineering consulting firms and quantity surveyors. BCA was assigned as the lead agency to coordinate these efforts to move towards enhanced IT interoperability.

In 1999, in line with a key recommendation from the Construction 21 (C21) blueprint to accelerate its implementation, the National Development Minister announced at the Baucon Asia 1999 event that some S$44 million would be spent over the next 4 years to firmly put in place the CoreNet infrastructure so as to facilitate the widespread use of IT in the industry. At that point, there was "no turning back" (Mok 2002) as BCA is the lead agency championing both the implementation of CoreNet and Construction 21. In the words of BCA's Project Manager A:

> *"To drive adoption of IT in general, we use G2B as a regulatory driver. Once they have built up the infrastructure, hopefully these companies will use the infrastructure to move into B2B and beyond… Regardless of good or bad project, the building will be up. It is just a matter of productivity and cost…The players will be very keen to know the success factors [of implementing IT] so as to determine ways to improve their processes."*

Specifically, the bulk of the confirmed funding was allocated for the full implementation of the e-information system, e-submission system and the integrated plan-checking system. The latter consists of three related sub-projects: Integrated Building Plan Checking System, Integrated Building Services Checking System and Integrated Structural Plan Checking System. To achieve this on a national scale, BCA realized that the implementation had to be carefully planned and executed to obtain buy-in, support and participation at all levels and across both private and public

sector organizations. This was because the regulatory functions are often interdependent and on the critical path of construction projects (Lim 2004).

As one of the first steps forward, a survey was done by BCA in 2000 to assess the level of IT readiness in the industry. The results indicated that the use of IT within the construction industry was fragmented and the IT gap between the different segments was growing. As a result, BCA started to address the different needs of the different segments of the industry separately and to actively calibrate its incentive schemes accordingly to speed up IT adoption. These schemes included LETAS (Local Enterprise Technical Assistance Scheme), Jumpstart Construction, IAS (Investment Allowance Scheme), IDS (Innovation Development Scheme) and INTECH (Initiatives in New Technology Scheme). Some of these schemes are tailored for smaller companies while others can be utilized by all companies, big or small. All of the schemes support IT upgrading except for IDS which is meant for technology upgrading of construction work (e.g. development of robotic equipment for painting). For example, LETAS is available for pre- and post-implementation consultancy services on firm's computerization efforts while the IAS scheme allows tax relief specifically for purchase of CoreNet-related hardware and software. Despite the many schemes available, take-up rate continued to be low for various reasons:

> *"Although the government has pledged so much money into the project, it is often difficult for contractors to obtain the grants. Usually the government is only willing to spend after the contractor has already spent a certain amount. Also, it is sometimes difficult for the contractor to justify its spending, and so sometimes often a portion of what the contractor spent is refunded back. This time lag and the need for justification make contractors reluctant to invest the initial amount needed to get the ball rolling."*
>
> *- Director, SCAL*

> *"There were incentives, but they were no big deal frankly."*
>
> *- Architect A*

Meanwhile, development work on the e-submission system started in June 2000 at a capital cost of S$1.65 million. To achieve the target of 1,600 companies and 16 government agencies using the system, a program management approach was adopted to deliver functionality that would yield visible benefits to all stakeholders. In particular, a 2-tier project management committee and work group structure was used to build consensus and overcome obstacles at the policy and operations level respectively (Lim 2004). The project management committee consisted of representatives from government agencies while the work groups consisted of both public and private sector personnel:

> *"The private organizations are only involved in the workgroups. At the committee level, we were arguing about government policies which they [the private organizations] wouldn't understand the jargon ... We [BCA] need to also understand the workings of the other government agencies involved – their limitations and constraints. Now, we are more proactive but at the beginning, very painful process..."*
>
> *-BCA's project manager B*

In addition, 1st of July 2004 was "collectively" agreed as the national mandatory e-submission date to firmly push the project forward (with intermediate progressive milestones):

> *"It's a chicken and egg problem. If it's not compulsory, no one would bother to use it. But if it's compulsory, there are people who would complain"*
>
> *- Architect B*

With regards to the integrated plan checking project, several government agencies started working together in 2000 to deliver a single plan-checking tool to check building plans submitted by Architects and M&E Engineers for compliance of the

various authorities' regulations. Besides BCA, key participants include government agencies such as Central Building Plans Unit of National Environment Agency (CBPU), Housing & Development Board (HDB), Land Transport Authority (LTA), National Parks Board (NParks), Singapore Civil Defence Force (SCDF) and Public Utilities Board (PUB). This project aims to develop leading-edge expert systems that require the integration of expert knowledge in plan checking with computer-aided design and drafting (CADD) technologies. In this way, regulatory requirements can be captured more consistently and comprehensively while non-compliance can be detected and amended during the design phase rather than during the approval phase. As a result, less re-submission needs to be done without compromising on the safety aspects of building, thus speeding up the plan approval process for firms. Phase 1 (2000-2002) was focused on awarding the tender to a software vendor.

Meanwhile, the industry at large watched the ongoing developments with both interest and skepticism, while at the same time dutifully participating in (and supporting) the government-led process:

> *"E-submission is in an embryonic stage and most users are still struggling with CP83, and so the kind of migration towards e-submission has not been realized yet… the industry is skeptical and watching… SCAL represents contractors to talk to the government and is accepted as the representative of the private sector… In a way, we are like the privatized sector of BCA, but our main difference other than being a private organization, we talk closely to more [government] ministries such as Ministry of Home Affairs, Ministry of Labor… We chair the Procurement Workgroup to develop a series of standards [in support of CoreNet] … "*
>
> *- Director, SCAL*

For example, in September 2000, SIACAD Pte Ltd was formed by the Singapore Institute of Architects (an industry association). While the charter of this company was to develop software solutions for the building industry in Singapore, its

immediate objective was to develop the SIACAD add-on (to work with the popular AutoCAD software) in supporting CoreNet e-submission requirements. Beyond the near-term, the company had its sights on eventually pushing a totally-integrated software (APEX) to help companies in the industry keep on top of everyday internal business tasks while facilitating connection to the Internet for external collaboration needs (again, a commercial objective that was supportive of CoreNet's vision). Reflecting their intuitive understanding of the industry dynamics (which might not be the case if a government agency was involved instead), there was this recognition that industry players would be more willing to invest in solutions that first enable them to coordinate their internal operations while offering the functionality to facilitate possible external collaboration:

> *"Architects are reluctant to pay for a system when the system exists only externally… they'll be more willing to pay and tidy their own systems…"*
> *- Director, SIACAD*

6.4 Conversion/Use Process: *Realizing Value*

In November 2001 at Baucon Asia, the National Development Minister announced the launch of the first versions of the e-information and e-submission systems.

Although the e-information system is a "passive" knowledge repository, the implementation was a massive coordination exercise and the full-suite of this system was only completed at the end of 2002. It needed the support and contributions from 12 regulatory departments spread across 8 ministries, namely Attorney General's Chambers (AGC), BCA, HDB, NParks, URA, LTA, Ministry of Manpower (MOM), Jurong Town Corporation (JTC), Standards Productivity and Innovation Board

(Spring), National Environment Agency (NEA), PUB, FSB and IDA. Industry partners such as ACES, IES, PowerGas Ltd, PowerGrid Ltd, Power Supply Ltd, REDAS, SCAL, SIA, Singapore Institute of Planners (SIP), SISV and SPM were also involved.

The e-submission system implementation was even more complex. The implementation team focused first on large companies with better IT infrastructure, higher Internet-literacy and more projects on hand, before progressing to smaller firms. A program of classroom training, executive briefings, helpdesk and onsite support was introduced in February 2002. e-Kiosks were available in 6 agencies and 8 service bureau were set up to help those small firms without IT facilities. Demand for training was high in 2002 and 2003. By the end of March 2004, a total of 3,527 professionals from 1,094 companies had been trained (Lim 2004).

Not surprisingly and in spite of all the detailed preparation and involvement of all the key players, the e-submission system implementation met with initial skepticism and considerable confusion:

> *"There is a complete lack of knowledge of the people at the regulatory bodies' side. When you asked them questions they would say things like 'We're still new' and 'We're not sure about it'. It's very frustrating."*
>
> *- Architect A*

> *"Officers from various technical departments are not familiar with the system. We have received clearances from technical departments without reference number, date, site info. Since the submission is all conducted electronically, hard copies should not be required. However, we were still asked by the technical departments for hard copies or certified true copies. It will defeat the purpose of CoreNet e-submission,"*
>
> *- Architect B*

> *"The architects were especially very creative with their criticisms…"*
>
> *- BCA's project manager B*

January 2003 saw the BCA and its building control units (i.e., regulatory units such as HDB, JTC and LTA) introduce mandatory e-submission for a few selected application types. Since then from the small base of 116 in early 2002, e-submission had been experiencing continuous growth. By January 2004, some 88% of the targeted 1,600 firms were "e-submission ready", having made at least one e-submission since the system's rollout. As part of the transition, various government agencies set up computer terminals at their premises, while BCA and SPRING packaged a financial assistance scheme to assist early adopters in acquiring the necessary hardware and software and for subsidized training on the new system. In particular, as the lead agency, the technical consultants in BCA also had to fervently work the ground including providing free onsite support to train practitioners on e-submission requirements within the comfort of their (the practitioners') own office premises:

> *"We literally had to knock on doors to encourage people to do e-submission…. to see what problems they have… The mandatory dates were only for architects but we had to reach out also to plumbers and others… This is because our performance indicator is based on the monthly e-submission numbers which have to keep on increasing..."*

> *"For performance indicator, it is the same for all members of the CoreNet implementation team. But it is different for the other government agencies involved in the project – that's a challenge…"*

> *"I provide on-site support free… about 2-3 cases per month… I take the bus to their offices – no, not by taxi… Cannot claim reimbursement but it's OK. One of the QPs [qualified persons] is 70 years old and he was very appreciative…"*

In a recent survey of firms (Lim 2004) which had used the system, it was found that 70% of the respondents found it to be convenient while 58% found it user-friendly. Respondent firms were also asked whether they had derived any benefits from the usage of the system. A majority confirmed they had experienced cost savings in the areas of printing of hard copies (79%), dispatch or traveling (78%) as well as time spent (65%). To a lesser extent, respondents also experienced cost reduction in manpower resources (42%) and storage/warehousing (46%). By 2004, with over 11,000 e-submissions per quarter, it appears that the use of the system had become integrated within the construction industry. After years of industry skepticism, some customer accolades are starting to stream in:

> *"We started using e-submission since it was first introduced a few years ago and we were a bit skeptical. But as time goes and we use it frequently, we were amazed on how much time we had saved."*
>
> *- Staff, DSA Architects (Lim 2004)*

> *"If we have a query or doubt, we can depend on the friendly service of the CoreNet e-submission team"*
>
> *- Staff, Chik & Yeo Architects (Lim 2004)*

> *"CoreNet e-submission system has really improved and grown since DCA Architects started using it…"*
>
> *- Staff, DCA Architects (Lim 2004)*

By bringing together the 16 key government agencies and departments whose approval is required for building and construction works under one roof based on a "Many Agencies, One Government" concept, the e-submission system has proven to be effective in relieving the industry from the complexities associated with the past need to perform multiple manual submissions. Standardized at the front-end with consistent look-and-feel, the industry players are not encumbered by the unique nature

of the submission requirements for each government agency or department. Recently, the system was selected as one of the semi-finalists for the Commonwealth Association for Public Administration and Management awards for 2004.

However, the challenge is in sustaining the maintenance and ongoing operations of the e-submission system, while expanding its usage beyond architects to also include other players in the industry such as plumbers, structural engineers, etc. Currently, it is funded by BCA – use of the system is heavily subsidized as the construction industry is still in the doldrums. In the near future, a way has to be found for the system to be self-sustaining while continuing to grow:

> *"The challenge is to keep costs low and to do that, we need to avoid continuing to make changes to the system but problem is that the users keep on asking for enhancements… "*
>
> *- BCA's Project Manager B*

Ironically, BCA is concerned that the industry's perception of the success of its project may be undermined by enterprising IT companies springing up to offer services (*at a fee*) to *help* companies in the construction industries comply with the mandatory e-submission requirements, when such services are already available free-of-charge directly from BCA's helpdesk function *("We don't want these companies to undermine a national initiative…").*

Finally, with regards to the integrated plan checking project, Phase 1 (award of tender to a software vendor) has been completed while Phase 2 is currently in progress with simulation testing and pilot projects. BCA's Project Manager B explains why the project is taking longer than expected:

"The industry is currently doing 2D drawings but as part of this initiative, it has to move to 3D. That would be a massive exercise. There is going to be a lot of frustration if the architect thinks his drawing is compliant but the system says not compliant… We also anticipate impact on storage considerations due to space needed for 3D drawings…"

6.5 Process Interventions

Amidst the rapid unfolding of events as described in the foregoing sections, the strong hand of BCA could be seen. Indeed, institutional leadership in CoreNet came primarily from BCA (with symbolic support from the Minister of National Development) but sixteen other construction-related government agencies were also involved in the two-tier project management committee and work group structure at the policy-making and operations level respectively (Lim 2004):

"BCA plays the role of central coordinator, while the rest [of the participating government agencies] play the role of technical requirements. Last time they [(QPs of private organizations] tried to talk to all at the same time. Now the reconciliary role is shifted to BCA"

- BCA's Project Manager A

It is also important to note the close involvement of stakeholders during the project at the different levels. For example, a memorandum of understanding to signal commitment to CoreNet was signed by all the various parties involved and publicly announced at an official ceremony open to the trade press. Independent inputs from professional bodies like SISV, SIA, REDAS and others thus constitute an important part of the standards-setting process to facilitate data interchange within the industry. Formal management committees and subsidiary workgroups which included key industry practitioners were also officially formed to arrive at a consensus on key policy-making decisions and ongoing implementation issues.

Finally, sensemaking also featured prominently during the implementation process. These activities first revolved around the tentative CoreNet vision (which culminated in a landmark memorandum of understanding being signed between the various government agencies and industry associations) and later around the C21 blueprint (i.e., on how the various components of CoreNet can support the objectives therein). Finally, sensemaking continued at the project management and work group levels as the implementation progressed over the recent years.

Chapter 7

LawNet

This chapter presents and interprets the findings of the study related to LawNet through the lens of the conceptual framework developed in Chapter 2. The aims, objectives and key players of the project are first identified. The organizational and interorganizational dynamics during each of the following processes are then described: valuation, creation and conversion/use. Finally, process interventions are highlighted.

7.1 Gaining Momentum and Impetus over the Years

Buoyed by the success of TradeNet in the 1980s, projects like LawNet, PortNet and Medinet were subsequently launched under the National IT Plan (1986-1991).

At the inception of the LawNet project, the initial intent was to provide a single window into all the various laws and legal information required in law practice, so that law firms would no longer need to maintain multiple subscriptions for the various electronic legal services (Tan 2001). This was accomplished by building upon the various then-ongoing computerization projects in the judiciary to create a national legal information database – a one-stop centre for various information repositories providing the legal community quick access to electronic legal information when they conduct their research. It was hoped that carrying out legal research would then become more convenient, time-saving and more effective. Lawyers would then no longer have to spend hours in the library laboriously searching for precedents and

authorities (Thian 2004). In the years since the initial launch of LawNet in 1990, this repository system has been progressively enhanced to include content for all the major areas of legal practice including legal research, litigation, corporate law and conveyancing.

From these humble beginnings, the Singapore's judiciary system is today credited as being one of the most advanced users of technology in the legal sector worldwide (Thian 2004) and was singled out for special mention in one of Accenture's recent annual e-government reports. Beyond the implementation of the aforementioned knowledge repository, the legal system has seen the progressive implementation of various other technological systems to help improve its effectiveness, its operational efficiencies, its accessibility to the public and more generally, to improve the nation's competitiveness (Magnus 1999).

Specifically, an integrated electronic litigation system (ELS) comprising various scalable state-of-the-art technologies has been gradually taking shape in Singapore in recent years. This system now consists of the Electronic Filing System (for electronic filing of court documents, obtaining electronic extracts, electronic service of documents - on other law firms - and access to electronic information services), the Electronic Hearings, the Technology Courts, the Practising Certificates e-Filing Service, the LawNet Litigation Module, the Internet Videophone Service, the Mobile Information Service, the Wireless Internet Hotspot and JusticeOnLine. The latter (based on broadband Internet and videoconferencing technologies) was implemented as a multiparty communication platform connecting the courts, law firms and other government agencies involved in the administration of justice. With this system,

lawyers now can book their online hearings on the Web, queue virtually, appear at hearings without leaving their offices, and check their bills online. The courts also benefit as they can increase their hearing capacity without having to build more courtrooms and chambers to accommodate the various parties (Magnus 2004).

Among these systems, perhaps the most noteworthy is the Electronic Filing System (EFS) which is the world's first nationwide paperless court implementation. Its benefits include time savings and reductions in the number of physical trips being made to file court documents, the ability to submit cases twenty-four hours a day and the resolution of the difficulties of paper handling that is faced by the judiciary. A good case in point is the antitrust case against Microsoft that was filed in the San Francisco Superior Court a few years ago. The judge concerned ordered electronic filing of all documents so that the courtroom would not be filled up with case papers and to better manage the huge volume of filings resulting from the complex lawsuit (Holmes 2001).

Over the years, progressive enhancements (such as adding Web-based and other capabilities) have been made to this EFS system with both public sector and private sector organizations deeply involved in the still ongoing deliberations. The former include the Supreme Courts, the Subordinate Courts, Attorney General's Chambers, Singapore Academy of Law (SAL) and IDA while the latter include representatives from law firms (both large and small).

7.2 Valuation Process: *Discovering Value*

Computerization of the judiciary actually began in the late 1980s but picked up speed after Chief Justice Yong Pung How was appointed in 1990:

> *"When I was first appointed Chief Justice, it would take roughly five years for a suit begun by writ to be heard, and a further two years before it went before the Court of Appeal… This was unacceptable… I realized that judges would have to become managers of cases, setting the pace and monitoring the timelines. They would have to be administrators as well, learning how to run an efficient judicial system. And because they would require technology to maximize their ability to administer and manage the judicial system, they would have to become technopreneurs as well. The legal profession would have to adapt to the changes in the judicial system by working harder, faster and more efficiently. They too would have to become knowledge workers, and technopreneurs…"*
>
> *-Chief Justice Yong Pung How's comments in Subordinates Court Annual Report 2000*

In 1991, a high-level Law National Council was formed to oversee the LawNet project and it comprises the Chief Justice, the Attorney-General, the Dean of the Law Faculty, the Minister of Law and the president of the Law Society (BT 1991). One year later, LawNet was given a further boost as part of the government's initiative to modernize the profession (BT 1992a). Particularly noteworthy was that the Chief Justice personally officiated at many launches of ongoing LawNet enhancements in the early years and even up to today (e.g., BT 1992a; BT 1992b; ST 1998) while his speeches at the opening of each new legal year would inevitably touch on the importance of IT to the legal profession (e.g., ST 1995d; ST 1999):

> *"When I was a young practicing lawyer half a century ago, I remember trying to make sense of a mountain of cases, statutes and books which I had located for particularly arduous cases. The only way to view everything in context, to see the relationship between them, was for me to take over a large section of the firm's floor space, lie down on the floor with law reports and text books opened out, in an attempt to achieve what I believe the computer whiz kids of today would call 'hyperlinking'. Thankfully, technology has come to the*

rescue and today's lawyers will not have to resort to territorial expansionism to carry out legal research that I used to have to do."

A senior assistant registrar of the Supreme Court confirmed this important early influence of the Chief Justice on the legal sector:

"When Yong Pung How became the Chief Justice, the greatest problem was the backlog of cases. So many of the cases took like maybe 10 years? So we started technology on a small scale ... The Chief Justice was very important in pushing IT. Being the top guy and also quite keen to use the technology, he had the vision."

In response to the massive backlog of cases, a mainframe-based case management system known as the Civil System was first developed and by the mid 1990s, the entire backlog of cases in the court docket was cleared as a result of a rigorous case management strategy led by the new Chief Justice, which was in turn greatly facilitated by the use of information technology.

In 1996, the Singapore Academy of Law took over the running of LawNet and started levying a subscription fee for the LawNet services to make sure that the operations are self-financing. Through this subscription, lawyers and others can obtain information on civil suits filed at the courts, Singapore statutes, case laws, bankruptcies and other court matters through their office computers (ST 1995c). In the same year, the LawNet Service Bureau was set up for lawyers who did not have the equipment and software to obtain electronic information from their own offices (ST 1995d). To enable it to be better placed to promote the use of IT in the legal sector**,** SAL was empowered to form companies and participate in arrangements and joint ventures so that it can provide consultancy and training services on legal technology to lawyers, para-legals and administrators. Computer professionals who were not lawyers would

then be able to sit on new committees to be formed by the academy so that they could contribute to its work.

This initial success which the courts had with the use of technology in improving the workings of the judiciary (especially in helping to clear the massive backlog of cases) reinforced the notion that technology, harnessed with purpose and innovation, could be instrumental in building up a first-rate Judiciary beyond LawNet's initial objective of being just a knowledge repository. In other words, it gradually became clear that a fair, efficient and responsive justice system can be facilitated by the strategic deployment of a holistic IT system to help in judicial decision-making, to expedite case handling and to enhance public access to justice (Magnus 2004):

> *"The Honourable Chief Justice Yong Pung How had a vision of a world class court system. He wanted technology as a tool to leverage that vision – but with the basic tenet that it should never be more than a tool. Litigation is about people."*
>
> *- Deputy Registrar of the Supreme Court (Inter Se 2002)*

Thus, the seed for a vision of a paperless courtroom system (that connects all the stakeholders involved) was thus sown. Such a system requires the computerization of every single court process, from the filing of court documents to legal research in the preparation of cases by counsel to the trial before the judge. Over the years, these various technological initiatives were gradually folded under the umbrella of implementing a "total and integrated Electronic Litigation System" revolving around the EFS.

7.3 Creation Process: *Constructing Value Proposition*

While SAL was the coordinating body, key members of the Judiciary were also instrumental in the ongoing push towards the electronic litigation vision (beyond LawNet's initial focus on developing a knowledge repository):

> *"Quite a bit of IT is judiciary driven…. We actually focus on the use of technology to better the administration of justice at all levels… the push by the judiciary helped…"*
>
> *- Senior assistant registrar of the Supreme Court*

> *"The Attorney General's Chambers.., and also one of the Solicitor Generals currently… They were senior officers in the Attorney General's Chambers an they had… came up with this idea which they got developed with the help of NCB [National Computer Board] and NCB officers were able to validate, to give ideas on how exactly such a project could be done…"*
>
> *- Senior State Counsel from Attorney General's Chambers*

The core technological component of this electronic litigation vision was the EFS which was started up as a pilot project (Phase 1.0) from 1997 to 1999 with four main services: an electronic filing service, an electronic extract service, an electronic service of documents facility and an electronic information service. On 8 March 1997, the Chief Justice officiated at the launch of this pilot phase with the following exhortation to the legal community:

> *"Of course this new system is not an isolated accident, but the result of a concerted effort, since the start of the 1990s, to realize the full potential of information technology… Our past experiences have accordingly prepared us for what may be described as the judiciary's most ambitious technological project to date…"*

Prior to this 1997 launch, practitioners from over 600 law firms were invited to a series of dialogue sessions held by Supreme Court Registry officers. A pilot scheme involving eight organizations was started during the launch. A series of small-group discussions and collaborative workshops continued to be held with practitioners while

the pilot was in progress. Meanwhile, to gain broad acceptance, regular technology tips and information about LawNet were provided in the newsletters of the Singapore Academy of Law to help the legal sector to be more familiar with IT. There were also many training sessions:

> *"Well, we need to have pretty good training, it is just not the same plain vanilla training that you get, you know, at Informatics [a private IT training school in Singapore] and what have you. We needed people to be trained in the specific things which we were making available to law firms. So we set up a training center and we provided specialist courses in those aspects of IT."*
>
> *- Deputy Senior State Counsel, Attorney General's Chambers*

While the reorganization of the judiciary in the 1990s has been referred to as its "golden years" (Thian 2004), this journey towards the vision of a paperless courtroom has not been without problems. Firstly, there were early concerns about the impact on small law firms which prompted the Minister of Law to publicly state in Parliament that small law firms would be "treated no less favorably" than other small enterprises if they apply for financial assistance from the government under the Small Enterprise Computerization Programme (SECP) (BT 1991). During the EFS pilot in 1997, there were also complaints from lawyers that they preferred the tried and tested method of sending their clerks to the courts with paper documents. This was because they were concerned that pages might be transmitted only partially, or not filed on time because of some electronic glitch. There were many skeptics then:

> *"They had to force certain small firms into it, some didn't even have PCs at that time…"*
>
> *- Lawyer A*

> *"For small firms at beginning, they were scared whether this thing can carry on or not, but now mostly they know the system can work… Earlier, some see this machine and scared you know, whether they can handle it or not… All the court clerks went down to the courts with one another and assist with the filing – we used to join the queue together and start catching up – how this thing can be done or not, then some of them got scared…"*
>
> *- Court clerk at a law firm*

"The book is still, all the legal books still play a very important part to all lawyers, cannot be replaced by the paperless world.. It's more interesting to look at the book – the feedback was: whole day, lawyers cannot think while on the screen.."

- *Library manager at a law firm*

In fact, some lawyers and judicial officers point out that even some of the judges themselves initially preferred to print out documents rather than refer to the computer screen during hearings. However, they (the judges) were seen as clearly trying their best to adjust to the new courtroom dynamics:

"In a trial in a high court, you might get papers that fill up the entire table, now to access the documents on a screen is a strain and it is slow, it is much easier to flip through pages than to go through documents on a screen…"

"You know, on paper, it's easy for me to flip to a particular page I want, but in electronic format however much you try and build in those navigation, it still lags a little behind in terms of intuitive ease of use and you also need to deal with the fact that different judges have different levels of comfort with technology. So, to expect all the judges to embrace the use of electronic documents in court is a bit unrealistic…"

"The judges themselves, especially the older ones were trying their best to use it, especially since many have come from a generation where IT was still absent, and there was no such thing as a School of Computing…"

In response to the early concerns about the move to the paperless courtroom, the Supreme Court Registrar Chiam Boon Keng argued that the resistance to change was expected and this was why the then-upcoming EFS system included <u>disincentives</u>: when implemented fully, it would cost 50 per cent more to file a court document manually instead of electronically:

"Here, we know the value and benefits ... convenience of this new way of working for lawyers. We have to adopt a paternalist approach to encourage lawyers to use the system. The day will come in the not-too-distant future

when lawyers say we can't do without EFS… There are over 3000 lawyers now, a large majority of which are young. Those 50 and above are a minority. Their number will dwindle as time goes by. But older ones are the senior partners. They hold the purse strings. Our message to them: You should adapt and change to the new way of working. If you are unwilling, step aside instead of resisting or acting as an obstacle to change… Let them take issue with me. We will throw them into the deep end because we know it is good for them when they haven't learnt how to swim. Eventually, they will be grateful for the rough treatment." (ST 1997b)

Other key members of the Judiciary involved in implementing the electronic litigation vision also echo the same refrain that it was only a matter of time before members of the legal profession realize that this initiative is being done in their best interests:

"Government puts in place good reasons by giving, providing or being a catalyst for these services to be available to the legal profession …. So the government has been trying to drag the profession kicking and screaming but eventually they will realize the value that IT can play in the law firm"
- Deputy Senior State Counsel

"I think at one time, everyone was complaining, but the push by the Judiciary helped. They have definitely egged the lawyers on to use it…"
- Supreme Court Senior Assistant Registrar

"Alright, some people might say that, but you look at it, it's a question of time before the lawyers realize the value of it… But of course, to make it mandatory, I would say it was useful in that it accelerated the whole process…"
- Subordinate Courts Registrar

While there were therefore grumblings on the ground during the early phases of the EFS implementation (with all its teething problems), the legal professionals generally accepted over time that they have to toe the line meanwhile (and make the best of the evolving situation):

"It is controlled… we have no choice but to follow but it is OK, there are quite a few advantages of using it as well…"
- Lawyer B

"LawNet itself has initially teething problems as will all systems have where it is difficult to define cases, the search engine wasn't very good, for example…"
- Lawyer C

7.4 Conversion/Use Process: *Realizing Value*

From the inception to the planning and development of the evolving electronic litigation system, efforts were made to ensure that all the major stakeholders in the legal fraternity were represented, as the success of the ongoing project was well understood to be dependent on the acceptance by all the main players (Thian 2004). Their input was valued because ultimately, they would be the key users of the system. For example, SAL organized an IT Law Immersion Program consisting of nine one-day seminars (on different topics) from 7 April to 28 July 2001. The primary objective of the program was to equip legal professionals with a basic understanding of information technology and the legal issues arising from the widespread use of information technology. The program attracted a wide spectrum of participants from the legal profession and government bodies to corporate entities. A total of 1803 participants attended the various sessions over the four-month period.

When Phase 1.2 of EFS went live on 1 March 2000, mandatory electronic filing of court documents to the Supreme Court and Subordinate Courts was introduced. With mandatory electronic filing, court documents that fall within the scope of Phase 1.2 could no longer be filed in court in paper form. Law Firms and users who were not EFS equipped could use one of the Service Bureau conveniently located either in or within the vicinity of the courthouse to assist them to file court documents

electronically. Originally designed to run on a dedicated private network, the system was migrated in 2001 to a web-based application accessible via the Internet to increase user acceptance of the system (Tan and Yong 2003). Subsequent phases involved progressively more documents included within the mandatory scope of the project. Such phased enhancements gained momentum over the past two years, with the system currently in Phase 6 enhancement (covering High Court criminal cases, criminal appeals and magistrates' appeals).

At the opening of the Legal Year 2003, the Chief Justice observed that the paperless court system, once "scoffed at as a far-fetched dream" was now a practicable reality, and that since May 2002, all classes of civil actions commenced in the Supreme Court had been efficiently filed via the EFS. In fact, the Supreme Court was conferred the prestigious National Infocomm Award (the highest industry accolade for information communications innovation in Singapore) for 2002.

In April 2003, the Chief Justice appointed an EFS Review Committee with representatives from both the Bar and the Judiciary, to undertake an in-depth review of the operations of the EFS. This committee was chaired by SAL's Director overseeing three sub-committees: technology, process and costs. Each of the sub-committees was chaired by a SAL representative with members from the legal profession, the Supreme Court and the Subordinate Courts. Both IT and non-IT personnel were represented. The review found that the EFS had indeed provided the judiciary with a fully electronic registry and was instrumental in encouraging the legal profession in Singapore to take a giant leap in the adoption of IT. However, the

resulting system usage had added a significant layer of costs for litigants while several technical issues also needed to be addressed.

Based on this review, the Chief Justice directed that a Review Implementation Committee, chaired by the Second Solicitor-General, oversee the implementation of the aforementioned recommendations. This committee consisted of three working groups, each of them chaired by a SAL representative with members from the legal profession, the Supreme Court, the Subordinate Courts and the software vendor. The first working group was focused on effecting the immediate changes such as looking into ways to reduce the cost of EFS usage, while the second group was charged with the objective to improve the performance and stability of the system in the medium-term. Finally, the last working group was to focus on developing a blueprint for a new EFS version that will completely move away from the paper-based paradigm. By 2004, many of the teething problems related to EFS were largely resolved, although isolated problems continued to beset at least one other LawNet-related system:

> *"Even EFS , we had some problems - quite a lot of problems in the beginning but it is better now. The other systems are fine, but you might like to look at the Registry of Companies, I can tell you there is chaos in that one… they make you use their website, and it takes hours just to get in and then it hangs… There are lots of rejections [of documents submitted electronically to that website], and you are charged for the rejection [of the submissions] after you filed them. IT doesn't work for older people. It is pathetic, honestly"*
>
> *- Lawyer D*

> *"So many people already feedback [regarding another LawNet-related system], they say they are doing but two years already… "*
>
> *- Court clerk at a law firm*

> *"Before we had EFS, all the filing was done manually. These gentlemen here [the court clerks] attended to the filing… This means they had to go to the courts and do it manually… They had to go to the respective ministries. They*

had the experience to know where to go, what to file, see if the files are properly followed up. Then they will get the documents served to the defendants. All that can be done through EFS… Now all this can be done in the office… Another advantage is the timing – EFS operates twenty-four hours, manually sometimes we had to rush… For EFS, as long as you file before midnight, it can meet the deadline.."

- Litigation support manager at a law firm

Propelled by the gradual acceptance of the ongoing successful EFS enhancements, a one-day Electronic Litigation Colloquium was held in 2004 to provide a forum for discussion and brainstorming. There were 43 participants including members from the Attorney General's Chambers, SAL, Supreme Courts, Subordinate Courts, IDA, the EFS software vendor as well as prominent members of the legal profession (from both large and small law firms).

Since then, events appeared to be speeding up dramatically. In January 2005, based on the discussions during the colloquium, SAL issued a white paper on "Electronic Litigation in Singapore: A Roadmap for the Implementation of Technology in the Litigation Process" for public feedback. It envisaged a new EFS version as one which should function as an effective and efficient litigation tool by providing features that litigation lawyers will utilize in their daily work such as integrated due diligence checks with various government departments, as a repository of case information, as an electronic data room for case documents, as a conduit for communications between law firms and the Court, as a conduit for law firms inter se, while at the same time, being customizable to suit different practices of the law firms. In this regard, it was proposed that open technical standards be adopted and that such standards be published to allow law firms to customize their internal systems (e.g., practice management and document management) to interoperate with the new EFS

system while also enabling IT vendors to design complementary solutions that are similarly interoperable.

A one-month period of public consultation followed, during which feedback was received from law firms of different sizes, academia, software vendors and government departments. The responses received were analyzed and, where appropriate, the Electronic Litigation Roadmap was amended. The revised version dated May 2005 was quickly approved by the Chief Justice for publication and implementation. A summary of the major themes of the feedback process was also made public. One of the key concerns was of course the issue of funding for implementation, operational and integration costs. The EFS Review Implementation Committee has now been reconstituted as the Electronic Litigation Systems Committee to address this feedback and to focus on the implementation of the concepts set out in the revised roadmap.

Today, there are more than 700 law firms in Singapore ranging from big ones consisting of hundreds of practicing lawyers with international presence to small ones with only a handful of employees. The average number of lawyers employed was 1.8 and 11 for small and medium-sized firms respectively, while for large firms, the average was 71 (Singapore Department of Statistics 2003). Almost all of the firms make use of basic computer systems and many also have networks linking their PCs with access to LawNet. Large firms in Singapore generally make use of some legal practice management systems to maintain accounts, generate financial and management reports, and manage case files. Some of these large firms are

implementing integration of the EFS system with their internal backend systems. A senior state counsel described the current industry situation as follows:

> *"I think it [LawNet] has made IT indispensable. You wouldn't imagine setting up a law firm without buying a computer, without buying your Internet access. Otherwise, you would be put at a great disadvantage… and imagine the competitive advantage the other guy would have if you don't make sure you have access to the same research tools…"*

The success of EFS has now spread worldwide, as described by one of the EFS implementation committee members:

> *"Everyone is interested in it around the world, if they come to know about it, they can overtake it. An IT system is such that if you pump in the money, you can build something better …"*

However, a registrar at the Subordinate Courts disagreed that money is behind the success of EFS:

> *"So these are the real secrets… because other countries don't realize - how come we all can do it, they cannot do it. They will ask - is it because of the money, then they say cannot be, they also have the money. They can't understand, you see, it's the way we run the place and how we manage the thing…"*

More importantly, there is emerging consensus in the industry (among legal professionals) that the ongoing implementation of the electronic litigation vision does have a positive impact on the individual firm's efficiency, the industry's productivity and the nation's competitiveness:

> *"Okay, let's focus on the EFS. I will try to give you a balanced view. EFS stands for Electronic Filing Service [sic]. What has happened is that Singapore is actually the first country in the world, whereby about the year 2000, it was mandatory that all court documents in relation to writs, are filed in court. That is way ahead of a lot of other countries…"*

"EFS is an amazing advance, it's a lot quicker than it used to be, it saves a lot of money and you don't need people to go around and serve documents to other people. Information is quicker, previously will have to write, fix calls, now it could be done with EFS…"

"Singapore was one of the first in the world to implement EFS – it has definitely given them a competitive start"

"Things are a lot faster than they used to be. [But] technology is costing law firms - the recurrent expenditure is higher than in the past. Even [for] sole proprietorships, you need not have a secretary, but to survive, you need to have these [technology] tools."

7.5 Process Interventions

Amidst the rapid unfolding of events as described in the foregoing sections, the strong hand of the Chief Justice could be seen. Clearly, the Chief Justice was instrumental in first recognizing the potential value of IT in helping to revamp the judiciary, articulating that vision and finally exercising his prodding influence throughout the process. While he was thus primarily responsible for the introduction of the change, other key institutional players also played important roles in bringing this vision to fruition at different levels. In this regard, the necessary planning and strategizing was taken up by SAL working in concert with the Attorney-General's Chambers, the Supreme Courts, the Subordinate Courts and IDA. The actual implementation was the responsibility of the various sub-committees and workgroups which were largely coordinated by SAL:

"We are quite fortunate in that we are given recognition for it, I mean the judiciary as a whole, because you know Singapore, we always work like a Singapore Inc… The Judiciary always act in one voice, you know what I mean, so even when you read a report, the report won't say, Karen Wong says this, because [we are] all part of the Judiciary…So what we do is that, actually, when we were working on Justice Online - we involved the people from Supreme Court and AG's Chambers… We started the working but in the

end, it involved everybody… In the end, it was more of a tripartite thing… Supreme Court was there, was involved also, AG's Chambers and Subordinate Courts… Cause I said judiciary must act in one voice right, I mean Juat Jong cannot speak … different thing from me."

- Registrar, Subordinate Courts

"Okay, we work very closely, after all we all report to the same Law and Justice Cluster Director, so in a way there are influences and involvement…

- IS Manager, Subordinate Courts

It is also important to note the close involvement of stakeholders in LawNet at the different levels. For example, the high-level Law National Council formed to oversee the project includes the president of the Law Society (a practitioner lawyer), in addition to institutional leaders. Specifically, the EFS pilot saw the involvement of the legal profession from the very start - the pilot from 1997 to 1999 involved many law firms (both large and small). In addition, the EFS review committee formed in 2003 included representatives from the Bar and the Judiciary while the subsequent review implementation committee also consisted of industry practitioners organized into workgroups:

"Yeah, [name of a person], now I remember, yeah, he talked quite a bit. So we have lawyers, we have judiciary, we have, of course, the main vendor Crimson Logic. So this is the… which is good because you need a unified approach. I mean Singapore is so small right? Only three million, I mean if you exclude the one million expatriates and all these, only three million of us."

- Registrar, Subordinate Courts

Finally, sensemaking activities also featured prominently during the LawNet implementation process. Sensemaking initially revolved around the Chief Justice's drive to reduce the massive backlog of cases and later around his vision of a world-

class judiciary and a paperless courtroom. Subsequently, the focus was on the myriad possibilities (e.g., technology courts, Justice Online, EFS, etc.) related to how the strategic deployment of a holistic IT system can help to achieve this vision. Finally, sensemaking concentrated on the functionality of the proposed EFS (via the pilot project which ran for an extended period of time from 1997 to 2000) and on ongoing enhancements (via the EFS review and EFS implementation committees, and via the public feedback process on the recent electronic litigation roadmap vision).

Chapter 8

Discussion

This chapter brings together key issues identified in the three cases. Clearly, the preliminary conceptual lens developed at the start of the research has provided a way to explore the complex interorganizational dynamics involved in government-initiated industry-wide IOS projects. In this chapter, we first summarize the key events of BookNet, CoreNet and LawNet over time. We then note how this study has allowed for a deeper understanding of the way that institutional leadership can be orchestrated (shared) to facilitate the implementation of such projects. Next, we emphasize how the effective exercise of such institutional leadership may need to be complemented with purposeful stakeholder cooptation to reduce the risks of failure and maximize the level of realized value. In this regard, the nature of interorganizational sensemaking activities that may influence the ongoing success of the industry-wide endeavor is discussed. To further move this study towards theoretical development, the in-depth analysis is then framed based on Dunphy's (1996) five elements of a change theory. Finally, the chapter concludes with a self-evaluation of the interpretivist insights offered in this study.

8.1 Summary of Key Events for BookNet, CoreNet and LawNet

The Internet in general and interorganizational systems in particular offer government agencies the potential to dramatically transform interorganizational relationships within a particular industry for international competitiveness. But what is it about the implementation of these systems that causes some projects to be relatively more successful than others?

At the time of this study, LawNet seems to be firmly on course to be an IOS implementation that may be of great help to Singapore's vision of building up a world-class judiciary:

> *"Now, it's almost instantaneous, so the pace of practice, pace of litigation has… productivity has definitely gone up. And now, it's become an indispensable tool. So again, I think that has… I would say it is a revolution."*
> *- Lawyer E*

Similarly, CoreNet appears to stand a good chance of achieving its objective to aid the recovery of the construction sector by improving the productivity of industry processes:

> *"I think CoreNet is a very good idea and practical and after getting used to the system, it really can save time and cost for everybody…"*
> *- Construction industry consultant (Lim 2004)*

On the other hand, the since-discontinued BookNet demonstrates the immense difficulties in getting companies (of widely varying motivations, perceptions and readiness) to work more closely with each other. Reflecting on the developments of the BookNet project as a whole, the Deputy General Manager of RTA contemplated aloud:

> *"What is the matter with this book industry?"*

Table 8.1 presents a timeline summary of key events for each of the three projects through the lens of the conceptual framework developed in Chapter 2. To begin,

analysis of the three cases seems to point to the existence of a common underlying thread - an institutionalization process at work. Specifically, the lead government agencies appear to be attempting to institutionalize a process of IOS-enabled planned change within the respective industries. Institutionalization is the process of infusion of norms and values over time, producing "a distinct identity, outlook, habits and commitments for its participants" and "a social integration that goes far beyond the formal command structure and instrumental functions" of the community (Selznick 1957). It is a network-building effort that centers on the creation, adoption and sustained implementation of a set of ideas among people who, through interactions, become sufficiently committed to these ideas (Van De Ven 1986). In the process, such ideas gradually gain general acceptance.

In LawNet, such attempted institutionalization could be seen in the form of a relentless push towards the vision of a paperless courtroom as part of building up a world-class judiciary. Similarly, CoreNet carries a visionary objective to transform the construction industry from one based on archaic practices to that based on information and knowledge. Finally, while much less visionary, BookNet also harbored high hopes of raising the productivity of the book industry as a whole (with the ultimate objective of aiding regional expansion of the companies involved), albeit with a disproportionately strong focus on uplifting the smaller retail players.

However, there were key differences between the three projects in the way that institutional leadership was orchestrated, in the cooptation of stakeholders and in the nature of interorganizational sensemaking activities during the course of each implementation.

Table 8.1
Summary of Key Events for BookNet, CoreNet and LawNet

	BOOKNET	CORENET	LAWNET
DISCOVERING VALUE	1993 RTA started internal computerization drive amongst SME retailers 1994/95 RTA started ShopNet with initial positive reaction from 200 retailers and several wholesalers Late 1996 RTA started BookNet - buoyed by the initial success of ShopNet - New Internet-based EDI technology provided an added boost - Expected benefits included increased data usage efficiency, reduced data entry cost, prompt information delivery, faster turnaround time, possibility of regional expansion	1992 IT2000 masterplan identified construction industry as one of the major economic sectors in which IT could be exploited to enhance the competitiveness of the industry 1995 CoreNet vision was "mooted" 1996-1999 Construction industry experienced a sharp downturn, prompting a Construction 21 (C21) blueprint to be developed	Late 1980s-1990 Buoyed by the success of TradeNet in the 1980s, LawNet was launched under the National IT Plan - initial focus was on building a knowledge repository 1990 CJ Yong Pung How appointed 1991 High-level Law National Council formed to oversee LawNet project 1992 LawNet given further boost as part of the government's initiative to modernize the profession 1995-1996 Entire huge backlog of cases in the court docket was cleared as a result of rigorous case management strategy led by the new CJ, which was in turn greatly facilitated by the use of IT 1996 SAL took over the running of LawNet and levied subscription fee to make sure that LawNet operations are self-financing Realization that IT could be instrumental in building up a first-

CONSTRUCTING VALUE PROPOSITION			rate Judiciary beyond LawNet's initial objective of being just a knowledge repository
	<u>Late 1996-1997</u> Steering committee formed IT consulting company appointed Regular meetings involving requirements gathering and system specifications Two publishers and two small retailers chosen to participate in technical EDI pilot Pilot project went live	<u>1996-1997</u> Demonstration project: "BP Expert" - 6 architectural firms - CAD vendors - BCA <u>1998</u> Memorandum of understanding signed between various government agencies and industry associations to jointly sponsor the development of common standards towards enhanced IT interoperability <u>1999</u> Project gained decisive momentum with C21 industry blueprint Funding of S$44 million over 4 years to put CoreNet infrastructure in place (e-information, e-submission and integrated plan-checking system) <u>2000</u> Industry survey by BCA prompted re-calibration of incentive schemes E-Submission project: 2-tier project management committee and work group structure (including government agencies and industry players)	<u>1997-1999</u> Pilot project for EFS launched by CJ - Practitioners from over 600 law firms invited to a series of dialogue sessions prior to the launch - Eight law firms involved in the pilot - Series of small-group discussions and collaborative workshops continued to be held with practitioners while the pilot was in progress

REALIZING VALUE	<u>Late 1997-1999</u> Official launch of BookNet Work on "Part 2" of BookNet commenced A follow-up seminar held to further promote BookNet due to lukewarm response Project discontinued Pilot system disconnected <u>2001-2004</u> Retailer-PO and Retailer-LT discontinued use of the internal Retailer system (that was installed as part of BookNet)	Integrated Plan Checking project: initial focus on awarding tender to a software vendor (Phase 1) SIACAD Pte Ltd formed by architects' association to develop software in support of CoreNet's requirements <u>Late 2001</u> First versions of e-information and e-submission systems launched <u>2002</u> Continuing enhancements to e-information and e-submission systems based on public feedback (with initial focus on large companies with better IT infrastructure, higher Internet-literacy and more projects on hand). Program of classroom training, executive briefings, helpdesk and onsite support introduced. e-Kiosks and service bureaus set up to help small firms without IT facilities. <u>2003</u> Mandatory use of e-submission system implemented for several application types A financial incentive scheme package was set	<u>2000</u> Phase 1.2 of EFS went live with mandatory electronic filing of court documents <u>2001</u> EFS system migrated to a web-based application accessible via the Internet <u>2001 onwards</u> Subsequent phases of EFS involved progressively more documents included within the mandatory scope of the project <u>2002</u> Supreme Court was conferred the prestigious National Infocomm Award for the EFS innovation <u>2003</u> CJ appointed an EFS Review Committee and a subsequent Review Implementation Committee <u>2004</u> Electronic Litigation Colliquium was held

		up at the same time to assist early adopters in acquiring the necessary hardware and software and for subsidized training. <u>2004</u> 88% of the targeted 1600 firms were "e-submission ready" Over 11,000 e-submissions per quarter E-submission system selected as one of the semi-finalists for the CAPAM awards <u>2005</u> Integrated plan-checking project continues (Phase 2)	<u>2005</u> Based on discussions during the colloquium, SAL issued a white paper on "Electronic Litigation in Singapore: A Roadmap for the implementation of Technology in the Litigation Process" for public feedback Revised version was released after a one-month period of public consultation EFS Review Implementation Committee re-constituted as the Electronic Litigation Systems Committee to focus on the implementation of the new roadmap

8.2 "Shared" Institutional Leadership

In many theories of leadership, traditional thoughts on leadership are usually focused on the top management echelons or the statesmen. While this focus is important, the dynamism of the modern knowledge-intensive economy makes it difficult for one person or an elite group of persons (however outstanding) to lead everything from the top, which thus necessitates an approach that encourages persons at different levels to take the leadership in particular circumstances depending on their knowledge, skill or ability (Pearce and Conger 2003). Specifically, "the exertion of influence on organizationally relevant matters by any member of the organization" (Katz and Kahn 1966) allows the accumulation of a diverse set of ideas, which may permit a better analysis of alternatives.

Indeed, this study suggests that the ideal institutional leadership should not be thought of in terms of just power or position, but rather in terms of a dynamic process of group development (Denhardt 1993). Collective action among the institutional leaders is critical in the long run to create the social, economic and political infrastructure the industry needs in order to sustain its members (Astley and Van de Ven 1983). Crucially, the lessons learnt from this study demonstrate the importance of having a balance of appropriate kinds of leadership distributed at three levels: the initiation of structure (i.e., introduction of the IOS-based planned change), interpretation of structure (i.e., planning and strategizing to enable the change) and administration of structure (i.e., implementation of the change) (Katz and Kahn 1966). More specifically (as per our findings discussed in Chapters 5, 6 and 7), such shared institutional leadership at the different levels was evident in the case of LawNet and CoreNet, but not BookNet.

8.3 "Purposeful" Stakeholder Cooptation

Our findings also suggest that the aforementioned shared institutional leadership ideally needs to be complemented with "purposeful" stakeholder cooptation. In organizational literature, stakeholder cooptation is generally viewed as a defensive mechanism – "the process of absorbing new elements into the leadership or policy-determining structure of an organization as a means of averting threats" to a particular initiative that it is undertaking (Selznick 1948). Specifically, organizational leadership may resort to cooptation when it is felt that there is a need to respond to the pressure of specific centers of power. Although the risks to the undertaking in question are thus reduced, the disadvantage is that such cooptation may negatively constrain the modes of action available.

In the context of this study, such a defensive dimension is undoubtedly still important since the government agencies cannot simply "take charge" and dominate the proceedings – they obviously have to be cognizant of the constraints facing them. However, stakeholder cooptation in BookNet, CoreNet and LawNet appears to be more of a purposeful mechanism on the part of the institutional leadership to maximize the level of realized value from the project than just simply a defensive mechanism. Specifically, to ensure success, cooptation appears to be needed at the same three aforementioned levels: initiation of structure, interpretation of structure and administration of structure (Katz and Kahn 1966). During structural initiation (i.e., introduction of the IOS-based planned change), appropriate stakeholders need to be co-opted to obtain buy-in to the vision of the institutional leadership while subsequently, cooptation needs to be in place for the purpose of providing feedback on the interpretation of the structure (i.e., planning and strategizing to enable the

change) and to support the ongoing administration of the structure (i.e. implementation of the change). As per our findings discussed in Chapters 5, 6 and 7, such purposeful stakeholder cooptation was clearly evident in all three projects, but was less effective in the case of BookNet.

8.4 Interorganizational Sensemaking

For shared institutional leadership and purposeful stakeholder cooptation to be complementary in their impact on the realization of IOS value, a high degree of reciprocity appears to be important. Specifically, the three cases suggest that the actors involved were engaged in interorganizational sensemaking.

Sensemaking activities are particularly critical in dynamic and turbulent contexts, where the need to create and maintain coherent understandings that sustain relationships and enable collective action is especially important and challenging (Weick 1993). It is a process of social construction in which members of the organizations confront events, issues and actions that are somehow surprising or confusing (Berger and Luckmann 1967). In the course of such sensemaking, some members may engage in "sensegiving" which are attempts to influence others' understandings of an issue. Louis and Sutton (1991) describe three trigger conditions for sensemaking: the situation is novel; there is a discrepancy between what is expected, given the schemas in use, and what is observed; and there is deliberate initiative (one is asked to think).

In the context of this study, the proposed introduction of the BookNet, CoreNet and LawNet projects appeared to provide the triggering conditions for interorganizational sensemaking regarding the need for change in the respective industry (Griffith 1999). For the lead agencies involved in the three projects, sensemaking activities significantly influenced decisions regarding the need for strategic change and the methods to proceed with the change. For the stakeholders, sensemaking powerfully affected how they responded to the vision and the changes as they were implemented.

Based on the findings of this study, it appears that to facilitate success, interorganizational sensemaking activities need to adequately and appropriately include all key players. Specifically, such activities need to first revolve around developing a joint understanding of the underlying vision for the IOS project before moving on to the IOS-enabled digital options available to achieve this vision (Sambamurthy et al. 2003) and the challenges associated with the integration of the IOS into industry processes. This can be seen in the case of LawNet and CoreNet where concerted sensemaking activities were adequately and appropriately targeted at all key players and carried out at all three levels as discussed in Chapters 6 and 7. In contrast, a large part of the sensemaking in BookNet (as discussed in Chapter 5) was devoted to the nitty-gritty challenges of IOS integration and to the special needs of the smaller players in the industry. Without symbolic support from a higher authority (such as the Chief Justice in the case of LawNet and the Minister of National Development in the case of CoreNet) or a higher cause (such as the world-class judiciary vision in the case of LawNet or the knowledge-based industry vision in the case of CoreNet), the sensemaking activities of RTA eventually proved to be ineffective.

8.5 A framework for understanding the process of value realization from government-initiated IOS implementations

Walsham (2002) argues that in interpretivist research, the articulation of theory as one of the final products of a qualitative research study should be one of the objectives. To thus further move the findings of this study towards theoretical development, this section draws some specific implications for implementing large-scale IOS-based planned change within a particular industry. In this regard, Dunphy (1996) proposes 5 elements to consider when developing a theory of change:

1. A basic metaphor of the organization
2. An analytical framework of the change process
3. A model of the ideal effectively functioning organization
4. An intervention theory to move the organization closer to the ideal
5. A definition of the role of change agents

The use of such a framework would allow scholars to compare various change theories to determine in what ways they are similar or different (Dunphy 1996). For example, the different ideological bases of different theories will be made apparent by comparison of their respective models of the ideal functioning organization. Socio-technical change theorists (e.g., Whyte 1997) will have a very different ideal model from that of strategic change theorists (e.g., Kotter and Heskett 1992). In addition, these ideological positions and theoretical assumptions will also point to the likely significant problems of implementation that will be faced by the change agents working from different perspectives. For example, socio-technical change agents may find that the achievements of their carefully designed change programs are suddenly

nullified by new strategic initiatives while change agents operating under the strategic change approach may find that the execution of their finely crafted strategy is unexpectedly stalled by the opposition of a disenchanted group that was not consulted during the strategy formulation process (Dunphy 1996). Recognition of the similarities and differences between different change theories is therefore important to understand the origins of such real-world organizational dynamics.

Since one major objective of this study is to take a modest step forward towards theoretical development based on the empirical findings, the aforementioned five elements will therefore guide the discussion for the rest of this chapter (see Table 8.2 for a quick summary).

8.5.1 Basic Metaphor of the Organization

To begin, the three cases suggest that the target firms within the respective industries viewed themselves as stakeholders with vested interests in the project. Specifically, some firms were co-opted into the leadership, decision-making and/or implementation structure, effectively functioning in the role as co-opted stakeholders. The rest of the firms were coalition stakeholders (Freeman 1984, pp135-136) – they appeared to be split into various coalitions, either supportive, neutral or doubtful of the shared institutional leadership being exercised by the responsible government agencies in initiating and facilitating the project.

Notwithstanding their views of the project concerned, it appears that the firms involved in all three cases accepted their role of stakeholders and decided to rest on or

actively complement the institutional leadership of the government agencies in moving the industry forward. In this regard, institutional theory argues that as organizations compete for resources, customers, political power, and economic and social fitness (Caroll and Delacroix 1982), they will face pressures to conform to shared notions of appropriate forms and behaviors. Violating these shared norms may call into question the organizations' legitimacy and thus affects their ability to secure resources and social support (DiMaggio and Powell 1983; Meyer and Rowan 1977; Tolbert 1985). In other words, organizations respond to an environment that consists of organizations responding to other organizations responding to their environment, which consists of organizations responding to an environment of organizations' responses (Aldrich 1979; Schelling 1978). In this study, the target firms appeared to be subject to institutional pressures to be isomorphic with the environment (DiMaggio and Powell 1983; Galaskiewicz and Wasserman 1989; Haunschild 1993; Haunschild and Miner 1997).

In BookNet for example, while the industry players might have been comfortable with the competitive status quo prior to being approached by RTA, this equilibrium was disturbed once the project was initiated. Suddenly, the players found themselves under a high degree of competitive and industry pressure to spring into concerted action. The same awakening from the status quo (and the almost identical reflex industry reaction) could also be seen in the case of both CoreNet and LawNet.

8.5.2 Analytical Framework of the Change Process

Secondly, the case findings also suggest that a "value-transformation" framework (that builds on the preliminary conceptual lens in Figure 2.1) may best depict the change process analytically, starting with the government's boundary-spanning knowledge that IT has value not only internally within organizations or the civil service ("business value of IT") but also among businesses and/or between government agencies and businesses ("business value of IOS"). The latter refers to the advantages that can be reaped through the possible implementation of G2B and/or B2B configurations to facilitate greater coordination and cooperation within the industry.

The discovery of this "business value of IOS" triggers the "valuation process", which in turn arrives at the "potential value" of a proposed program implementation. This potential value is based on expected program benefits moderated by affirmative considerations (due to the government's obligation to address anticipated imbalances as a result of the implementation within the industry).

Potential value gradually becomes transformed into "realizable value" as a result of the "creation process", during which the lead government agencies secure the progressive participation of firms within the industry. This is value that becomes increasingly visible to the players but does not have any beneficial impact as it still "lurks" below the business process level awaiting realization.

Finally, the "conversion/use process" impacts the progressive realization of this value. In this regard, "manifested realized value" is important and refers to the public

perception of the ongoing benefits (in terms of program and affirmative outcomes) accruing to the industry as a whole as a result of implementing and using the IOS. From the standpoint of the lead government agencies, it is critical that the success of the change process be reflected in the (public) manifestation of such business value from the ongoing implementation. Such visible manifestation is important to the agencies as a galvanizing influence in sustaining the continuing operation and fine-tuning of the project.

However, the precise quantification of the level of program and affirmative outcomes achieved appears to be difficult – as such, the government agencies involved in LawNet and CoreNet seem to be turning to winning international awards as a way to publicly manifest realized value. For example, Singapore's judiciary has publicly prided itself on winning many awards, both IT and non-IT related. Similarly, BCA appears to be satisfied that its e-submission system was able to at least make its way into the semi-final stage for the Commonwealth-related CAPAM 2004 "Innovations in Governance" Awards. For this award, there were a total of 153 submissions from 12 countries, with 46 from Singapore (the highest number of entries from a single country) as compared to 27 from India, 26 from Australia, 26 from Canada, 6 from Malaysia and 3 from New Zealand. These figures seem to tell quite a compelling story of how the government agencies in Singapore appear to be looking for some way to publicly justify the huge investments of time, money and effort that they have put into their IT projects.

8.5.3 Model of the Ideal Effectively Functioning Organization

Based on the findings, the implementation of the three projects can be viewed as a mutual adjustment process between two change trajectories: that of the lead government agencies and the affected firms within the respective industries. At the beginning of the project, the lead government agencies have their own strategies, values and modes of functioning as well as a set of expectations for the use of IOS within the industry. Similarly, each of the firms has its own set of values, goals and expectations for the project. Over the months and years following the initiation, the two parties interact with each other, generating cycles of action and learning on both sides which in turn influence the overall trajectory of change within the industry (Boschma and Lambooy 2002; Carbonara 2002).

As the project progresses, three integration outcomes are possible: transformation, accommodation and parallelism. These concepts are based on Denis et al.'s (2000) work on the exercise of leadership in complex organizations, which was in turn inspired by Gordon's (1964) study on the integration of immigrants to host societies, Cox's (1991) research on the integration of multiple cultural groups to organizations and Nahavandi and Malekzadeh's (1988) treatment of acculturation in the context of mergers and acquisitions.

In the context of this study, transformation implies that the government agencies would have succeeded in imposing their conception of the project trajectory on the industry (with full achievement of both program and affirmative outcomes). Accommodation means that the government agencies and businesses involved adapt their perspectives partially to converge on a new pattern (with partial success in

achieving program and/or affirmative outcomes). Finally, parallelism would occur when there is persistent divergence between the two trajectories (both program and affirmative outcomes continue to be elusive).

From the standpoint of the lead government agencies, transformation would be the ideal outcome while accommodation may be a more realistic outcome that they are prepared to accept. Parallelism is an outcome to be avoided, and this is where the appropriate exercise of a portfolio of change intervention actions (as described in the next section) is critical.

For example, while all three projects (LawNet, CoreNet and BookNet) started off expressedly with transformation outcomes in mind, the resultant change trajectories with their respective industries evolved quite differently. At the present time, LawNet is still focused on a transformation outcome (with the continuing driving influence of the Chief Justice), while CoreNet seemed to have settled for an accommodation outcome based on BCA's recognition of the realities of the construction industry's near-term and medium-term prospects. While e-submission is mandatory for architects, it is still optional for other players like plumbers and engineers. BCA is also still heavily subsidizing the operational costs with no immediate plans for any subscription- or usage-based pricing (unlike LawNet which is self-financing). There is also internal ongoing debate about whether BCA should implement the full scope of the ambitious integrated plan-checking system as initially envisioned.

With regards to BookNet, the unfortunate sequence of events could have ended up quite differently if RTA had exercised flexibility to settle for an accommodation

outcome in the run-up to the official launch. From the start of the project, RTA was very clear in its view that the maximum benefits of the projects could only be obtained if there is seamless backend integration of the EDI transactions with internal systems. This message was so emphatic that all the industry players bought into that objective, and when they realized that their internal systems were not in the necessary state of readiness for such integration, they were reluctant to climb aboard the project during and after the official launch:

> *"Everybody not prepared for e-commerce – how to participate?"*
> *- Owner, Retailer-A*

8.5.4 An intervention theory to move the organization closer to the ideal

The case findings and the foregoing discussion also suggest that the overall trajectory of change within the target industry does not just automatically unfold, nor is it straightforwardly determined by social, economic, political, cultural or other circumstances; rather, it appears to be shaped by the interorganizational sensemaking (Garetty and Badham 2000; Strauss 1993) between the parties involved on the underlying IOS-enabled vision, on the IOS-enabled digital options available and on the IOS integration challenges that need to be addressed. Specifically, such sensemaking is the "glue" that enables shared institutional leadership and purposeful stakeholder cooptation to be complementary in their impact on the desired trajectory of change within the industry.

In this regard, the dominant form of sensemaking adopted by the institutional leadership may be critical. Maitlis (2005) describes four types of sensemaking styles:

guided, restricted, fragmented and minimal. The dominant sensemaking style adopted by the institutional leadership will have implications for the ongoing exercise of influence and power, for the patterns of ongoing interactions and for the modes of intervention actions chosen (the latter will be described in the next section).

Guided sensemaking comprises processes that are both highly controlled and highly animated. Here, the leaders are very active as "sensegivers", constructing and promoting understandings and explanations of events and of the process. At the same time, stakeholders are also actively engaged in sensegiving, attempting to shape beliefs about certain elements of the issues and their significance. These sensemaking processes are guided in that leaders, through the systematic approach they bring to their stakeholder interactions, are able to gather, coordinate and shape stakeholder contributions. This form of sensemaking may lead to an emergent series of actions – the project's progress would be constantly reviewed, expanded, trimmed and modified to suit changing circumstances (Maitlis 2005).

Restricted sensemaking occurs when processes are highly controlled but not very animated, with high leadership sensegiving. Here, leaders promote overarching accounts of key issues, which stakeholders tend to accept with relatively few attempts to provide alternative understandings. Leaders do, however, identify certain stakeholders as valuable to the process and seek them out to draw on their constructions of the issues at key points (Maitlis 2005).

Fragmented sensemaking occurs when processes are animated but not controlled, with high stakeholder sensegiving and low leader sensegiving. Stakeholders animate the

interactions by raising issues, generating and shaping accounts of the situations, and arguing for potential solutions. Leaders often seek the views of stakeholders, but do not attempt to organize or control discussions, nor do they typically integrate stakeholder constructions into coherent collective accounts (Maitlis 2005).

Minimal sensemaking results from processes that are neither animated nor controlled. Each party tends to await others' interpretations of an issue, which typically comes in response to some external trigger. Animation is low, with few stakeholders discussing the issue or seeking to offer their constructions of it. At the same time, leaders make little attempt to organize ways of promoting their interpretations of it or to gather the views of their stakeholder groups in any systematic way (Maitlis 2005).

In BookNet and CoreNet, it appears that the dominant sensemaking style was the restricted form, while in LawNet, the style lies along the continuum between restricted and guided (perhaps necessitated by the higher intellectual level of the industry). In all three projects, the institutional leadership had a clear vision/objective which it wanted to fulfill and purposefully co-opted key stakeholders to buy into this vision/objective. Committees and workgroups were then formed, and again key stakeholders were co-opted into these structures in a supporting role (to obtain consensus on implementation options). During the ongoing implementation, key stakeholders were also purposefully co-opted to provide feedback on integration-related and other nitty-gritty issues. In LawNet however, there was a slightly greater (albeit still limited) attempt at a more interactive two-way communication, as can be seen from the way that the EFS pilot was conducted over an extended period from 1997 to 1999, the organization of a one-day Electronic Litigation colloquium in 2004

and the (limited though symbolic) one-month feedback period related to the roadmap vision in 2005. In a letter announcing the revised edition of the roadmap, the Second Solicitor-General thanked all the stakeholders for their feedback (the underlining of certain text in the quote below is not in the original document but is done here to support the points that are being made in this section):

> *"We received written responses from a good cross section of the stakeholders in the litigation process… Following the closure of the public consultation, we analyzed the responses received and have, where appropriate, made amendments to the Roadmap in order to incorporate the feedback received. The Honourable Chief Justice has approved the revised roadmap for implementation. I am pleased to present the revised edition of the Electronic Litigation Roadmap. Continuing with the spirit of openness, I am also enclosing with this letter an executive summary highlighting the overarching themes from the consultation responses and a table summarizing the feedback received …As we commence the implementation of the Electronic Litigation Roadmap, I look forward to your continued support and participation in this process"*

With a such dominant sensemaking style, the high sensegiving of the leadership (relative to the lower sensegiving of the stakeholders) can form into powerful operational values and patterns which assist the leadership in effecting change (as in the case of LawNet which had the benefit of firm but visionary leadership from the Chief Justice). However, it can also impede change in other circumstances without genuine reciprocal feedback from the stakeholders. In the case of BookNet, this restricted sensemaking style led RTA to mistakenly proceed with the official launch as per its ambitious original schedule, as it did not realize that most of the big industry players had not totally bought into the vision of the project:

> *"Those big boys [RTA and ITA] – don't want to listen…Came to us and said that they have chosen a qualified consultant – 100% satisfaction… Anything led by the government – cannot go wrong. In the end, there was so much confusion – we know about the launch but we didn't want to attend the launch..."*
>
> *- Owner, Retailer-B*

In the case of CoreNet, the restricted sensemaking style adopted was compensated somewhat by formal surveys conducted by BCA in 2000 and in 2004. The 2000 survey (which galvanized BCA into greater action to gain industry acceptance) indicated that the industry players seemed to be paying mere lip service to the need for computerization which might in turn ultimately threaten the success of the fledgling project.

8.5.5 A definition of the role of change agents

To influence the overall trajectory of change within the industry (i.e., achieve the desired program and affirmative outcomes), appropriate change intervention actions need to be taken, as the project progresses. In other words, there is a need for an effective trajectory management strategy (Strebel 2003) - a strategy that involves imagining, trying out, assessing actions, unblocking blocked actions and moving along towards the vision (Strauss 1993). Specifically, it is about anticipating how the business community may react, monitoring their feedback, and responding accordingly. The preferred trajectory can be achieved only when the aforesaid intervention actions fit the industry conditions and are aligned to support the value realization process. In this regard, how can such appropriate intervention actions be structured?

Based on the case findings, I offer six intervention action types grouped under two categories based on the work of Lodahl and Mitchell (1980), Huy (2001) and Garson (2000) which are in turn informed by the various change perspectives as discussed in the literature review: Institutional Processes (*Entrepreneurial, Commanding* and *Affirmative* actions*)* and Technical (Instrumental) Processes *(Engineering, Teaching* and *Socializing* actions*)*.

Institutional and technical (instrumental) processes are critical in jointly influencing the process of large-scale planned change (Lodahl and Mitchell 1980). Technical (instrumental) processes are well known approaches typically operationalized into setting clear goals or ends to be achieved; establishing impersonal and universal criteria for recruitment, developing clear rules and procedures for learning and socialization; analytical problem solving and decision making; and routinizing activities in order to reduce uncertainty. On the other hand, institutional processes focus on the creation of an ideology to support the founding ideals; the use of personal networks and value-based criteria for recruitment; socialization and learning by sharing rituals and symbols; charismatic leadership; and the infusion of values.

Entrepreneurial intervention refers to the institutional leadership's exercise of strategic foresight and systemic insight (Sambamurthy et al. 2003) to transform the industry by continuously using resources (such as IT) in new ways to maximize productivity and effectiveness (Osborne and Gaebler 1992). Such entrepreneurial intervention was evident in all three projects.

In LawNet, a recent annual e-government study by Accenture identified Singapore as offering one of the most innovative solutions in technology usage in the justice arena. In this regard, the recently revised "Electronic Litigation System" roadmap contains an even more ambitious vision of the use of IOS-enabled systems to facilitate seamless exchange of documents between various electronic data rooms (i.e., the plaintiffs' war room, the defendants' war room and the court's case file). Another example of such entrepreneurial intervention was the early realization by the judiciary that it was not sufficient to rely on traditional IT departments, as building high-technology paperless courtrooms also requires the skills of audio and video engineers, acousticians, lighting specialists and allied professionals. A technological services department was then set up which comprised a multidisciplinary set of technologists who were conversant in different specialty areas, with responsibilities that include technology scanning and R&D in infrastructure technologies and products (Magnus 1999). In CoreNet, Singapore's integrated plan checking system is one of the largest projects undertaken by a government agency in support of Industry Foundation Classes (IFC) and it has sparked worldwide interest (NIBS 2005). In late 2004, the International Alliance for Interoperability (IAI) completed a two-state certification and a ground-breaking practical demonstration of this system – a world first (NIBS 2005). Unlike most others, this system is designed to work with 3D CAD software that can produce digital drawings conforming to IFC specifications. However, the eventual success of this initiative is dependent on mainstream CAD vendors coming up with IFC-compliant products in a timely manner – in other words, such entrepreneurial intervention has its risks. In BookNet, the government agencies were similarly taking a risk by betting on the then-emerging Internet-based EDI technology.

Commanding intervention (Huy 2001) is useful for changing formal structures, where the 'change agents' use direct and coercive actions to achieve their goals. The leadership role is adopted by the people at the top of the hierarchy. A commander-like style is used to ensure compliance. Such commanding intervention was also evident in LawNet and CoreNet but not BookNet.

In LawNet, electronic filing of court documents was made mandatory with the launch of Phase 1.2 (covering most classes of court documents in writ actions) on 1 March 2000. Subsequent phases involved more and more documents coming under this mandatory scope. In CoreNet, progressive mandatory deadlines were imposed for e-submission, with each deadline including more and more project types under its scope. In BookNet, no such mandatory G2B deadlines could be imposed as the project had its initial focus on B2B implementation (the government-linked libraries were supposed to be involved much later in the project).

Affirmative intervention has been argued to be needed to address the possibility of widening information inequality, and it involves proactive and purposeful government efforts to give priority to the information have-nots (Garson 2000). Such intervention was evident in all three projects.

In LawNet, small law firms could obtain financial assistance under the Small Enterprise Computerization Programme while service bureaus were also set up in the Supreme and Subordinate Courts to enable small non-computerized firms to do electronic filing for a reasonable assistance fee. In CoreNet, several of the incentive

schemes were targeted mainly at the smaller firms. For example, LETAS for the construction sector is only available to firms with at least 30% equity, with fixed product assets of not more than S$15 million net book value and employment of less than 200 workers. Public listed companies are not eligible for such support. Similarly, Jumpstart Construction is meant for such SMEs. In BookNet, the technical and financial assistance schemes were mainly targeted at helping the small book retailers. Two publishers (Publisher-YES and Publisher-NO) also qualified for significant funding because they were selected to participate in the technical pilot.

Engineering intervention (Huy 2001) concentrates on changing the work processes and increasing productivity through the process of analyzing, understanding, and redesigning. This form of intervention usually takes time, as one needs to be engaged in analyzing and redesigning work processes. The success of the intervention depends on whether people will make use of the new work processes and whether the new system (based on the new processes) continues to be fully used when pressure is no longer being exerted to exact usage compliance. Such intervention was evident in all three projects.

In LawNet, the courts' business workflow changed dramatically with the implementation of EFS while even more changes are likely as stated in the recent "Electronic Litigation System" roadmap:

> *"In most sectors, the successful implementation of IT systems has typically been preceded by an exercise in re-engineering the affected work processes. This allows the work processes to be rationalized and re-designed if necessary to harness the benefits of IT more fully. The Committee is of the view that a similar exercise related to the rules governing the litigation process may be necessary in order to realize efficiencies in the litigation process…"*

In CoreNet, the implementation of e-submission has since changed organizational practices in the industry as building professionals adopted electronic form-filling, electronic organization of building plans and digital signatures. A recent BCA survey has shown that after mastering the system, industry players are starting to reap benefits via reduced printing and dispatch costs. On the government agency side, IT departments have adapted to their e-service roles, regulatory officers are using viewer software for their primary processing and managers are reviewing office procedures for possible streamlining. In addition, a few government agencies have also migrated their practices online and adopted digital plan archival (Lim 2004). In BookNet, the focus was on arriving at a consensus on data interchange standards while simultaneously building up internal computerized systems at the SME retailers so that business documents being exchanged externally could be integrated seamlessly with these backend systems.

In a *teaching* type of intervention (Huy 2001), a learning approach is adopted in that the change agents facilitate the reeducation of the targets to bring about changes in their beliefs through sensemaking. Here, the idea is that a change in belief will bring about a change in behavior. These teachers are also sympathetic in nature so as to generate trust and many are in the role of formal or informal process consultants. Such intervention was evident in all three projects.

In CoreNet for example, BCA conducted periodic seminars, industry briefings and roadshows to motivate and assist the industry on IT implementation and/or upgrading. These events were conducted almost every quarter, each with a specific theme. Prominent speakers were invited to talk on topics related to the theme and software

vendors were also invited to showcase their innovations. Occasionally, overseas trips were also organized by BCA to attend leading IT trade shows such as the A/E/C Systems in the United States. In BookNet, an overseas trip was organized for the key players in the book industry to visit trade fairs in Europe for interactions with companies that have implemented EDI.

Finally, *socializing* intervention (Huy 2001) focuses on improving the social relationships between organizations. The premise here is that a change in behavioral interactions will bring about a change in beliefs and organizational culture. It is believed that by making the social bonds strong, stability will be achieved, which will be useful when major changes are being made in the industry. The process by which this is achieved could be through conversations, interpersonal communications and through the agents behaving as role models. In LawNet for example, the judges were clearly trying their best to adjust to the electronic courtroom proceedings, so as to be a role model to the legal profession. In all three projects due to the dominant form of sensemaking style adopted, socializing intervention actions were used largely with the intent of getting feedback to fine-tune and improve a pre-conceived strategy.

To summarize, commanding intervention appears to be important in galvanizing the industry concerned into joint competitive action considering the global stakes involved – it is akin to the government precipitating a "crisis" to prompt the targeted firms out of the status quo and from their organizational inertia. However, there appears to be limits to commanding intervention as can be seen especially in the cases of CoreNet (only architects currently come under the mandatory scope) and BookNet. Furthermore, use of such intervention alone could create covert resentment and

resistance, while seldom leading to fundamental change in beliefs and values (Huy 2001). Besides, not all intervention approaches are equally powerful and effective throughout the whole process, since each of the interventions has their advantages and disadvantages. For example, while entrepreneurial intervention can motivate the industry players initially into joining forces and commanding intervention can force compliance to intermediate deadlines, they on their own cannot ensure the ongoing success of the system in terms of achieving both program and affirmative outcomes. Instead, such success is more dependent on slower, empathetic approaches such as affirmative, engineering, teaching and socializing interventions. However, overemphasis on a particular empathetic intervention may possibly lead to negative consequences. For example, in line with its focus on uplifting the smaller players in the industry, affirmative and engineering interventions were given great emphasis in BookNet which led the major retailers to eventually question the underlying objective of the project in terms of the balance between program outcomes versus affirmative outcomes.

Table 8.2 Toward theoretical development of this study's findings

Metaphor of the Organization	Institutional Leadership vs. Co-opted/Coalition Stakeholders
Analytical framework of the Change Process	"Value-Transformation" framework Valuation process: *discovering "potential value"* Creation process: *constructing "realizable value"* Conversion/Use process : *manifesting "realized value"*
Model of the Ideal Effectively Functioning Organization	Trajectory Outcomes Transformation Accommodation Parallelism
An intervention theory to move the organization closer to the ideal	Interorganizational Sensemaking: *IOS-enabled vision, IOS-enabled digital options, IOS integration challenges*
The role of change agents	Institutional Actions: *Entrepreneurial, Commanding, Affirmative* Technical Actions: *Engineering, Teaching, Socializing*

8.6 Basis for and Evaluation of the Interpretivist Insights

Underpinning the findings of this interpretivist study is the preliminary conceptual lens developed in Chapter 2. This initial framework takes account of previous knowledge and provides a starting point for the empirical work. Specifically, the use of this lens allows for an appreciation of conflicting rationales, objectives and behaviors of the various players through the use of a processual approach (as described in Chapter 3) which views the exploration of the contexts, content and process of change together with their interconnections over time as important in explaining the differential achievement of change objectives in the three different projects (Pettigrew 1990, 1997). Time and history are thus at the center of the analysis in linking processes to outcomes (Pettigrew 1997). Such a processual approach takes into account influences arising from complex and dynamic interactions between organizations and change processes - such two-way interactions are difficult to analyze with traditional positivist approaches but are more suited to the use of intensive interpretive research methods as employed in this study (Kurnia and Johnston 2000). In dealing with the huge amount of in-depth data collected since the start of this study in 2001, I followed Werner and Schoepfle's (1987) typology of observation processes by starting with "descriptive observation" and then gradually moving into "focused observation" and "selective observation" for each of the three projects, with the help of coding and data analysis techniques as detailed in Chapter 3. Using CoreNet as an example, my initial focus was on talking to as many people as possible to gain familiarity with the construction industry in general and the project in particular. Once that understanding was reached, I started to conduct more focused interviews and concentrate on emerging themes related to that specific project. Finally towards the end of the study, I started to self-consciously collect data on a

series of incidents and interactions of the "same type" and look for regularities in them, while still being open to variations from patterns emerging from the other two projects (BookNet and LawNet).

Finally and as discussed in Chapter 3, Golden-Biddle and Locke (1993) describe three broad criteria for judging the merit of the ethnographic research project (which they consider can also be applied especially to interpretive work): authenticity, plausibility and criticality. Following Walsham and Sahay (1999), this set of broad criteria also appears well suited to evaluate the merit of this study. Firstly, to establish "authenticity", it is argued that the authors must show through their text that they have actually been out "there" in the field (Walsham and Sahay 1999). In my detailed and meticulous description of the three cases, I have made a deliberate effort to demonstrate my familiarity with the "everyday language and jargon" that is freely used in that particular industry – in addition, there is a lengthy and careful description of the unique case background (from the early 1990s to the present time) of each of the three industries in Chapter 4. In this regard, I also employ extensive use of direct quotes over time from the participants themselves. Secondly, to establish "plausibility", it is argued that the authors must present the findings as relevant to the concerns of the intended audience. In this paper, my initial focus is on the full complexity of human sensemaking as the situation emerged in each of the three unique industry contexts (Kaplan and Maxwell 1994). Table 8.2 is then used to express this study's findings in a scientific reductionist form (Walsham and Sahay 1999), consistent with Dunphy's five elements of a change theory. In this way, I hope to appeal to the reader's scientific stance by offering interpretive insights combined with a distinctive contribution in a niche IOS research area. Finally, to establish

"criticality", it is argued that the text must activate readers to re-examine assumptions underlying their work. In this paper, I have sought to highlight the similarities and contrasts between the three projects (all of which took place in Singapore at about the same general timeframe), thereby prodding the reader to re-examine his/her prevailing views about the efficacy of government initiatives in that particular country. More importantly, I hope to motivate and interest the reader into questioning how the same concepts of shared institutional leadership, purposeful stakeholder cooptation and interorganizational sensemaking may or may not apply in their own national contexts.

Chapter 9

Conclusion

This chapter summarizes the contributions and limitations of the study and discusses the resulting implications for research, practice and methods.

9.1 Contributions

In closing, this study makes several important contributions.

The analysis of the three projects in Singapore offers several insights into the array of actions that government agencies can take to successfully initiate and facilitate the realization of business value from such implementations. First, the analysis reveals possible ways that institutional leadership can be orchestrated to facilitate the implementation of such projects. Indeed, such leadership appears to be most effective when it is shared at various levels: initiation of structure, interpretation of structure and administration of structure. Secondly, the analysis shows how the effective exercise of such institutional leadership can be complemented with purposeful stakeholder cooptation to reduce the risks of failure and maximize the level of realized value. Specifically, such stakeholder cooptation can complement the exercise of institutional leadership at three corresponding levels: buy-in to the structure (being initiated), feedback on the (interpretation of the) structure and support of (the administration of the) structure.

This study's findings also demonstrate the existence of discernable patterns of interaction between the government agencies and the affected firms, and their impact on outcomes. In general, it appears that the various actors were involved in sensemaking activities – for the lead government agencies, sensemaking significantly influenced decisions and the methods employed to effect change while for the stakeholders, sensemaking powerfully affected their responses to the changes as they unfolded in context. Specifically, one conclusion is that for shared institutional leadership and purposeful stakeholder cooptation to be complementary in their impact on the realization of value from such implementations, there is a need for interorganizational sensemaking to facilitate convergence between the two change trajectories: that of the lead government agencies and the affected firms within the respective industries. In this regard, such convergence may be highly dependent on the dominant sensemaking style adopted by the institutional leadership and on optimizing the exercise of available change intervention actions at appropriate times during the process. Although this study does not explore the sequencing of such actions in detail, the findings do suggest the need to appropriately combine, pace and time these change intervention actions (Huy 2001), as the project progresses from valuation and creation to subsequent conversion and use.

Beyond these insights into the nature of challenges that government agencies face, the actions that they can take in leveraging such implementations and the interorganizational dynamics involved, this study also makes an important contribution by framing its detailed analysis based on Dunphy's five elements of a change theory (thereby providing a theoretical basis for future work). Of particular importance is the complementarity that needs to exist between "shared" institutional

leadership and "purposeful" stakeholder cooptation at the different levels of involvement and the role of "interorganizational sensemaking" in this regard – the latter is a concept, which to the best of my knowledge, has not been explicated in extant IOS literature.

Underlying these contributions is the conceptual lens used in this study which allows for the exploration of the contexts, content and process of change in BookNet, CoreNet and LawNet together with their interconnections over time. In the process, we draw specific implications in particular domains of actions (i.e., book industry, construction industry and legal sector) while contributing insights into governmental IOS-based facilitative actions in general.

9.2 Limitations

This study has several limitations. First, it has the limitation of not being able to study the interactive course of events in a full longitudinal manner from the inception of three projects through the present day – some of the accounts were retrospective in nature. While this limitation cannot be completely removed, it was purposefully addressed through the detailed study of relevant documentation (e.g. minutes of meetings, newspaper articles, newsletter bulletins), and the interpretation and tracing of the events were cross-validated with the many participants. In this way, a careful attempt was made to balance the objective but impersonal view of events (as captured in the documentation) with the subjective but corroborated views of the participants.

Another limitation is that access to the very top echelon leadership (such as the Chief Justice, the Minister of National Development and the Chief Executive of the National Library Board) and to project review meetings (due to the sensitive nature of policy issues usually tabled for discussion) was not possible.

A final limitation of this study is its generalizability to other contexts since it is conducted in just one country where government agencies are well known to have strong institutional authority and where there is a certain tendency for (and pressure on) Singapore-based managers to make organizational decisions that are consistent with major initiatives being promoted by such agencies (Chwelos et al. 2001). Singapore is also well known as a country where government interventions in many sectors of the economy and in society at large are generally accepted. In this regard, government bodies in other countries may hold different interpretations, priorities, values and cultures (Stewart 1997), which would greatly influence the strategies created and implemented by policy makers. Furthermore, in a small country (city-state) like Singapore, the government may be able to exercise better control and provide better support to bring about such large-scale initiatives. In other larger countries, this form of intervention may not be possible or feasible. The Asian (in general) and Singapore (in particular) context of the research site may thus yield unique insights not applicable to other settings. While this study does certainly provide some needed diversity due to the preponderance of IOS-related research in North American and European settings, generalization to other contexts should nevertheless be proceeded with cautiously. Interested researchers may thus wish to explore these same concepts in other contexts and settings.

9.3 Implications for Future Research

One key implication of this study stems from the conceptualization of the interactions between the institutional leadership and the affected stakeholders in terms of distributed sensemaking and sensegiving. During the process of discovering, constructing and realizing value, the shared leadership's role might best be seen as one that involves calling into question an obsolete interpretive scheme, articulating the new interpretive scheme in cogent terms, providing guidance for action in the direction of the change, exerting influence to sustain the necessary momentum and finally mobilizing appropriate action to accomplish the target vision (Gioia and Chittipeddi 1991). These ongoing sensemaking activities on the part of the shared institutional leadership to create meaning appear to be important in providing a symbolic foundation for stakeholders at various levels to understand the proposed scheme, respond with alternative interpretive schemes and to support the final scheme that is eventually negotiated.

In this study, a restricted form of sensemaking was found to be used in both the BookNet and CoreNet projects, while an intermediate form (between restricted and guided) was used in LawNet. In the Singapore context of this study, the institutional leadership thus dominates the definition of the negotiated reality because of the influence they hold over possible visions of change. However, it would be interesting to ascertain whether a guided form of sensemaking (Maitlis 2005) would lead to more successful implementations (and perhaps even avoid the BookNet debacle). Guided sensemaking comprises processes with both leaders and stakeholders involved in a high level of mutual sensegiving. Such a situation may

lead to an emergent series of positive actions that ensure eventual success – in theory, the project's progress would be constantly reviewed, expanded, trimmed and modified to suit changing circumstances.

Such a guided form of sensemaking may be important because ultimately, effecting complex planned change within a particular industry is a negotiation process. The nature of the resulting change depends upon the kind of negotiated reality that the institutional leadership are able to arrive at with other stakeholders (Smircich and Morgan 1982). In this negotiation process, each group tries to sell its vision of the future to the others (sensegiving), even as it is engaged in the process of trying to figure out what the others want and to ascribe meaning to it (sensemaking) (Gioia and Chittipeddi 1991). Interested researchers might want to devote more attention to whether this vision can develop better with a guided form of sensemaking. The pertinent question is: will greater animation in the negotiation process cause unnecessary delays (or even un-resolvable conflicts) in the implementation process or are some delays (and some conflicts) necessary in order to arrive at better decisions?

Another implication of the study lies with the perennial challenge of measuring the bottom-line economic impact of IT investments. Most business value of IT studies have focused on the organizational level, even though the impact of IT on the performance of the national economy is of great interest to the government and policy makers (Barua and Mukhopadhyay 2000). In this regard, it may be important for IS researchers to begin quantifying the benefits of government-facilitated IOS projects such as those that have been implemented in Singapore. While the lack of explicit measures of the business value of IT had make it particularly vulnerable to internal

misallocation and over-consumption by organizations in the past (Brynjolfsson 1993), this situation may be re-enacted today by government agencies on a broader scale. In this study, some interviewees indeed viewed the huge IOS investments made by the Singapore government as being "wasteful":

> *"Singapore spends ... large amounts of money delivering stuff via computerization…"*
>
> *- Project manager, construction firm*

> *"Currently, Singapore is one of the first countries promoting such an initiative. We are at the frontier. These are untested territories and the amount of money invested cannot translate to benefits immediately…"*
>
> *- Director, SCAL*

> *"A lot of money sunk in… even if you can get [benefits] out of the system, it [the system] is going to be very expensive…"*
>
> *- MIS Manager, Publisher-YES*

To complement the qualitative insights of this study, quantitative studies (to measure the bottom-line economic impact of large-scale IOS investments) may thus be helpful to gain a deeper understanding of the business value impact of such projects.

9.4 Implications for Practice

Finally, the practical lessons learnt in this study are not just about leadership or management techniques in government. Many people presume that new ideas about management are generated first in the private sector and then transferred to or adopted by the public sector. To a certain extent, this is true – in the past, the drive to reinvent government and for greater efficiencies in the civil service motivated public sector managers to borrow from private sector best practices (Kellerman 1999). However,

businesses have not always been the first to lead in management innovation. For example, models of participation and involvement have long been a significant part of public sector management – indeed, they are essential to operating a democratic system. Empowerment is therefore not an incidental technique in the public sector: it is an integral part of the mission of public institutions (Denhardt 1993). In fact, the practice of shared leadership has been far more significant in the public sector over the years than in the private sector. As such, there appears to be much that the private sector can also learn from the public institutions.

In this regard, the literature on leadership in the public sector and management in the private sector has changed dramatically over the years. In the 1950s and 1960s, both were viewed as being on opposite ends of the spectrum. By the 1990s however, leaders in government were expected to meet performance standards of efficiency while business leaders were, like their political counterparts, increasingly held accountable – to employees, stockholders, boards and customers. Today, leaders on both sides are performing in ways that are remarkably similar, shaped by the larger national and international contexts that govern how and when leadership is exercised (Kellerman 1999). In short, while "most people have been taught that the public and private sectors occupy distinct worlds; that government should not interfere with business, and that business should have no truck with government", that mindset is not viable today (Osborne and Gaebler 1992). Although government cannot of course be run like a business with all its attendant profit considerations, that does not mean it cannot become more entrepreneurial in working with businesses to raise the competitive edge of particular industries within the country.

As we move into the global knowledge economy, it may become more and more necessary for governments to facilitate the formation of various kinds of collaborations within industries and implement new types of IT systems for greater industry-wide efficiencies. In such a scenario, shared institutional leadership and purposeful stakeholder cooptation discussed in this paper may be crucial. Paying attention to just a single leader would neglect the necessary leadership required at other levels in order for the industry-wide initiatives to be successful. Similarly, viewing stakeholder cooptation as a defensive mechanism may limit the extent of benefits that can be realized from greater involvement of industry practitioners. Extrapolating the results of this study to the organizational context, layers of leadership and stakeholders can usually be identified within organizations - this means that it may be similarly important that such leaders and stakeholders at the different levels be given the necessary power and facility to exercise their different synergistic roles for internal IT implementations.

9.5 Implications for Methods

As mentioned previously, a certain positivist-interpretivist tension has permeated the IS discipline for years. On one side of the fence are the so-called "mainstream navigators" while on the other side are the "knights of change" (Landry and Banville 1992). The former group consists of followers of the dominant approach of positivism and the orthodox model of science, while the latter group strives to advance the cause of new methods or theories and include supporters of interpretivism. In recent years however, it has become increasingly clear that the interpretivist approach is gradually gaining ground in IS research (Prus 1996;

Walsham 1995). At the heart of this interpretivist movement (which has helped to advance its cause) is a belief in theoretical and methodological pluralism - that alternative interpretive understandings can be valuable by offering different but equally interesting insights (Walsham 1995).

In many disciplines, the case for a plurality of theories rather than a single, all-embracing theory to guide research is quite well understood. In interpretive IS research specifically, a variety of theoretical perspectives such as structuration theory, actor network theory, critical social theory and symbolic interactionism have indeed been used in different studies over time to illuminate various aspects of complex phenomena. Similarly, methodological pluralism is generally well accepted in interpretive IS research - a variety of strategies of inquiry such as ethnography, grounded theory, case study and action research have also been used to guide fieldwork in varied organizational settings. In this regard, particularly noteworthy is the fact that the constant comparative technique of data analysis used in grounded theory has been "informally" adopted over time by many qualitative researchers who are actually not seeking to build substantive theory (as in a grounded theory approach). Such adaptation has come about because the basic premise of the constant comparative method is compatible with the inductive, concept-building orientation of qualitative research in general (Merriam 1998).

To summarize, the leverage of theoretical and methodological pluralism in interpretive IS research over time has thus helped to yield insights in many areas. Such insights are important considering the increasing complexity of IS phenomena – indeed, the potential of IT to transform social and organizational life has been a

persistent theme in IS literature. Compounding this situation is the seemingly incessant trail of new technologies as well as new functionalities being rapidly added on to existing technologies, and the extensive integration and inter-linkage between such technologies and people. In other words, many contemporary IS phenomena are increasing in complexity as well as fluidity. Against this backdrop, it is important to note that IS research is different from traditional scientific research in that it has to develop a body of academic knowledge while providing practice-oriented insights related to the organizational contexts being studied (Harvey and Myers 1995). As such, today's IS researchers face an increasingly heavy intellectual responsibility to dissect such unique phenomena incisively and in a timely manner so as to stay relevant to the needs of the industry.

Inherent in this challenge is yet another opportunity for researchers operating within the interpretivist tradition to further leverage the inherent strengths of the paradigm. In this study, a detailed exposition has been provided of how much-needed structure and "formality" can be brought to the use of the constant comparative method in qualitative research (in contrast to its currently "informal" use by many qualitative researchers). While the known strength of the interpretivist approach is that it can produce rich insights of interest and value to practitioners in varied IS research settings, a more "formal" adaptation of the constant comparative technique as described in this thesis may help to move interpretive studies towards greater theoretical or conceptual development as one of the eventual products of the research. Such a movement may in turn help to accentuate the rising momentum of interpretivism in IS research.

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APPENDIX A: Key Informants

BOOKNET	LIST OF INFORMANTS
Publisher-YES	Operations Director, Customer Service Manager, MIS Manager
Publisher-NO	Sales Director, Services Director, Operations Director, Country General Manager, Business Manager, MIS Manager (2)
RTA	Deputy General Manager
ITA	Deputy Director
(Major) Retailer-SG	Managing Director
(Major) Retailer-FN	Retail Director, Asst Department Manager – Store
(Small) Retailer-PO	Director
(Small) Retailer-LT	Managing Director, General Manager
(Small) Retailer-A	Owner
(Small) Retailer-B	Owner
(Small) Retailer-C	Owner
Publisher D	Sales Director
Local Publishers' Association	Committee Member

CORENET	LIST OF INFORMANTS
Building and Construction Authority (BCA)	Project Manager (3), Senior Development Officer (2), Technical Consultant (3)
Housing & Development Board (HDB)	Director (Procurement), Manager (IT)
Cyber-IB (software vendor)	Vice President
SIACAD (architects' association)	Director
Singapore Contractors' Association Limited (SCAL)	Executive Director
Architectural firm 1	Architect
Architectural firm 2	Architect
Construction firm	Project Manager

LAWNET	LIST OF INFORMANTS
Singapore Academy of Law (SAL)	Assistant Director, Business Development Manager
Supreme Courts	Senior Assistant Registrar
Subordinate Courts	Registrar, IS Manager
Attorney General's Chambers	Deputy Senior State Counsel
BiziLaw (software vendor)	Director (2)
CrimsonLogic (software vendor)	Administrator
Law Firm 1	Lawyer
Law Firm 2	Lawyer (3), Secretary
Law Firm 3	Lawyer (9), BizNet clerk, EFS court clerk (2), EFS administrator (2), IS Manager, Systems Analyst, Knowledge Management Department employee, Litigation Support manager (2), Library manager

APPENDIX B: Key Interview Questions

1. What is happening here?

- Can you talk about this project in general: its aims, objectives?
- Can you talk about the unique characteristics of the industry?
- What is the current status of this project?

2. Who are involved in making it happen? Who are affected?

- Who are the people in charge of this project?
  - What are their roles and how are they performing?
- Who are the people helping out in the project?
  - What are their roles and how are they performing?
- Who are the people affected by this project?
  - How are they reacting to the project?
- What is your role in this project?
  - What are your personal views regarding its progress, possibilities, obstacles, etc?

3. When did it happen?

- What were the key milestones of this project?
- What happened at each of these key milestones?
- What are the next few milestones?

- When did you start to become involved in this project?
    - What is your past, present and/or future role?

4. Why is it happening?

- Can you talk about the reasons why things happened the way they do at each of these milestones?
- What do you think will happen or is likely to happen in the future? Why?

5. How has it come to happen this way?

- Can you tell us more about the historical backdrop for some of these events?
- Can you tell us more about the historical backdrop regarding the key organizations that are involved in this project?
- Can you tell us more about the historical backdrop of the industry leading up to the present day?
- Can you tell us more about the historical backdrop of your organization leading up to your present involvement in the project?
- Are there any other reasons that you think have impacted, are impacting and/or will impact the progress of the project?