Association for Information Systems
AIS Electronic Library (AISeL)

Information Technology Governance Processes Under Environmental Dynamism: Investigating Competing Theories of Decision Making and Knowledge Sharing

Ryan Peterson
Instituto de Empresa

Marilyn Parker
Key Strategies & Solutions Inc.

Pieter Ribbers
Tilburg University

Follow this and additional works at: http://aisel.aisnet.org/icis2002

INFORMATION TECHNOLOGY GOVERNANCE PROCESSES UNDER ENVIRONMENTAL DYNAMISM: INVESTIGATING COMPETING THEORIES OF DECISION MAKING AND KNOWLEDGE SHARING

Ryan R. Peterson
Instituto de Empresa
Madrid, Spain
Ryan.Peterson@ie.edu

Marilyn M. Parker
Key Strategies & Solutions Inc.
Osprey, Florida, USA
parkercaseym@worldnet.att.net

Pieter M. A. Ribbers
Tilburg University
Tilburg, The Netherlands
P.M.A.Ribbers@kub.nl

Abstract

This paper describes an empirical study of IT governance processes in complex organizations under conditions of environmental dynamism. Rooted in competing theories of organizational decision making and knowledge sharing, and based on a case study investigation of large, distributed organizations, this study examines the design and effectiveness of IT governance processes from both rational-analytical and social-learning perspectives. The results indicate that, regardless of the level of environmental dynamism, effective IT governance processes are characterized by both methodological comprehensiveness and social capabilities. The implications for theory development, future research, and IT governance practices are discussed.

1 INTRODUCTION

The growing infusion of e-business technologies in and between organizations, and the "e-wakening" from the dot.com frenzy, has made executives recognize that getting IT right this time will not be about technology, but about governing IT. Traditionally defined as the locus of IT control, scholars have recently questioned whether the concept of IT governance is simply about centralization and decentralization (Peterson et al. 2000; Sambamurthy and Zmud 2000; Vitale 2001; Whetherbe 2001).

With the profusion of electronically-enabled, globally-operating organizations, the classical hierarchical design of IT governance is inadequate to develop the competitive agility required by an environment characterized by environmental dynamism, i.e., frequent and unpredictable changes in the expectations, demands, and actions of customers, competitors, and/or suppliers (Miller 1988; Rasheed et al. 1995; Sambamurthy et al. 1993).

Under these conditions, the organizing logic of IT governance is based on horizontal decision-making processes that span functional, organizational, and geographic boundaries. The *process* dimension of IT governance gains importance in developing strategic flexibility for sustaining strategic advantage under environmental dynamism. Moreover, in complex, interdependent decision-making environments, there is considerable uncertainty and ambiguity arising from within distributed business and IT communities (DeSanctis et al. 1999; Jarvenpaa and Ives 1994).

The orientation of IT governance thus shifts from the structural differentiation of IT decision making, toward the integration of IT decision making (Sambamurthy and Zmud 2000; Weill and Broadbent 1998), in order to share information and knowledge on decisions and performance of IT. The question that remains, however, is what type of *process*es are involved in IT governance in complex and dynamic business environments? While previous studies discuss IT governance structures, they have failed to recognize the importance of IT governance processes. As a result, we have a partial understanding of IT governance in contemporary organizations. The goal of the present study is to fill this paucity in empirical research by addressing the process mechanisms of IT governance, thereby providing an enriched understanding of the *processual* nature of IT governance. The main research questions are: *How do contemporary organizations design IT governance processes under environmental dynamism? How are traditional decision-making and knowledge-sharing theories challenged by contemporary organizational contexts and environmental contingencies? What models best explain the design and effectiveness of IT governance processes in contemporary organizations?*

The remainder of the paper is organized as follows. The second section describes the theoretical background and framework underlying this study, and the third section contains the case study rationale and research methodology. The case study results are presented in the fourth section, with a discussion of the conclusions and implications in the fifth section.

2   THEORETICAL BACKGROUND

IT governance processes describe the mechanisms that enable business and IT executives to integrate business and IT decisions, implement and monitor decision implementation, and learn from their effectiveness (Weill and Broadbent 1998). This involves the identification and explication of the IT business case, and the prioritization, selection and (post-)evaluation of IT decisions (Luftman and Brier 1999; Willcocks et al. 1997). Vitale (2001) defines IT governance as the process of making strategic decisions about IT and monitoring IT performance, emphasizing that IT governance is not—only—an IT management architecture, but first and foremost a process or pattern in decision making for IT.

2.1 Methodological Comprehensiveness and Social Capabilities

Theories on organizational decision making describe two competing models for effective decision making under environmental dynamism with different descriptions of decision-making *sophistication,* decision-making *synchronization*, and decision-making *structure* (Table 1). These models are rooted in rational-analytical and social-political schools of organization theory (March and Simon 1958; Pfeffer 1981). The rational-analytical school describes decision making as a rational and logical process, based on outcome-maximizing choices, in which goals and preferences are consistent across organizational members. Proponents of the rational decision-making school argue for the use of comprehensive procedures and formal methodologies, i.e, methodological comprehensiveness. **Methodological comprehensiveness** emphasizes the *acquisition and exhaustive analysis of information about strategic alternatives, and the formal integration of decisions based on specified rules, procedures, and standard methodologies* (Ansoff 1965; Sambamurthy et al. 1993). The rationale is that meticulous analysis provides greater knowledge, and thus more effective decisions, wherein knowledge is explicit and formal, and knowledge sharing is automatic and articulate.

Table 1. Methodological Comprehensiveness and Social Capabilities

	Methodological Comprehensiveness	**Social Capabilities**
Decision-Making Sophistication	Comprehensive, based on analytical tools and formal methodologies	Experimental, based on experiential knowledge and improvisation;
Decision-Making Synchronization	Formalization and standardization Explicit knowledge, articulate and accessible	Shared understanding and active conflict-resolution Tacit knowledge, embedded and diffuse
Decision-Making Structure	Select representation of elite stakeholders	Social network of competent stakeholders

The social-political model describes decision making as a "pull" and "push" between stakeholders, based on negotiation and coalition building, in which multiple ambiguous goals exist, and developing social capabilities are essential. **Social capabilities** emphasize an *incremental approach in which coalition building, trust, conflict resolution, and strategic experimentation are regarded as pivotal*. Advocates of social capabilities suggest that, whereas in stable and placid environments methodological comprehensiveness can be effective (Fredrickson and Iaquinto 1989), in dynamic and turbulent environments, comprehensive decision making does not provide the necessary flexibility to be effective, and is susceptible to misdirected efforts and investments (Ciborra 1993; Fredrickson and Iacquinto 1989; Iacono and Weisband 1997). Social capabilities develop in an evolutionary manner, based on past experiences and (tacit) knowledge bases, and are a subset of capabilities involved in organizational learning, represented by the synergistic combination of different competencies (Nonaka and Takeuchi 1995). Proponents of social capabilities contend that the experiences and shared knowledge among stakeholders is essential to effective decision making under environmental dynamism, in which knowledge is ephemeral, ill-defined, diffuse, and embedded within the local organizational context (Ciborra and Andreu 2000).

Environmental contingencies are thus seen as important moderating variables (Eisenhardt 1989; Fredrickson and Iacquinto 1989; Goll and Rasheed 1997; Mintzberg 1979). However, whereas each of these schools asserts that their decision-making model is the most appropriate for dynamic and turbulent environments, empirical studies remain inconclusive and results contradictory. While Fredrickson and Iaquinto (1989) indicate that successful decision making in dynamic environments is associated with less comprehensiveness, Eisenhardt (1989) and Goll and Rasheed (1997) provide the opposite evidence.

2.2 IT Governance Processes under Environmental Dynamism: Research Model and Propositions

With regard to IT governance processes, a similar dichotomy exists between rational-analytical and socio-political models. Advocates of methodological comprehensiveness argue for the comprehensive analysis and formal integration of IT decisions through the use of analytical tools and methodological frameworks across different stages of decision making. Examples of IT decision-making methodologies and frameworks include, the *strategic alignment model* (SAM; Venkatraman et al. 1993), *strength, weaknesses, opportunities, and threats* (SWOT) *analysis* (Rowe 1996), *critical success factors* (CSF; Zmud 1979), *balanced scorecard* (BSC; Kaplan and Norton 1996), *information economics* (IE; Parker and Benson 1988), and *scenario analysis* (Galliers 1993).

A competing theory suggests that methodological comprehensiveness is inappropriate for addressing the uncertainties and ambiguities that arise in IT governance processes. Instead, what is called for is the development of social capabilities and competent (multidisciplinary) communities, which are based on the experiences and expertise of different stakeholders, and the development of shared understanding and collaborative relationships between business and IT stakeholder constituencies (Sambamurthy et al. 1993; Weill and Broadbent 1998). Previous empirical studies are, however, few and too inconclusive to draw any definitive conclusions. Whereas Pyburn (1983) provides evidence that less comprehensive decision making was more effective in turbulent environments, Salmela et al. (2000) indicate that less comprehensive IT decision making is not more successful under environmental dynamism.

Furthermore, no studies have been conducted that simultaneously include two competing theoretical lenses on the appropriateness of IT governance processes under environmental dynamism. Therefore, consistent with previous studies (Eisenhardt 1989; Fredrickson and Iacquinto 1989; Goll and Rasheed 1997; Mintzberg 1979), this study posits that environmental contingencies will moderate the relationship between IT governance processes and IT governance effectiveness (Figure 1). Specifically, the following propositions are suggested:
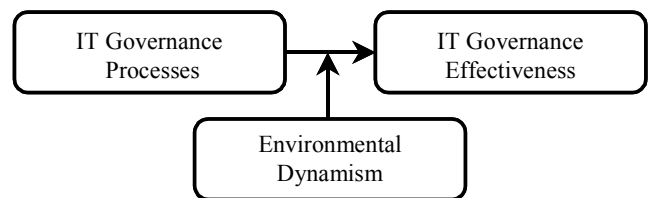

Figure 1. Research Model

Proposition 1: *Effective IT governance processes in environments of low (high) environmental dynamism are associated with high (low) methodological comprehensive IT decision making.*

Proposition 2: *Effective IT governance processes in environments of high (low) environmental dynamism are associated with high (low) social capabilities IT decision making.*

3 RESEARCH METHODOLOGY

Due to the complex, contextual, and contemporary nature of IT governance processes, and the lack of a cumulative research base on the processes involved in IT governance, a case study research design was deemed appropriate (Benbasat et al. 1989; Yin 1994). The specific research design is a qualitative, exploratory, multiple case study approach. In total, nine large, complex organizations were selected across different industries operating in Europe, the United States, and Canada (Table 2). The organizations are characterized by multiple business units and distributed operations. The case studies were sampled across industries to reflect variability in environmental contingencies, with the explicit purpose of *analytical validation* (Yin 1994).

The operationalization of the variables is based on validated measures used in previous studies (Table 3). Environmental dynamism is operationalized as the level of perceived unpredictability and variability in the actions of customers, competitors, suppliers and government agencies (Dess and Beard 1984; Eisenhardt 1989; Miller 1988). IT governance process is operationalized as the type of mechanisms (i.e., methodological comprehensiveness and/or social capabilities) used in IT decision-making processes (Fredrickson and Iacquinto 1989; Mintzberg 1979; Salmela et al. 2000; Sambamurthy et al. 1993). IT governance effectiveness is operationalized as the contribution of IT to business performance improvement, and stakeholder satisfaction with IT operations (Weill and Broadbent 1998; Willcocks et al. 1997; Vitale 2001).

Data collection was conducted through interviews (88 in total) with business and IT executives at both divisional/business unit and corporate levels (Table 2). Interview data was complemented by the collection and analysis of company documents, including, business and IT plans, IT decision-making procedures, and executive memos. A semi-structured interview protocol was used in all interviews. Participants were assured that their company and responses would remain anonymous. Based on the data, detailed case descriptions were written up and validation was sought from the different stakeholders.

Data analysis consisted of within- and cross-case analysis through coding, clustering, and pattern-matching techniques, and was designed to meet internal validity requirements (Yin 1994). The cases were clustered around the results of the dependent construct, and patterns of similarities and differences within and across clusters of independent and moderating constructs were analyzed. The results were analyzed against the explanations offered by the research model and underlying propositions.

Table 2. Case Studies

Case Studies	Industry	Geographic Location (Headquarters)	Company Size	Interviews with:			
				CEO	CIO	Bus. Man.	IT Man.
Company A	Financial Services	Europe	> 10,000	1	1	5	4
Company B	Financial Services	Europe	> 10,000	1	1	4	4
Company C	Financial Services	Europe	> 3,000	1	1	4	3
Company D	Financial Services	Europe	> 3,000	1	1	4	5
Company E	Financial Services	Europe	> 3,000	1	1	4	3
Company F	Health Care	Europe	> 1,500	1	1	4	3
Company G	Health Care	Europe	> 1,500	1	1	4	3
Company H	Utilities	United States	> 15,000	1	1	4	4
Company I	Telecommunication	Canada	> 10,000	1	1	4	4

Table 3. Operationalization of Constructs and Sample of Interview Questions

Construct	Operationalization and Measurement		Sample Interview Questions
IT Governance Process	**Methodological Comprehensiveness** Low, e.g.: — *Ad hoc* problem analysis — No integration — No use of formal methodology	**Social Capabilities** Low, e.g.: — Passive conflict resolution (avoidance strategy) — No shared understanding	• How would you describe the decision-making process on IT investments? • Who are involved, at what moment, in IT decision making? • What types of tools or methods are used in IT decision making? • If or when conflicts arise, how are they solved?
	High, e.g.: — Thorough problem analysis — Tight integration — Use of formal methodology	High, e.g.: — Active conflict resolution (confrontation strategy) — Shared understanding	
IT Governance Effectiveness	**Business Performance:** Low, e.g.: — Low productivity — Lack of product innovation — Customer dissatisfaction	**IT Operations:** Low, e.g.: — Budget/time overruns in IT delivery — Low system functionality — IT legacy systems	• Have you achieved major business performance improvements over the last 5 years? • If so, could you explain and provide examples? • If not, what are the key areas that still need improvement? • How would you describe the quality of your IT operations, in terms, for instance, of IT development, IT functionality, IT infrastructure? • How satisfied are you? • Why (not)?
	High, e,g, Improved: — Operational efficiencies, productivity — Product innovation — Time-to-market — Corporate communication	High, e.g.: — Strategic middleware architecture — Reliable IT infrastructure services	
Environmental Dynamism	**Customer Actions:** — Variable customer demand for tailoring services, customer churn	**Competitors Actions:** — Mew dot-com entrants, old competitors repositioning	• How would you characterize the competitive climate in your industry • How has this changed over the last 5 years? • What role has IT/e-business played? • What are the major upstream/supplier and downstream/customer changes? • Were (and are) these changes predictable then (and now)? • How has this affected your strategy, organization, and decision making?
	Supplier Actions: — Securing supplies, supplier collaboration, value chain integration	**Government Actions:** — Deregulation, new funding policies	

4   CASE STUDY RESULTS

The case study descriptions and analyses are presented in this section. Due to space restrictions, the case study descriptions are presented in a summarized format (see Appendix A for case study details).

4.1 Case Study Descriptions

The case study results indicate that executives perceive different degrees of unpredictability and variability in the organization's direct environment. The financial service organizations (cases A, B, C, D, and E) perceive the environment as relatively more dynamic and turbulent, in comparison to the health care organizations (cases F and G). Common sources of uncertainty reported

by these organizations include changing customer demands, competitive threat by new players due to deregulation and the pan-European financial market place, and seeking collaboration and partnerships with other financial institutions in Europe.

Executives in these health care organizations (cases F and G) report a more modest pace of change in the environment, yet also describe the importance of collaboration and networking with other health care institutions and medical clinics. The primary reason for this networking, according to one health care manager, is

> *the need to share expertise, reduce costs and provide improved health care services to patients. In recent years, I see a movement towards more patient-oriented care, and the streamlining of our care and cure processes. Collaboration with local clinics then becomes important.*

Over the past decade, the Utility company (case H) pursued an opportunity to extend its geographical area through a merger and restructured itself to take advantage of opportunities in the increasing domestic market and the growing international privatization of utilities. Company I (telecommunication) also experienced a fundamental transformation from a public to a private corporation, and is now competing in key market segments formerly operated as a monopoly. Both companies indicate that they have experienced a significant increase in the degree and pace of change in their markets and customer preferences.

With respect to decision-making sophistication, all organizations use frameworks or management support tools for IT decision making. The results indicate, however, that while cases A, B, C, D, E, H, and I use relatively new management tools, such as, BSC and IE, the health care organizations use more traditional management tools, including SWOT and CSF.

Both of the health care organizations use pilot studies and "IT green field" experiments in order to guide decision making. The rationale behind pilot studies is described by a health care officer at Company G:

> *We use the pilot studies in order to first gain experience with the new technologies and new ways of working. Pilot studies help us to assess the impacts of new communication technologies on the organization. In this way, we attempt to minimize risks and try to gain commitment from the medical staff. The experiences and feedback we receive are often an input to future decisions.*

In companies A, B, C, D, E, H, and I, on the other hand, balanced scorecard and information economics-like methods are used, often integrated and tailored to the existing business decision-making practices. In the utility company (case H), the ranking mechanism provides management with specific measures as to how closely proposed investments support the strategic and tactical direction of the corporation. For each of the value perspectives, critical success factors are defined, which are then operationalized into different measures. These measures are then used by business and IT managers to rate and score different IT decisions and business-IT projects.

Company A uses scenario analysis based on the strategic alignment model. Specifically, changes in the IT environment are viewed as impact factors on the business strategy, which led to several possible changes in the organization structure. These possible organizational futures are then discussed among business and IT stakeholders in special IT scenario workshops organized by the corporate IT office. Company H also embraced the scenario-based planning philosophy, and developed a set of global scenarios for business planning. To achieve this objective, the business resource plan consists of a number of strategic elements that are arranged in a variety of ways to accommodate any plausible future scenario and its associated demand.

The case studies illustrate different levels and forms of synchronization, ranging from formalized procedures for the integration of business and IT decision making, to informal socialization and shared understanding between business and IT stakeholders. In company A and company E, business and IT decisions are mutually influential, and decision making is characterized by reciprocal integration, i.e., business decisions influence IT decision making, and IT decisions influence business decision making. In contrast, companies B, C, and D are characterized by loose, sequentially integrated IT decision making. Business decisions are leading in IT decision making, and the impacts of IT decisions on the business organization are rarely assessed, or evaluated after implementation.

Decision-making integration also transpires through informal mechanisms in the form of collaboration and shared understanding between business and IT stakeholders. Business and IT decisions are integrated through the sharing of information, expertise, and other resources, and the development of a shared vision regarding the application and exploitation of IT. This shared vision is often developed by a coalition of business and IT executives (in companies E and F), or is influenced by the individual leadership actions of a single stakeholder (in companies A and I). In the latter cases, the CIO plays a strategic role, i.e., developing and

gaining commitment, communicating and negotiating with key stakeholders, instilling an organizational change mindset in the organization, developing a shared understanding, and integrating business and IT decisions.

In company H, at first the IT organization was an efficiency driven, purely technical function. Organized as a closed system, it had a hierarchical organizational structure mirroring the business organization. Linking related to the increased use of IT and was quite formalized. During the 1990s, the charter of IT was consistency with the overall strategic direction of the business goals. On a strategic level, with the CIO as a member of the executive team, IT plans became an integral part of business plans.

In company I, the primary change vehicle was a new emphasis on team skills, and a team environment characterized by business and IT professionals working together. The skill set of the IT professionals evolved, emphasizing soft skills and business skills in addition to technical skills, contributing to an effective functioning of those teams. Management and decision-making processes rooted in the culture of the traditional hierarchical organization were insufficient when dealing with decisions associated with rapid organizational change. Communications between organizations became face-to-face rather than interoffice memos, and line-of-business (LOB) directors affected by IT changes were personally briefed by the CIO. The CIO had a crucial role in bringing about the integration. He clearly defined the vision for IT and communicated it throughout the organization.

With respect to the structural organization of decision making for IT, the case study results reveal that different stakeholders are involved to varying degrees in IT decision-making processes. Multiple stakeholders, including corporate and IT executives, and business and IT managers, are involved in companies A, E, F, H, and I. Select stakeholder constituencies from predominantly corporate and IT groups are involved in companies B, C, D, and G. In the latter organizations, corporate IT management indicates that often there is a lack of commitment on the side of the business management, and extensive misunderstandings and conflicts emerge between business and IT management.

4.2 Case Study Analysis

Analysis of the case studies indicates that companies differ in levels of IT effectiveness. Based on the case study findings, companies A, E, F, H, and I are characterized by relatively high levels of IT effectiveness and stakeholder satisfaction (see also Appendix A). In contrast, companies B, C, D, and G are characterized by relatively low levels of IT effectiveness. Based on the research model, Table 4 provides a summarized interpretation of the main case study results. The findings indicate that effective IT governance processes under environmental dynamism are characterized by high methodological comprehensiveness *and* high social capabilities, thereby providing *no support for proposition 1*.

**Table 4. Analysis of Environmental Contingencies, IT Governance Processes,
and IT Governance Effectiveness**

| Case Study	Environmental Dynamism	Methodological Comprehensiveness	Social Capabilities	Effectiveness
A	High	High	High	High
B	High	**High**	Low	Low
C	High	Low	Low	Low
D	High	Low	**High**	Low
E	High	High	High	High
F	Low/Moderate	High	High	High
G	Low/Moderate	**High**	Low	Low
H	High	High	High	High
I	High	High	High	High
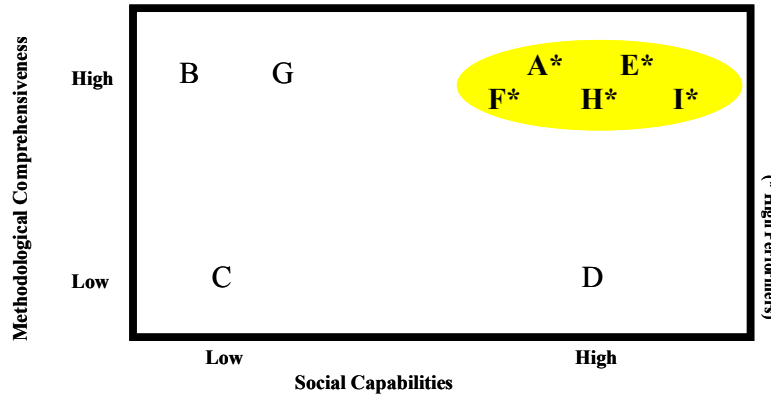
**Figure 2. Interpretation of Methodological Comprehensiveness
and Social Capabilities**

Effective process mechanisms involve (1) a comprehensive analysis of the decision problem and the alternative solutions, (2) the use of tailored IT decision-making frameworks, (3) strategic experimentation through piloting and green fields, (4) the involvement of multiple stakeholder constituencies, and (5) mutual understanding, conflict resolution, and collaboration among stakeholders (companies A, E, F, H, and I). Likewise, effective IT governance processes in relatively stable and less turbulent environments are also characterized by high methodological comprehensiveness *and* high social capabilities, thereby also providing *no support for proposition 2*. The results indicate that effective IT governance processes, under different levels of environmental dynamism, are characterized by both methodological comprehensiveness and social capabilities (Figure 2).

According to executives in the high performing cases, the first step is *collectively* recognizing and agreeing on the problem situation. The case study results indicate that without some sense of shared objectives between stakeholder constituencies, the problem solution stage will only lead to partial and partisan solutions, which subsequently do not meet the objectives and expectations of the different stakeholders. Once agreement has been reached about the problem and objectives, the emphasis is placed on the *collective* development and evaluation of alternatives. In this stage, different decision-making tools are used, but are tailored to existing decision-making methodologies in the organization. The implementation of alternatives transpires through strategic experimentation and the use of pilot studies. Strategic experimentation, and the monitoring thereof, informs stakeholders on problem identification in IT governance processes, and provides flexibility for solution integration.

Effective IT governance processes are thus characterized by a hybrid approach of both methodological comprehensiveness and social capabilities. The knowledge creation process as described by Nonaka and Takeuchi (1995) provides an analytical lens to explain and understand the complementary necessity of methodological comprehensiveness and social capabilities in effective IT governance processes. Knowledge creation within and among professional business and IT communities transpires through cycles of converting formal knowledge into tacit knowledge, and vice versa (Figure 3). It is within this conversion that organizational knowledge is created. Whereas methodological comprehensiveness provides the mechanism for the combination of formal knowledge, social capabilities enable socialization and sharing of tacit knowledge. Together, both mechanisms complement each other, thereby creating a cycle of knowledge creation.
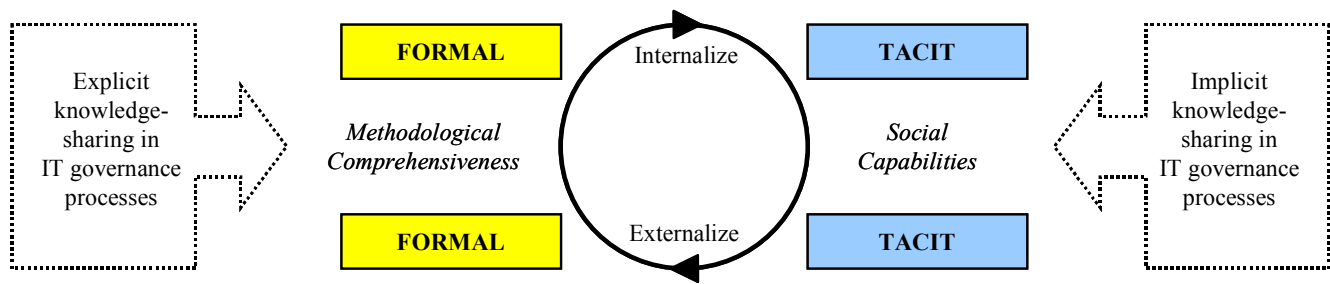
Figure 3. Knowledge Creation and Conversion in IT Governance Processes

5 CONCLUSIONS

Whereas previous studies focused on the structural mechanisms of IT governance, the goal of this study was to gain understanding of IT governance *processes*, and in so doing, diagnose contemporary practices and competing theories regarding the *process* mechanisms of IT governance. Acknowledging the limitations of this study (i.e., exploratory research, basic operationalization, and limited generalization) the results hold important implications for both theory and practice.

From a theoretical perspective, the dichotomy between methodological comprehensiveness and social capabilities does not adequately describe and explain what the effective process mechanisms are for IT governance. Effective IT governance processes across the cases were associated with a *bricolage* (Ciborra 1993) of methodological comprehensiveness and social capabilities, characterized by (1) strategic integration and monitoring and (2) shared understanding and experimentation. Thus, neither of the competing theories fully describes and explains effective IT governance processes within contemporary enterprises. More importantly, the case studies indicate that methodological comprehensiveness and social capabilities are not competing but *complementary* models for analyzing and understanding IT governance processes.

The predictive power of these competing theories is thus questionable. The case study results suggest that traditional theories of decision making are inadequate in shaping appropriate insights for contemporary practices on IT governance processes in competitive environments. This study underscores the gap that exists between theoretical frameworks, empirical research and contemporary practices on effective IT governance processes. As such, these results should motivate future research endeavors on the effective processes mechanisms of IT governance.

In particular, in-depth, longitudinal case studies across a variety of industries, as well as a large-scale survey would provide valuable insights. Future research should, however, use more refined measurements (instead of the crude high/low scoring) of the constructs used in this paper in order to empirically test and validate the research model and propositions. This would add more variability to the measurement of the constructs and improve the external validity of the findings, which is a general weakness in case studies. However, it should be noted that this study was geared at analytical, not empirical, validation.

Furthermore, other organizational contingency variables (e.g., corporate governance, management style, IT maturity) and objective business performance measures should be included. Future research could also investigate the interaction effects of structural alternatives and process mechanisms on the effectiveness of IT governance.

From a practitioner's perspective, this study serves as a reminder that the use of management tools and frameworks are insufficient for governing IT effectively. These tools should be embedded within the organizational context of stakeholders' experiences, judgments, and understanding. Likewise, attention for stakeholders' experiences and judgments, without some analysis of objectives, costs, and benefits, is unlikely to lead to satisfactory results. Similar to the hybrid structure for IT governance, hybrid processes are required for developing strategic flexibility in sustaining strategic advantage in an increasingly global and digital economy.

6 ACKNOWLEDGEMENT

7 REFERENCES

Ansoff, H. I. *Corporate Strategy*. New York: McGraw Hill, 1965.

Benbasat, I., Goldstein, K., and Mead, M. "The Case Study Research Strategy in Studies of Information Systems," *MIS Quarterly* (13:3), September 1989, pp. 177-188.

Ciborra, C. U. *Teams, Markets and Systems: Business Innovation and Information Technology*. Cambridge, UK: Cambridge University Press, 1993.

Ciborra, C., and Andreu, R. "Knowledge Across Boundaries: Managing Knowledge in Distributed Organizations," Working Paper Series, London School of Economics and Political Science, 2000.

DeSanctis, G., Staudenmayer, N., and Wong, S. "Interdependence in Virtual Organizations," in C. Cooper and D. M. Rousseau (eds.), *Trends in Organizational Behavior*. New York: John Wiley & Sons, 1999, pp. 81-104.

Dess, G. G., and Beard, D. W. "Dimensions of Organizational Task Environments," *Administrative Science Quarterly* (29), 1984, pp. 52-73.

Eisenhardt, K. M. "Making Fast Decisions in High Velocity Environments," *Academy of Management* (32:3), 1989, pp. 543-576.

Fredrickson, J. W., and Iaquinto, A. L. "Inertia and Creeping Rationality in Strategic Decision Processes," *Academy of Management Journal* (32:3), 1989, pp. 516-542.

Galliers, R. D. "Towards a Flexible Information Architecture: Integrating Business Strategies, Information Systems Strategies, and Business Process Redesign," *Journal of Information Systems* (3), 1993, pp. 199-213.

Goll, I., and Rasheed, A. M. A. "Rational Decision-Making and Firm Performance: The Moderating Role of Environment," *Strategic Management Journal* (18:7), 1997, pp. 583-591.

Iacono, S., and Weisband, S. "Developing Trust in Virtual Teams," in *Proceedings of the 30th Annual Hawaii Conference on Information Systems*. Los Alamitos, CA: IEEE Computer Society Press, 1997.

Jarvenpaa, S. L., and Ives, B. "The Global Network Organization of the Future: Information Management Opportunities and Challenges," *Journal of Management Information Systems* (10:4), 1994, pp. 25-57.

Kaplan, R. S., and Norton, D. P. "Using the Balanced Scorecard as a Strategic Management System," *Harvard Business Review* (74:1), 1996, pp. 75-85.

Lederer, A. L., and Salmela, H. "Towards a Theory of Strategic Information Systems Planning," *Journal of Strategic Information Systems* (5), 1996, pp. 237-253.

Luftman, J., and Brier, T. "Achieving and Sustaining Business-IT Alignment," *California Management Review* (42:1), 1999, pp. 109-122.

March, J. G., and Simon, H. A. *Organizations* (2nd ed.). New York: Wiley, 1958.

Miller, D. "Relating Porter's Business Strategies to Environment and Structure: Analysis and Performance Implications," *Academy of Management Journal* (31:2), 1988, pp. 280-308.

Mintzberg, H. *The Structuring of Organizations*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1979.

Nonaka, I., and Takeuchi, H. *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford: Oxford University Press, 1995.

Parker, M. M., Benson, R. J., and Trainor, H. E. *Information Economics: Linking Business Performance to Information Technology*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1988.

Peterson, R. R., O'Callaghan, R., and Ribbers, P. M. A. "Information Technology Governance by Design: Investigating Hybrid Configurations and Integration Mechanisms," in W. J. Orlikowski, S. Ang, P. Weill, H. Krcmar, and J. I. DeGross (eds.), *Proceedings of the 20th International Conference on Information Systems*, Brisbane, Australia, 2000, pp. 435-452.

Pfeffer, J. *Power in Organizations*. Marshfield, MA: Pitman Publishing, 1981.

Pyburn, P. J. "Linking the MIS Plan with Corporate Strategy: An Exploratory Study," *MIS Quarterly* (7:2), 1983, pp. 1-14.

Rasheed, A. M. A., Priem, R. L., and Kotulic, A. G. "Rationality in Strategic Decision Processes, Environmental Dynamism and Firm Performance," *Journal of Management* (21:5), 1995, pp. 913-929.

Rowe, A. J. *Strategic Management: A Methodological Approach*. Reading, MA: Addison Wesley Publishing Company, 1996.

Salmela, H., Lederer, A. L., and Reponen, T. "Information Systems Planning in a Turbulent Environment," *European Journal of Information Systems* (9), 2000, pp. 3-15.

Sambamurthy, V., Venkatraman, S., and DeSanctis, G. "The Design of Information Technology Planning Systems for Varying Organizational Contexts," *European Journal of Information Systems* (2:1), 1993, pp. 23-35.

Sambamurthy, V., and Zmud, R. W. "Arrangements for Information Technology Governance: A Theory of Multiple Contingencies," *MIS Quarterly* (23:2), 1999, pp. 261-290.

Sambamurthy, V., and Zmud, R. W. "Research Commentary: The Organizing Logic for an Enterprise's IT Activities in the Digital Era: A Prognosis of Practice and a Call for Research," *Information Systems Research* (11:2), 2000, pp. 105-114.

Venkatraman, N., Henderson, J., and Oldach, S. "Continuous Strategic Alignment: Exploiting Information Technology Capabilities for Competitive Success," *European Management Journal* (11:2), 1993, pp. 139-149.

Vitale, M. "The dot.com Legacy: Governing IT on Internet Time," Working Paper, Information Systems Research Center, University of Houston, 2001.

Whetherbe, J. "Achieving the High-Performance, Information-Based Networked Organization," Working Paper, Information Systems Research Center, University of Houston, 2001.

Willcocks, L. P., Feeny, D. F. and Islei, G. *Managing IT as a Strategic Resource*. London: McGraw-Hill Companies, 1997.

Weill, P., and Broadbent, M. *Leveraging the New Infrastructure: How Market Leaders Capitalize on Information Technology*. Boston: Harvard Business School Press, 1998.

Yin, R. *Case Study Research* (2nd ed.). Thousand Oaks, CA: Sage Publications, 1994.

Zmud, R. W. "Individual Differences and MIS Success: A Review o the Empirical Literature," *Management Science* (25:10), 1979, pp. 966-979.

APPENDIX A

SUMMARIZED DESCRIPTION OF CASE STUDIES RESULTS

Case Study	Environmental Dynamism	Decision-Making Sophistication	Decision-Making Synchronization	Decision-Making Structure	IT Governance Effectiveness
A	Change in the demands of customers, and the unpredictability in competitors' strategies and moves are considered strategic uncertainties The pan-European financial market place is causing significant competitive shifts	Thorough analysis Problem identification and solution integration Tailored BSC-IE, SWOT, CSF, scenario analysis Pilot studies and experimentation	Tight integration of business and IT decisions Formal documentation Monthly IT newsletter describing major decisions Negotiation, Lobbying Shared understanding among key stakeholders	Multiple stakeholders Involving corporate, IT and local business constituencies Business managers play a key role in selecting IT projects	• Implementation of middleware architecture • Internet-based distribution channels • Improved time-to-market, product innovation, work-flow streamlining, customer satisfaction • Business and IT executive satisfied, yet concerned that IT evaluation can still be improved
B	Change in customer demands, and collaboration with other European financial institutions perceived as sources of significant uncertainty	Thorough analysis Problem identification and solution integration Use of BSC, IE, CSF scenario analysis for IT investments and business impacts	Loose integration of business and IT decisions Formal IT documentation Negotiation Existing stakeholder conflicts	Select stakeholders Predominantly from the corporate IT headquarters Formal mandate to manage IT decisions	• Project delays and overruns • Low system functionality • Infrastructure legacy systems • Struggling with cost-efficiencies and work-flow redesign • Corporate IT and business management dissatisfied due conflicts, politics and low delivery performance
C	Competitor actions are hard to predict. Deregulation and the entry of new players are increasing the level of competitive threat	*Ad hoc* analysis Problem solution BSC, IE, CSF	Loose integration of business and IT decisions Multiple informal memos Negotiation, lobbying Existing stakeholder conflicts	Select stakeholders Predominantly the IT director's office, with occasional involvement from local IT management	• Project delays and overruns • Low system functionality • Patchy information architecture • Low productivity, no efficiency gains • Low process and product innovation, only maintenance of existing products • Business and IT executives dissatisfied with low IT performance and heavy top/down approach by the director's IT office

Case Study	Environmental Dynamism	Decision-Making Sophistication	Decision-Making Synchronization	Decision-Making Structure	IT Governance Effectiveness
D	Meeting changing and demanding customer needs considered as strategic uncertainties. Developing pan-European "bancassur-ance" networks causing fundamental changes	*Ad hoc* analysis Assessment and evaluation not formally conducted Some use of BSC, IE, CSF; not consistently	Loose integration of business and IT decisions Multiple informal memos Negotiation, lobbying	Multiple stakeholders Involving corporate, IT and local business constituencies, especially in IT project management	• Project delays and overruns • IT infrastructure legacy • Non-responsive IT delivery • Marginal productivity improvement • No significant product innovation • Business executives unsatis-fied, and blame the IT organi-zation for low performance
E	Competitive threat by new players perceived as key issue in the environment. Meeting customer demands and collaborating with other financial institutions also considered strategic sources of uncertainty.	Thorough analysis Problem identification and solution integration Tailored BSC-IE, SWOT, CSF, ITIL scenario analysis Pilot studies and experimentation	Tight integration of business and IT decisions Formal documentation of IT decision making Monthly IT newsletter containing major decisions Negotiation, lobbying Shared understanding among key stakeholders	Multiple stakeholders Involving corporate, IT and local business constituencies Only business managers have the formal mandate to initiate IT projects, which are reviewed by a committee of corporate business and IT executives	• Shared business information architectures • Internet-based operations and distribution channels • CRM system implemented and operational • Improved time-to-market • Product integration and innovation • Business and IT executive satisfied • Concerned about the level of integration among key systems
F	Deregulation and colla-boration with other health care and medical clinics perceived as a source of some uncertainty. No competitive threat, nor unpredictable patterns in customer demands.	Thorough analysis Problem identification and solution integration SWOT, CSF, Scenario analysis Pilot studies and experimentation	Tight integration of business and IT decisions Formal documented IT decisions Negotiation, Lobbying Shared understanding among key stakeholders	Multiple stakeholders Involving corporate, IT and local constituencies, including physicians, R&D staff	• Institutionalized of patient-information-sharing • Videoconferencing-based consultations • Process-based, patient oriented organization • Organizational change strategy implemented • Restructuring towards a networked care provider • Corporate director, division managers and medical staff satisfied • Concerned, however, about future funding

Case Study	Environmental Dynamism	Decision-Making Sophistication	Decision-Making Synchronization	Decision-Making Structure	IT Governance Effectiveness
G	Collaboration with regional medical centers and getting funds from regulatory agencies described as difficult to predict and control.	Thorough analysis Problem identification and solution integration CSF Pilot studies and experimentation	Tight integration of business and IT decisions Document business and IT plans Negotiation among key stakeholders Attempting to define shared objectives and commitment	Select stakeholders Predominantly corporate executive and financial staff, with occasional consultation of IT specialists.	• Project delays and overruns • IT legacy systems • Electronic Patient Record system development terminated • Cultural legacy • Change management failing • Physicians and medical staff dissatisfied due lack of involvement • Financial manager troubled due to waste of financial resources, and follow-up funding
H	Deregulation and industry structure undergoing major change. Focus on redefinition of markets, customers and services. Re-evaluating current business model of centralized production facilities. Political, societal and environmental drivers affecting business decisions.	Scenario planning Option thinking Information technology scanning as an input for scenario planning BSC Information economics for project prioritization Management by business case and strategic opportunity	IT charter: to ensure that any IT dollar spent is consistent with the overall direction of the corporation IT participates in highest level strategic planning sessions Rotational assignments for both business and IT Cross-training Collocate IT support with LOB Focus on team skills and team based planning Appointment of an ombudsman	CIO is member of executive planning team Flattening organization with majority of IT professionals resident in LOB Introduction of interdepartmental teams IT is responsible for technology scan for the entire business	• IT and Business develop shared mental models and understanding of the business, act as full business partners at all levels of management, with installed demand and supply management • The result is a strong business/IT partnership that forged an almost integrated vision and execution • IT/business integration contributed to a continuous competitive fit of the corporation • Successful implementation of Xxnet as a common infrastructure: linking the company to its distributed facilities, operating equip-ment, suppliers and customers

Case Study	Environmental Dynamism	Decision-Making Sophistication	Decision-Making Synchronization	Decision-Making Structure	IT Governance Effectiveness
I	Organization faces an immediate and funda-mental environmental shift Privatization initiative caused a move from a government owned entity to a private sector commercial competitive environment Preparation for competition in key market segments formerly operated as a monopoly Focus on redefinition of markets, customers, services	Net present value calculations IT project ranking mechanisms based on information economics Traditional financial reports and balanced scorecard Plans and schedules developed by customer focus groups (CFGs) and reviewed/approved by upper management	New CIO focused efforts by outlining vision, organizing major players, ensuring funding, informing affected departments and resolving conflicts IT charter: Cost; improved efficiencies and effectiveness Management emphasis on cross-functional teams, faci-litative leadership styles, and group problem solving Senior IT management com-mitment to project assuring peer directors in affected LOBs were aware and supportive Business/IT shared com-mitment to common goals Instituted business/IT joint strategy/planning sessions. Business informs IT/IT plans reflect business strategy. Joint study of business processes to produce new business model. IT leadership and communi-cation skills recognized as contributing to business suc-cess. Face to face negotiations within the CFGs. CFGs devel-oped common mental models.	Implementation of customer focus groups for shared business/IT respon-sibility and commitment to serve distinct business functions—ultimately responsible for systems requirements of a business function Demand and supply management: Demand: Operating Plan Management team manages business demands Supply: combination of IT professionals resident in business units; majority of operations outsourced. Participation in alliance for sharing industry-common development activities IT planning cycle followed business cycles with customer focus groups planning became single business/IT event	• IT being viewed as business team member • Approach helped break down organizational and communication barriers with internal stakeholders and outside vendors • Each CFG possessed required expertise to ensure successful application development • IT managers work in tandem with LOB managers assuring rationality and cohesiveness of all development efforts • New IT infrastructure improved corporate-wide communications: Global office initiative, technology downsizing, and outsourcing