

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

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**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.

**Keywords**

IT Governance, Decision-Making, Knowledge Management.

## 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 & 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, spanning 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 & 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 & Zmud, 2000; Weill & Broadbent, 1998), in order to share information and knowledge on decisions and performance of IT. The question remains, however, what type of *processes* 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 present study aims 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, and what models best explain the design and effectiveness of IT governance processes in contemporary organizations?*

The remainder of the paper is organized as follows. Section 2 describes the theoretical background and framework underlying this study, and Section 3 contains the case study rationale and research methodology. The case study results are presented in Section 4, with a discussion of the conclusions and implications in Section 5.

## 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 & Broadbent, 1998). This involves the identification and explication of the IT

business case, and the prioritization, selection and (post-) evaluation of IT decisions (Luftman & 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 & 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 & 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 & improvisation;
Decision-making Synchronization	Formalization & standardization; Explicit knowledge, articulate and accessible	Shared understanding & 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 & Iacinto 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 & Iacinto 1989; Iacono & 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 & 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 & Andreu, 2000).

Environmental contingencies are thus seen as important moderating variables (Eisenhardt, 1989; Fredrickson & Iacinto 1989; Goll & 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 & Iacinto (1989) indicate that successful decision-making in dynamic environments is associated with less comprehensiveness, Eisenhardt (1989) and Goll & Rasheed (1997) provide the opposite evidence.

## 2.2. IT Governance Processes under Environmental Dynamism: Research Model & 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, e.g., *Strategic Alignment Model* (Venkatraman et al. 1993), *SWOT analysis* (Rowe, 1996), *Critical Success Factors* (Zmud, 1979) *Balanced Scorecard* (Kaplan & Norton, 1996), *Information Economics* (Parker & 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 (multi-disciplinary) 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 & Broadbent, 1998). Previous empirical studies are, however, few and 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.

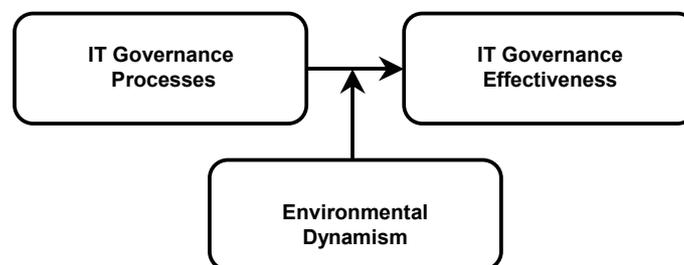


Figure 1. Research Model.

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 & Iacquinto, 1989; Goll & 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:

**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, 9 large complex organizations were selected across different industries operating in Europe, USA, 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).

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	> 10000	1	1	5	4
Company B	Financial Services	Europe	> 10000	1	1	4	4
Company C	Financial Services	Europe	> 3000	1	1	4	3
Company D	Financial Services	Europe	> 3000	1	1	4	5
Company E	Financial Services	Europe	> 3000	1	1	4	3
Company F	Health Care	Europe	> 1500	1	1	4	3
Company G	Health Care	Europe	> 1500	1	1	4	3
Company H	Utilities	USA	> 15000	1	1	4	4
Company I	Telecommunication	Canada	> 10000	1	1	4	4

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 & 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 & 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 & Broadbent, 1998; Willcocks et al., 1997; Vitale, 2001).

Table 3. Operationalization of Constructs and Sample of Interview Questions

Construct	Operationalization & Measurement		Sample Interview Questions
<b>IT Governance Process</b>	<b>Meth. Comp.:</b> Low, e.g.: Ad-Hoc problem analysis No Integration No use of formal methodology	<b>Soc. Cap.:</b> 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, and when conflicts arise, how are these solved?
	High, e.g.: Thorough problem analysis Tight integration Use of formal methodology	High, e.g.: Active conflict resolution ('confrontation strategy') Shared understanding	
<b>IT Governance Effectiveness</b>	<b>Business performance:</b> Low, e.g.: Low productivity, Lack of product innovation, Customer dissatisfaction	<b>IT operations:</b> 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	
<b>Environmental Dynamism</b>	<b>Cust. Actions:</b> E.g., variable customer demand for tailoring services, customer churn	<b>Comp. Actions:</b> E.g., new '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?
	<b>Suppl. Actions:</b> E.g., securing supplies, supplier collaboration, value chain integration	<b>Gov. Actions:</b> E.g. deregulation, new funding policies	

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.

#### 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, 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 as: *"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 integration 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, in developing a shared understanding and integrating business and IT decisions.

In the 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 '90s 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 inter-office memos, and 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 the 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/Mod.	High	High	High
G	Low/Mod.	High	Low	Low
H	High	High	High	High
I	High	High	High	High

Effective process mechanisms involve (a) a comprehensive analysis of the decision problem and the alternative solutions, (b) the use of tailored IT decision-making frameworks, (c) strategic experimentation through piloting and 'green fields', (d) the involvement of multiple stakeholder constituencies, and (e) 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).

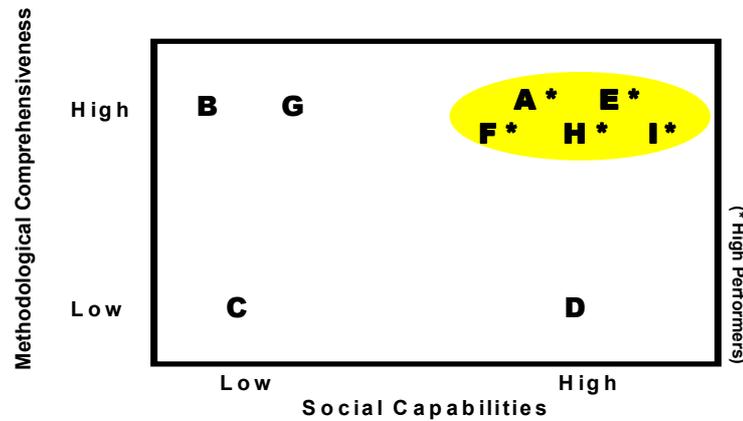


Figure 2. Interpretation of Methodological Comprehensiveness and Social Capabilities.

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 & 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 amongst 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, creating thereby a cycle of knowledge creation.

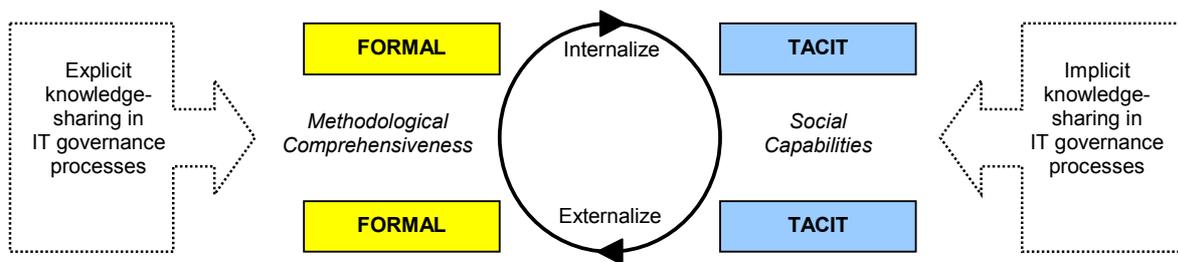


Figure 3. Knowledge creation and conversion in IT governance processes.

## 5. Conclusions

Whereas previous studies focused on the structural mechanisms of IT governance, the aim 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 of this study 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 (a) strategic integration and monitoring and (b) 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.

Particularly, 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.

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Appendix A. Summarized description of case studies results.

Case Study	Environmental Dynamism	Decision-making Sophistication	Decision-making Synchronization	Decision-making Structure	
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	Implement Internet-b Improved streamlini Business evaluation
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 de Low syste Infrastruc Struggling Corporate conflicts,
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 de Low syste 'Patchy' I Low prod Low proc of existing Business performan director's
D	Meeting changing and demanding customer needs considered as strategic uncertainties. Developing pan-European 'bancassurance' 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 de IT infrastr Non-respo Marginal No signific Business organizati
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 and 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 bu Internet-b CRM syste Improved. Product in Business level of in
F	Deregulation and collaboration 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	Institution Videecon Process-b Organizat Restructur Corporate satisfied; Concerne
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 & 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 de IT legacy Electronic terminated Cultural le Change m Physicians involvement Financial resources
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;  Co-locate 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 Bu understan at all leve supply ma The result an almost IT/ Busin competiti Successful infrastructure facilities,
I	Organization faces an immediate and fundamental 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.	Net present value calculations  IT project ranking mechanisms based on Information Economics;  Traditional financial reports and Balanced Scorecard  Plans and schedules developed by Customer	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	Implementation of customer focus groups for shared business / IT responsibility 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	IT being v Approach communic outside ve Each CFO successful IT manag rationality New IT ir

	<p>Focus on redefinition of markets, customers, services.</p>	<p>Focus Groups (CFGs) and reviewed/approved by upper management;</p>	<p>teams, facilitative leadership styles, and group problem solving;</p> <p>Senior IT management commitment to project assuring peer Directors in affected LOBs were aware and supportive. Business/IT shared commitment to common goals;</p> <p>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</p> <p>IT leadership &amp; communication skills recognized as contributing to business success. Face to face negotiations within the CFGs. CFGs developed common mental models.</p>	<p>Supply: combination of IT professionals resident in business units; majority of operations outsourced. Participation in alliance for sharing industry-common development activities;</p> <p>IT planning cycle followed business cycles; with customer focus groups planning became single business/IT event;</p>	<p>communicati downsizin</p>
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