

Designing Information Technology Governance Processes: Diagnosing Contemporary Practices and Competing Theories

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Abstract

Whereas previous studies have been primarily focused on the structural features of Information Technology governance, this paper describes an exploratory study of IT governance processes. Rooted in competing theories of organizational decision-making, and based on a case study investigation of large complex organizations, this paper examines the design and effectiveness of IT governance processes from both rational and social perspectives. The results indicate that, regardless of the level of environmental dynamism and turbulence, effective IT governance processes are characterized by both methodological comprehensiveness and social interventions, involving strategic integration of business and IT decisions, and building collaborative relationships and shared understanding among key stakeholders. The implications of these results for research and practice are outlined.

1. Introduction

Traditionally, research on Information Technology (IT) governance has focused on the design of decision-making structures for the control of IT [3,34]. These studies indicate that a federal IT governance structure, i.e., a hybrid design of centralized infrastructure control and decentralized application control, is the dominant model in many contemporary enterprises. However, in current hypercompetitive environments and with the emergence of new electronic network organizations [11], the classical hierarchical design of IT governance becomes obsolete and inadequate to deal with the information processing and coordination demands posed [13,35].

Under these conditions, IT governance is based on *lateral* decision-making *processes* across corporate and local business and IT decision-making units. The process dimension of IT governance gains importance in

developing strategic flexibility for sustaining strategic advantage.

The orientation of IT governance shifts from the differentiation of IT decision-making structures, toward the integration of IT decision-making structures in order to maximize value appropriation from IT [24,40]. Research indicates that organizations use a number of *structural* alternatives for IT governance, involving e.g., cross-functional management teams, IT committees, co-location, cross-training, and job-rotation [17,25,27,40].

The question remains, however, what *process* mechanisms are required for IT governance in contemporary business conditions. Previous studies have focused primarily on the structural mechanisms, while overlooking or failing to recognize the importance of process mechanisms involved in the governance of IT. As a result, we have a partial and limited understanding of IT governance and its mechanisms in contemporary organizations. Subsequently, we are ill prepared for shaping appropriate insights on effective practices within enterprises.

The present study aims to fill this void in empirical research by addressing the procedural and social mechanisms of IT governance, thereby providing an enriched understanding of the *processual* nature of IT governance mechanisms. The main research questions are:

- *How do contemporary organizations design IT governance processes to integrate business-IT decision-making?*
- *What theories best describe and 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 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 [40]. This involves the identification and explication of the IT business case, and the prioritization, selection and (post-) evaluation of IT decisions [17,39]. At the conceptual core of IT governance processes, is an organizational model of decision-making, defined as the process of identifying and solving problems [6]. *Problem identification* [monitoring external and internal environments to determine performance disturbances and diagnose deficiencies] and *problem solution* [developing, selecting and implementing alternative courses of action] are the basic stages in any kind of organizational decision-making [6,22]. The organizational model of decision-making describes a cyclical process of intermediate and iterative steps (Figure 1).

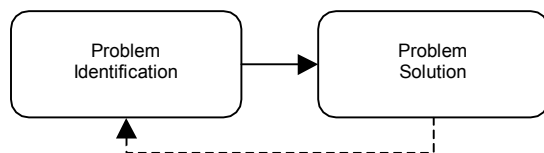


Figure 1. Organizational model of decision making.

Literature on organizational decision-making describes two competing theories for effective decision-making in hypercompetitive environments (Table 1). Hypercompetitive environments are described as dynamic and turbulent environments, characterized by frequent and unpredictable changes in stakeholder expectations and actions [7,19,33]

The competing theories for organizational decision-making are rooted in rational-analytical and social-political schools of organization theory [5,18,28]. 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. '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 [1,6,33]. The organizational logic is that meticulous analysis provides greater knowledge, and thus more effective decisions.

In contrast, the social-political school describes organizations and decision-making as a 'pull' and 'push'

between stakeholders, based on negotiation and coalition building, in which multiple ambiguous goals exist [5]. The social-political school emphasizes an incremental approach in which coalition building and strategic experimentation are regarded as pivotal. Advocates of 'social interventions' suggest that, whereas in stable and placid environments methodological-comprehensiveness can be effective [12], 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 [4,12,21]. Proponents of 'social interventions' contend that the experiences and shared - negotiated - understanding among key stakeholders is essential to effective decision-making processes.

Table 1. Competing models of organizational decision-making.

| Decision-making Features | Methodological Comprehensiveness | Social Interventions |
|--------------------------|---------------------------------------|--------------------------------------|
| <i>Sophistication</i> | Comprehensive Analytical Tools | Experimental Experiential Knowledge |
| <i>Integration</i> | Formal & Documented | Mutual understanding & collaboration |
| <i>Organization</i> | Select representation of stakeholders | Social network of stakeholders |

Environmental contingencies are thus seen as important moderating variables [8,10,12,15,21]. The suggested relationships between environmental contingencies and the appropriate organizational model for decision-making are graphically depicted in Figure 2.

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 & Iaquinto [12] indicate that successful decision-making in dynamic environments is associated with less comprehensiveness, Goll & Rasheed [15] provide the opposite evidence.

| | Methodological Comprehensiveness | Social Interventions |
|----------------------------|----------------------------------|----------------------|
| Low Dynamism & Turbulence | Effective | Ineffective |
| High Dynamism & Turbulence | Ineffective | Effective |

Figure 2. Environmental contingencies and effective decision-making.

A similar dichotomy exists with regard to IT governance processes. Advocates of methodological comprehensiveness argue for the comprehensive analysis

and formal integration of IT decisions through the use of different management tools and frameworks across different stages of decision-making [14,16,29,36]. Examples of IT decision-making methodologies and frameworks include: *Strategic Alignment Model* [38], *SWOT analysis* [31], *Critical Success Factors* [31], *IT Balanced Scorecard* [37], *Information Economics* [26], and *Scenario Analysis* [14].

A different and competing theory suggests that methodological comprehensiveness is inappropriate for addressing the uncertainties and ambiguities that arise in IT governance processes [33]. Instead, what is called for is the reliance on the experiences and expertise of different stakeholders, and the development of shared understanding and collaborative partnerships between business and IT constituencies [33,40].

The results from previous studies are, however, few and inconclusive. Whereas Pyburn [30] provides evidence that less comprehensive decision-making was more effective in turbulent environments, Salmela et al. [32] indicate that less comprehensive IT decision-making is not more successful in turbulent environments.

In conclusion, while organization theories suggest that effective decision-making in dynamic and turbulent environments is associated with social interventions, previous studies relating to IT governance are too few and inconclusive in order to draw any definitive conclusions. Moreover, no studies have been conducted that simultaneously include two competing theoretical lenses on the appropriateness of IT governance processes.

Therefore, consistent with previous organization studies [8,10,12,15,21], this study posits that environmental contingencies will moderate the relationship between IT governance processes and IT governance outcome (Figure 3).

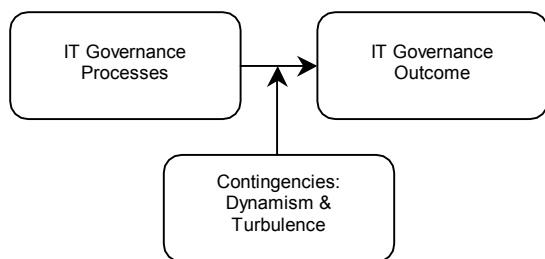


Figure 3. Theoretical framework.

Specifically, the following propositions are suggested:

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

Proposition 2: *Effective IT governance processes in environments of low (high) dynamism and turbulence are associated with low (high) social interventions IT decision-making.*

3. Research Design

Due to the complex, contextual and contemporary nature of IT governance processes, and the lack of a cumulative research base, a case study research design was deemed appropriate [2,41]. The specific research design is an exploratory multiple case study approach. In total, 9 large complex organizations (staff over 1000 and multiple operational units) were selected across different industries operating in Europe and North America (Table 2). The case studies were purposely sampled across industries to reflect variability in environmental contingencies.

Table 2. Case study demographics.

| Case Study | Industry | Geographic Location | Company Size |
|------------|-------------|---------------------|--------------|
| B1 | Banking | Europe | > 10000 |
| B2 | Banking | Europe | > 10000 |
| I1 | Insurance | Europe | > 3000 |
| I2 | Insurance | Europe | > 3000 |
| I3 | Insurance | Europe | > 3000 |
| H1 | Health Care | Europe | > 1500 |
| H2 | Health Care | Europe | > 1500 |
| U | Utility | USA | > 15000 |
| T | Telecom | Canada | > 10000 |

In order to assess environmental contingencies, dynamism and turbulence are operationalized as the level of perceived unpredictability and variability in the actions of customers, competitors, suppliers and government agencies [8,10,19].

Decision-making mechanisms are operationalized following the different decision-making features, i.e., sophistication, integration and organization (See Figure 2), and their distinct operationalizations [6,12,21,32,33].

The dependent construct, IT governance outcome, is operationalized as [39,40]: IT success (the perceived contribution of IT to business goal-attainment), and IT satisfaction (stakeholder satisfaction with IT operations, and the IT contribution to business performance improvement).

Data collection was conducted through interviews with business and IT executives, and the analysis of company documents, including, business and IT plans. A semi-structured interview protocol was used in all interviews. Furthermore, memos regarding IT decisions and IT decision-making were also analyzed, and compared with interview responses. 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 [9,41]. The cases are clustered around the results of the dependent construct and patterns of similarities and differences within and across clusters of independent and moderating constructs are analyzed. The findings are analyzed against the explanations offered by the theoretical framework and the 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).

4.1. Environmental Conditions

The case study results indicate that executives perceive different degrees of unpredictability and variability in the organization's direct environment. The banking and insurance organizations perceive the environment as relatively more dynamic and turbulent, in comparison to health care organizations. Common sources of uncertainty reported by banking and insurance 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 the health care organizations 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. Quality was never really a big issue. Yet, 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".

Utility (case U) is a large electric utility operating in the US that continues to prosper despite many changes. Over the past decade, it 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. In an industry currently

undergoing radical change this century old company faces the challenge of sustaining competitive fit with its external environment. The strategies developed triggered profound changes in both the business and IT functions.

Telco (case T) is among the largest long-term suppliers of telecommunication services in Canada. It underwent transformation from a public to a private corporation. The transformation resulted in an increase of accountability for fiscal performance and the preparation for competition in key market segments formerly operated as a monopoly. For the IT function, the transformation triggered downsizing and outsourcing while protecting critical skills, forming strategic alliances, and creating an infrastructure to link the company with major suppliers and alliances partners.

4.2. Decision-making Sophistication

Regarding decision-making mechanisms, all organizations use frameworks or management support tools for IT decision-making. The results indicate, however, that while the banking, insurance, telecommunications and utility cases use relatively 'new' management tools, such as, BSC and IE, the health care organizations use more 'traditional' management tools, including SWOT and CSF. As a health care director explains: *"I have heard of the Balanced Scorecard and Information Economics, but we have always used critical success factors in the organization, and people understand what I mean. We always attempt to identify the critical success factors for our IT initiatives. If I start talking about 'BSC' with physicians and medical staff, they might think I am talking about some new kind of disease"*.

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 Health 2 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"*.

The Banking, Insurance, Utility and Telecommunication companies on the other hand do use BSC and IE, often integrated and tailored to the existing business decision-making practices. *Bank 1, Insurance 3, Utility, and Telecommunication* use a similar decision-making framework based on the integration and combined use of BSC, IE and CSF (Figure 4).

In the *Utility* case 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, and a total score is calculated.

| | | | | |
|--|-----------|-----------|-----------|-------------|
| Business Value Propositions: | | | | |
| <ul style="list-style-type: none"> ➤ Financial Perspective; ➤ Operational Perspective; ➤ Growth Perspective; ➤ Customer Perspective: | | | | |
| <ul style="list-style-type: none"> • CSF: Service Quality; • CSF: Satisfaction: | | | | |
| <ul style="list-style-type: none"> - Measure 1: % Customer Satisfaction; - Measure 2: % Customer Retention; - Measure n: % | | | | |
| | Measure 1 | Measure 2 | Measure n | Total Score |
| Project X | ... | ... | ... | ... |
| Project Y | ... | ... | ... | ... |
| Project Z | ... | ... | ... | ... |

Figure 4. Example of BSC-CSF-IE integration.

Bank 1 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 lead to several possible changes in the organization structure. These possible ‘organizational futures’ are then discussed among business and IT stakeholder in special IT scenario workshops organized by the corporate IT office. The *Utility* company also embraced the scenario-based planning philosophy and developed a set of global scenarios for business planning. Management wanted to prepare for future uncertainties by considering a number of alternative scenarios and prepare strategies in response to each. Finally they wanted to understand the options, so that any planning kept future strategies unencumbered. Since they do not know which one, if any, of the plausible scenarios will happen, they focus on the development of a flexible business action plan that addresses each of the global scenarios. 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 IT function is responsible for technology scanning as input to the scenarios for the entire utility, not just for information technologies. For its own strategic planning, the IT function applies the demand articulation along with the applied business strategic elements and applies them to its own *strategic systems elements* (i.e., staffing and those hardware and software systems that link to,

and support each of the strategic systems elements), identifying new requirements, possible limitations, and options.

4.3. Decision-making Integration

The cases illustrate different levels and forms of decision-making integration, ranging from formalized procedures for the integration of business and IT decision-making (i.e., *Bank 1*, *Insurance 3*, *Health 1*, *Health 2*, *Utility and Telco*), to informal socialization and shared understanding between business and IT stakeholders (i.e., *Bank 1*, *Insurance 3*, *Health 1*, *Utility and Telco*).

In *Bank 1* and *Insurance 3*, 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, *Bank 2*, *Insurance 1* and *Insurance 2* are characterized by loose, sequentially integration IT decision-making. Business decisions are leading in IT decision-making, and the impacts on business decisions 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 the case of *Insurance 3* and *Health 1*), or is influenced by the individual leadership actions of a single stakeholder (in the case of *Bank 1* and *Telco*). In the latter cases, the CIO played 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 *Utility* case, 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 ‘80s the IT business orientation grew. New linking devices were initiated, but still on an operational level (e.g., emphasizing business skills of IT professionals). During the 90s the charter of IT was consistency with the overall strategic direction of the business goals. It became clear that adequate linking required a whole array of mutually supporting devices. On a strategic level, with the CIO as a member of the

executive team, IT plans became an integral part of business plans. Company U evolved to a team environment where business and IT professionals work together. The skill set of the IT professionals also evolved emphasizing soft skills and business skills in addition to technical skills, contributing to an effective functioning of those teams.

In the *telecommunication* case, the primary change vehicle was a new emphasis on team skills. 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. The traditionally separate development and support organizations created Customer Focus Groups enabling both functions to work towards a common understanding within a consistent frame of reference. 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 (newly appointed) CIO had a crucial role in bringing about the integration. He clearly defined the vision for IT and communicated it throughout the organization.

4.4. Decision-making organization

Regarding decision-making organization, 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 *Bank 1, Insurance 3, Health 1, the Utility and Telecommunication* case. Select stakeholder constituencies from predominantly corporate and IT groups are involved in *Bank 2, Insurance 1, Insurance 3, and Health 2*. 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. At *Insurance 2*, the IT director states: *"If once there was ever some kind of collaboration with business management, the situation is currently off to the worse. In the past, business managers were involved in the IT decision-making, but over the years, they have become less committed due to numerous project and system failures. This has led to IT management taking control over the processes again, sometimes by mere default. Business no longer wants to do it, we think they should do it, and in the end, we end up doing it anyway. Why? Well, just to make sure that we don't get blamed again for all of the failures. It's a strange world sometimes..."*

4.5. IT Governance Outcome

Analysis of the case studies indicate that companies differ in levels of IT success and satisfaction. Based on the case evidence (Table 4), *Bank 1, Insurance 3, Health 1, the Utility and Telecommunication* case are characterized by relatively high levels of IT success and satisfaction (Table 3). In contrast, *Bank 2, Insurance 1, Insurance 2, and Health 2* are characterized by relatively low levels of IT performance and satisfaction. The results indicate that effective IT governance processes in dynamic and turbulent environments are characterized by high methodological comprehensiveness and high social interventions, thereby providing *no support for proposition 1*.

Table 3. Analysis of environmental contingencies, IT governance processes, and IT governance outcome.

| Case | Dynamism / Turbulence | Method. Compreh. | Social Interven. | IT Success / Satisfaction |
|------|-----------------------|------------------|------------------|---------------------------|
| B1 | High | High | High | High |
| B2 | High | Low | Low | Low |
| I1 | High | Low | Low | Low |
| I2 | High | Low | Low | Low |
| I3 | High | High | High | High |
| H1 | Low/Mod. | High | High | High |
| H2 | Low/Mod. | High | Low | Low |
| U | High | High | High | High |
| T | 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 (*Bank 1, Insurance 3, Utility and Telecommunication*). Likewise, effective IT governance processes in relatively stable and less turbulent environments are also characterized by high methodological comprehensiveness and high social interventions, thereby also providing *no support for proposition 2*. The process mechanisms are similar to the process mechanisms used for IT governance in dynamic and turbulent environments.

Using the organizational model of decision-making (Figure 1), the combination and integration of methodological comprehensiveness and social interventions at *Bank 1, Insurance 3, Health 1, Utility and Telecommunication* is graphically illustrated in Figure 5.

According to executives in all five organizations, the first step is *collectively* recognizing and agreeing on the problem situation. A senior executive at *Insurance 3* indicates: *"Some sort of agreement among the managers regarding the issues and objectives needs to exist before we can do anything. Usually this occurs in a very*

informal fashion. I pick up the phone, discuss my plans with the IT director. Then we often plan a meeting with other managers to see what they think and what their experiences are. In this manner we develop involvement, a shared sense of the problem, and commitment for the shared objectives”.

At Bank 1, a senior executive indicates that every year there is a ‘vision workshop’ in which new business and IT trends are discussed. Different scenarios are proposed, criticized, and jointly developed by business and IT managers. Based on the different scenarios, alternative courses of action are assessed and discussed among the workshop participants.

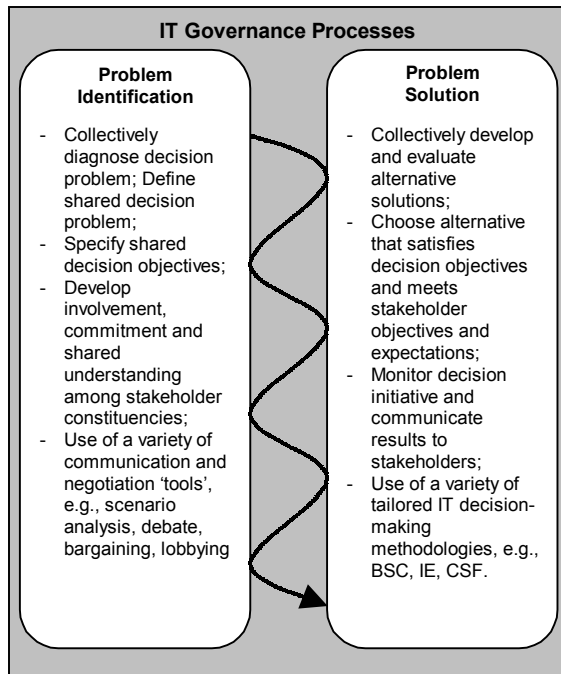


Figure 5. Integration of methodological comprehensiveness and social interventions in IT governance processes.

The case study results indicate that without some sense of shared objectives, or minimal conflict resolution between stakeholder constituencies, the problem solution stage will only lead to partial and partisan solutions, that 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. In this manner, problem identification and problem solution are mutually interdependent, through which stakeholders iteratively cycle through over time.

Effective IT governance processes are thus characterized by a hybrid approach of both methodological comprehensiveness and social interventions. Similar to the dominance of hybrid IT governance structures in contemporary organizations, the case study results indicate that effective IT governance processes in contemporary organizations are characterized by comprehensive analysis and comprehensive shared understanding of business-IT decision objectives, solutions, and initiatives.

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, subjective measures, limited generalization - although not the purpose of this study -, the results of this study hold important implications for both theory and practice.

From a theoretical perspective, the dichotomy between methodological comprehensiveness and social interventions 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* of methodological comprehensiveness and social interventions, 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.

The predictive power of these competing theories is, at the least, questionable. The case study results suggest that these theoretical insights are inadequate in shaping appropriate insights for contemporary practices on IT governance mechanisms 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. More in-depth case studies across a variety of industries, as well as, a large-scale survey of enterprise practices would provide valuable insights. Furthermore, 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 costs, benefits and risks, is unlikely to lead to a satisfactory result. 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 & Turbulence | Decision-making Sophistication | Decision-making Integration | Decision-making Organization | Outcome |
|------------|--|--|---|---|--|
| B1 | 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 |
| B2 | Change in customer demands, and collaboration with other European financial institutions perceived as sources of significant uncertainty. | Ad-hoc analysis: Problem solution BSC, IE, CSF Scenario analysis | 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 |
| I1 | 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, CMM | 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 Information architecture problematic Low productivity, no efficiency gains Low process and product innovation, only 'maintenance' of existing products Business & IT executives dissatisfied with low IT performance and 'heavy top-down' approach by the director's IT office |
| I2 | Meeting changing and demanding customer needs considered as strategic uncertainties. Developing pan-European 'bancassurance' networks causing fundamental changes | Thorough analysis: Problem identification and solution integration BSC, IE, CSF, CMM | Loose integration of business and IT decisions Multiple informal memos Negotiation, Lobbying, Existing stakeholder conflicts and lack of commitment | Select stakeholders Involving the CIO and the IT investment manager | Project delays and overruns IT infrastructure legacy Non-responsive IT delivery Marginal productivity improvement No significant product innovation Business executives unsatisfied, and blame the IT organization for low performance |
| I3 | 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 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 |
| | Deregulation and collaboration with other health care and medical clinics | Thorough analysis Problem identification and solution | Tight integration of business and IT decisions | Multiple stakeholders | Institutionalized of patient-information-sharing. |

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|-----------|--|---|---|--|---|
| H1 | perceived as a source of some uncertainty. No competitive threat, nor unpredictable patterns in customer demands | integration SWOT, CSF, Scenario analysis Pilot studies and experimentation | Formal documented IT decisions Negotiation, Lobbying Shared understanding among key stakeholders | Involving corporate, IT and local constituencies, including physicians, R&D staff | Process-based, patient oriented organization Videoconferencing based consultations Organizational change strategy implemented Restructuring towards a networked care provider Corporate director, division managers and medical staff satisfied. Concerned, however, about future funding. |
| H2 | 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 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 |
| U | 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 (value scorecard / management dashboard); 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 responsible for technology scan. | 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 equipment, suppliers and customers. |
| T | 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. Focus on redefinition of markets, customers, and 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; IT leadership & communication skills recognized as contributing to business success. | New CIO focused efforts by outlining vision, organizing major players, ensuring funding, informing affected departments and resolving conflicts Management emphasis on cross-functional teams, facilitative leadership styles, and group problem solving; Business/IT shared commitment to common goals; Instituted Business / IT joint strategy/ planning sessions; Joint study of business processes to produce new business model | 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 - Supply: combination of IT professionals resident in business units; majority of operations outsourced. Participation in alliance for sharing industry-common development activities; | 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 & cohesiveness of all development efforts; New IT infrastructure improved corporate-wide communications: Global office initiative; technology downsizing and outsourcing |

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|--|---|
| | <p>Face to face negotiations within the CFGs.</p> <p>IT training in inter-personal communications, team skills and facilitative leadership.</p> <p>IT planning cycle followed business cycles; with customer focus groups planning became single business/IT event;</p> |
|--|---|