Understanding IT Governance

Towards Dimensions for specifying Decision Rights

Andreas Roland Schwertsik, Petra Wolf, Helmut Krcmar

Lehrstuhl für Wirtschaftsinformatik (I17),
Technische Universität München

1 Introduction

Typically IT decisions are of enterprise wide importance as IT increasingly supports business processes. On the one hand Information Systems (IS) are part of complex social and organizational processes, affecting financial, technological and social issues (Serafeimidis/Smithson 2003). On the other hand process orientation and service orientation (Grohmann 2003; Meyer/Zarnekow/Kolbe 2003) require more and more effort regarding integration and coordination between different parts of an organization. The more complex the coordination setting gets the more problems and challenges regarding interfaces emerge. Intransparent structures and intransparent IT processes are only one consequence. An overall augmentation regarding the significance of IT governance can be observed as effective IT governance can help to cope with these challenges (Weill/Ross 2004). IT governance assists with establishing value orientation, process orientation, service orientation and risk management (Meyer/Zarnekow/Kolbe 2003).

Further motivation for establishing well defined IT governance structures and processes results from corporate governance and compliance requirements such as strategic IT/business alignment and IT resource management. Frameworks like the IT Infrastructure Library (ITIL) and Control Objectives for Information Related Technology (CobiT) and standards like ISO 20000 gain more and more recognition (Kozlova 2008) thus supporting the idea of establishing well defined IT Governance structures and processes.

The reported governance challenges are reinforced by the fact that organizational forms built of centralized and decentralized units become progressively important in practice (Burke 2007). In large and complex multiunit organizations with interdependent information resources, conflicts and coordination difficulties are

likely to occur. Tsai (2002) for example describes the phenomenon of "coopeti-tion": Subunits of large multiunit organizations, which are supposed to cooperate become competitors concerning internal resources and are therefore likely to reject information sharing.

Commonly found IT decisions in practice comprise for example strategy, secu-rity, software engineering, or IT architecture. Whilst the importance of alignment and the supporting role of IT governance to reach alignment are widely accepted, existing literature focuses rather on the outcome of IT governance – IT/Business alignment - than on the underlying structures and processes. As a consequence, the described types of governance remain rather generic. How exactly they are imple-mented in practice is not known.

The aim of this paper is therefore to derive dimensions for specifying decision rights from a literature review and in consequence contribute to a better under-standing of IT governance.

The paper is guided by the following research question: What dimensions need to be taken into account for specifying decision rights?

2   Literature Review

Conducting the literature review we built on the notion that previous information systems (IS) research on IT governance can be classified according to two major research streams: IT Governance Forms on the one hand and IT Governance Contingency Analysis on the other hand (Brown/Grant 2005). As a consequence we divided our review in these two streams, too. In addition we searched for litera-ture on business/ IT alignment which we found to be the source of the ongoing centralization-decentralization debate.

2.1   A Gap between Business and IT

From the very beginnings of IT use in organizations there has been trouble in the relationship between the IT function and the business. The most predominant among the reported issues are lacks of standardization and interfaces preventing from economies of scale and leading to a maximum of complexity. Similar issues are reported in literature and ascribed to cultural differences between the business function and the IT function (Ward/Peppard 1996). Henderson/Venkatraman (1999) consequently state that there is a lack of alignment between business and IT. Their Strategic Alignment Model is the most dominant concept regarding alignment in current literature. The model defines four fundamental domains of strategic choice: business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes. Strategic integration characterizes the fit between business strategy and IT strategy taking into account external do-mains and shows the ability of the IT function to support and influence the busi-

ness. Operational integration describes the internal domains concerning the link between organizational infrastructure and processes and IS infrastructure and processes. It deals with organizational requirements on the one hand and the delivery capability of the IT function on the other hand. Changes in one part of the model will lead to changes within the other parts thus making strategic alignment a "process of continuous adaptation and change". Therefore effective management requires a balance of decisions in all four domains (Henderson/Venkatraman 1999). Table 1 summarizes IT governance aspects derived from strategic alignment needs.

Table 1: Governance aspects derived from strategic alignment needs

Governance aspects from strategic alignment needs
• Culture (Ward/Peppard 1996)   • Business strategy (Henderson/Venkatraman 1999)   • IT strategy (Henderson/Venkatraman 1999)   • Organizational infrastructure and processes (Henderson/Venkatraman 1999)   • IT infrastructure and processes (Henderson/Venkatraman 1999)

2.2 IT Governance as a Means to bridge the Gap – IT Governance Forms

One way to reach strategic alignment and to bridge the gap between business and IT lies in the way companies govern their IT: Weill/Ross (2004) report that companies with effective IT governance have profits that are 20 % higher than the profits of companies pursuing similar strategies. Starting from the fact that IT governance and its underlying structures can be classified by the location, where IT decisions are taken they distinguish six types of decision structures from centralized decisions to decentralized decisions:

- Business monarchy: Decisions taken by a member of the management or a group of managers,
- IT monarchy: Decisions taken by the IT director or a group of IT directors,
- Federalism: Decisions taken by executives of the middle management of all operative divisions; the integration of the IT direction is also considered,
- IT duopoly: Decisions taken by IT direction and a group of members of the management,
- Feudalism: Decisions taken autonomously by respective divisions,
- Anarchy: Decisions taken autonomously by user or a group of users.

No matter what decision making type an enterprise has chosen, its IT governance is regarded as effective if it is contributing to cost effective use of IT, effective use

of IT for asset utilization, effective use of IT for growth, and effective use of IT for business flexibility. In order to reach such effectiveness Weill/Ross (2004) propose to consider five decision domains namely IT principles, IT architecture, IT infrastructure strategies, business application needs, and IT investments. In each domain different decision structures are possible. These structures are to be supported by a set of governance mechanisms such as committees, budget processes, or service level agreements. But no certain set of mechanisms can be recommended to all organizations. Organizations focusing on profit tend to follow a centralized governing approach, organizations concentrating on growth a decentralized one, and organizations with the goal of asset utilization a federal one (Weill/Ross 2004). What are the reasons for different organizations to choose different governance types on the centralization-decentralization-continuum?

Apart from the centralization-decentralization debate there exists a multiplicity of work which deals with IT governance from a predominately prescriptive point of view. This literature has already described a variety of aspects regarding IT governance which need to be taken into consideration: Decision rights and accountabilities cannot be universally specified (Krcmar 2009), but are influenced by organizational (Grohmann 2003; Rau 2004; Peterson 2004; Weill/Ross 2004), judicial (Tjoa/Karagiannis 2005; Kozlova 2008), economical (Grohmann 2003; Peterson 2004; Rau 2004; Tjoa/Karagiannis 2005; Kozlova 2008), and technical (Grohmann 2003; Peterson 2004; Weill/Ross 2004; Tjoa/Karagiannis 2005; Kozlova 2008) conditions of an organization. In addition to that IT governance is a subject emerging over time.

Whilst decentralized IT decisions are seen as the key to reach high IT/ business alignment, central decision making is seen as the gatekeeper for realizing economies of scope and scale (Peterson 2004).

In order to reach effective IT governance a systemic approach is discussed: Systemic IT governance comprises culture, structure, internal economy, methods and tools as well as metrics and rewards which characterize an organization (Meyer 2004). Peterson (2004) develops an IT governance assessment process model which allows to evaluate IT governance effectiveness in terms of IT governance value drivers, IT governance complexity, and IT governance capabilities. He concludes that in order to be effective, IT governance has "to coordinate and integrate formal and informal IT decision-making authority across business and IT stakeholder communities". Rau (2004) agrees, saying that "organizational readiness and stakeholder participation are critical success factors for a new IT governance implementation". In addition, reference models like ISO 20000, ITIL and COBIT are discussed as a valuable support for the introduction of IT governance (e.g. ITGI 2003; Johannsen/Goeken 2007).

Whilst the term IT governance is mainly used in Anglo-American literature, in German literature similar topics are discussed using the term IT controlling (see Schauer 2006). IT controlling according to Krcmar (2009) means the controlling of IT in the organization. Its main aim is to ensure the formal objectives efficiency

and effectivity, but also the non-formal objectives quality, functionality and compliance to deadlines in information processing. Thereby it has not only a pure monitoring function but also a coordination function for the whole information management. Consequently, an institutional view and a functional view of controlling are to be distinguished (Britzelmaier 1999). In literature, a multiplicity of different controlling conceptions is discussed, which put their emphasis differently depending on their application field. For instance profit-oriented, reporting system oriented or key figure oriented and coordination oriented controlling conceptions are to be differentiated (e.g. Küpper 2005; Horvàth 2006; Reichmann 2006). Recently published literature on controlling also mentions information oriented and behaviour oriented controlling conceptions which open possibilities to control multiunit organizations. In this context organizational theories such as agency theory, transaction costs or the gaming theory are discussed (Schaefer 2008).

For an aggregation of governance aspects which can be derived from literature on IT Governance Forms see Table 2.

Table 2: Governance aspects derived from IT governance concepts

Governance aspects from IT governance concepts
• IT principles (Weill/Ross 2004)
• IT architecture (Weill/Ross 2004)
• IT infrastructure strategies (Weill/Ross 2004)
• Business application needs (Weill/Ross 2004)
• IT investments (Weill/Ross 2004)
• Mechanisms (committees, budget processes, SLA) (Weill/Ross 2004)
• Organizational conditions, judicial conditions, economical conditions, technical conditions (Grohmann 2003; Rau 2004; Peterson 2004; Weill/Ross 2004; Tjoa/Karagiannis 2005; Kozlova 2008)
• Culture, structure, internal economy, methods and tools, metrics and rewards (Meyer 2004)
• Value drivers, complexity, capabilities (Peterson 2004)
• Organizational readiness, stakeholder participation (Rau 2004)
• Reference models (ITGI 2003; Johannsen/Goeken 2007)

2.3 IT Governance as Consequence of Contingency Factors

Researchers investigated different contingency factors (key drivers) affecting an organization's decision to choose a certain IT governance type. Starting from the awareness that management of IT consists rather of two components, the management of technology and the management of the use of technology, researchers and practitioners came to the conclusion that different IT management constellations regarding the IT governance structure are possible (Brown/Magill 1994): Whilst centralized IT governance is accredited to contribute to economies of scale and standardization, decentralized approaches provide greater responsiveness to business units needs. Brown/Magill (1994) applied the contingency theory in order to explain an organization's design decision for a decentralized, centralized or federal IT governance. They wanted to know, which contingency factors best explained different IT governance implementations. First they confirmed by a qualitative study in six multi-divisional organizations that all three types of governance exist in practice and can be effective. In addition they defined several contingency factors using the data from the qualitative study and the results of a literature review. In order to determine the importance of the drivers they conducted a quantitative survey. Based on the findings they developed a model of how to govern IT depending on the contingency factors of an organization. The contingency factors include industry (weak predictor), firm size, corporate or business level strategy, structural variables, business unit autonomy, and a contingent pattern of corporate strategy, firm structure and business unit autonomy. The model aims at a better alignment between business and IT. In their conclusions the authors state that even within a singular organization different governance constellations are possible. They therefore suggest that further research on the topic ought to include data collection by interviews. Moreover IT governance is a subject emerging over time and is characterized by "pendulum swings". In consequence changes in the IT governance structure require horizontal linking mechanisms (e.g. steering committees), human resource management mechanisms and an appropriate leadership role (CIO). Brown and Magill (1994) conclude that additional research regarding the structures and processes of these mechanisms is necessary.

Sambamurthy/Zmud (1999) complement the research of Brown/Magill (1994) investigating types for information technology governance and the location where IT decisions are taken (central, decentral, federal). Between these types of decision taking several variations are possible. According to them, decisions are to be taken regarding IT infrastructure, IT use and IT project management. In contrast to prior research they use the theory of multiple contingencies to provide explanations of how several contingency forces actively influence firms' IT governance types. They state that rather multiple contingencies than singular contingencies in isolation influence the mode of IT governance of an organization. Multiple contingencies can be reinforcing, conflicting, and dominating. In order to show that each

of theses possibilities influences a particular type of IT governance, they conducted a literature review and an empirical study in eight organizations. However the literature review results in similar contingency factors (key drivers) as the research of Brown/ Magill (1994). These factors are summarized in three categories: corporate governance, economies of scope and absorptive capacity (ability of employees to develop relevant knowledge and make appropriate decisions). As result Sambamurthy/Zmud (1999) show that reinforcing and dominating contingencies – depending on the specific driver – either lead to centralized or decentralized IT governance. In the case of reinforcing contingencies several drivers lead to the same type of IT governance, in the case of dominating contingencies drivers may be conflicting but one single driver dominates and leads to the outcome. Conflicting contingencies often lead to federal IT governance and are considered as most interesting for research. The authors suggest future researchers to focus on changing organizations and to investigate several organizations of one industry. The question how coordination mechanisms are utilized along with the locus of decision rights is regarded as most fascinating question for future research (Sambamurthy/Zmud 1999).

The contingency research provides answers on why an organization would tend to choose a certain type of IT governance. But still it is not known, how a certain type is really implemented in practice and what structures and processes are used to execute a certain governance type.

The governance aspects resulting from (multiple) contingency theory are shown in Table 3.

Table 3: Governance aspects derived from (multiple) contingency theory

• Governance aspects from contingency theory (Brown/Magill 1994)	• Governance aspects from multiple contingency theory (Sambamurthy/Zmud 1999)
• Industry • Firm size • Corporate or business level strategy • Structural variables • Business unit autonomy • Pattern of corporate strategy, firm structure, and business unit autonomy • Horizontal linking mechanisms • Human resource management mechanisms • Appropriate leadership role (CIO)	• IT infrastructure • IT use • IT project management • Corporate governance • Economies of scope • Absorptive capacity

3   Towards Dimensions for specifying Decision Rights

The short review of the most prominent research results on IT governance shows that there has been done some fascinating research concerning key drivers and contingency factors of IT governance and consequently emerging types of governance. In addition there exist recommendations and concepts on how to implement and establish IT governance in organizations. But existing literature focuses rather on the outcome of IT governance - IT/ business alignment - than on the underlying structures and processes leading to this result. This is illustrated by the arrows in Figure 1, which indicate that IT governance is widely seen as a way to reach IT/ business alignment by making assertions concerning the management of technology and the management of the use of technology. As a consequence, the described types of governance remain rather generic. How exactly they are implemented in practice is not known: So far there is only little research done exploring what IT governance structures, processes, and mechanisms exist and what the resulting effects are. Therefore research has to develop ways of investigating theses structures, processes and mechanisms in a valid and reproducible way. A classification of aspects of IT governance in dimensions of interests for specifying decision rights could be a first step towards such research. By conducting a literature review we were able to take stock of such aspects. Building on the results of Table 1 to Table 3 we aggregated and precinded from the derived categories. As a result of this aggregation we propose a classification of IT governance dimensions in *IT/ Business alignment*, *contingency factors*, *approach*, and *structures and processes* as depicted in Figure 1: Four dimensions must be taken into account and can be considered by the following questions:

1. *IT/business alignment:* What culture and what requirements influence the relationship between business and IT (upper inner rectangle of Figure 1)?
2. *Contingency factors:* What surrounding conditions and contingency factors characterize the environment of IT governance (the outer rectangle of Figure 1)?
3. *Approach:* What concepts build the foundations of IT governance, central, federal, or decentral (bottom rectangle of Figure 1)?
4. *Structures and Processes:* What governance methods, instruments, and mechanisms are implemented?
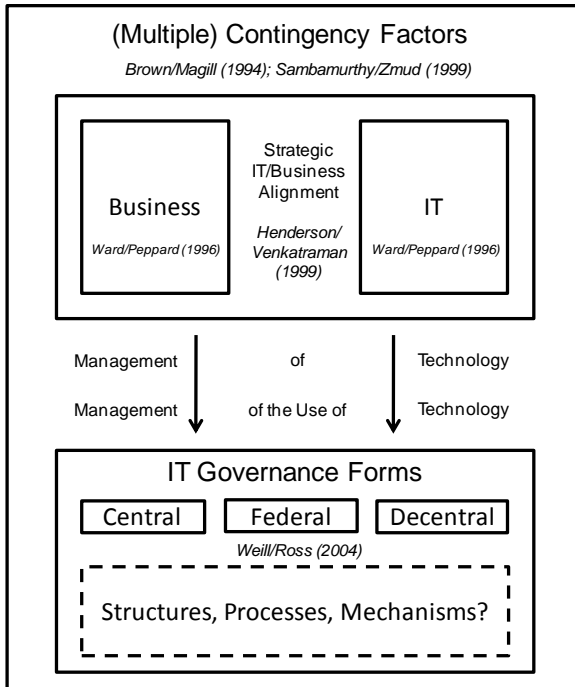
Figure 1: Prior streams of research as a foundation for IT governance dimensions

The four dimensions can be illustrated by common decision examples as found in practice (Table 4).

Table 4: Examples of typical IT decisions - allocated to the four IT governance dimensions

Dimension of IT governance	Example of IT decision
IT/ business alignment	• Definition of IT strategy, IT goals • Outsourcing and Outtasking decisions
Contingency factors	• Setup of IT projects • selection of platforms and infrastructure
Approach	• Agreement on IT investments and IT budgets: top down, bottom up, discussion and consensus
Structures and processes	• IT benchmarking between functional divisions • IT accounting • Definition of key performance indicators and reporting systems

4   Discussion and conclusion

By conducting a literature review we were able to derive dimensions for the analysis of IT governance implementations. Though we did not yet apply these categories, we still think that the paper will contribute to both, theory and practice.

As to practitioners the paper will allow a detailed description of strengths and weaknesses of IT governance implementations going beyond the centralization/decentralization debate. Based on a detailed description of the status quo future improvements and the way to the improvements can be defined a better way. By specifying decision rights responsibilities for IT can be clearly defined. Best practices can be revealed on a comparable and reproducible base. Practice will be able to profit from a better strategic IT/ business alignment by understanding structures and processes a better way.

As to theory the contribution of the paper lies in an extension of the existing body of knowledge. It will help to answer the call for further research of Meyer/Zarnekow/Kolbe (2003), regarding the combination of IT governance and information management. It will describe the IT governance structures and processes leading to alignment there as existing literature focuses on the outcome of these processes.

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