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# Challenges of Governing Interorganizational Value Chains: Insights from a Case Study

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# CHALLENGES OF GOVERNING INTER-ORGANIZATIONAL RELATIONSHIPS: INSIGHTS FROM A CASE STUDY

*Complete Research*

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## Abstract

*Existing research has shown that both IT and data within an organization need to be governed appropriately in order to achieve business value from IT and to ensure data quality, compliance, and privacy. For achieving a high level of maturity in IT and Data Governance functions, a combination of governance structures, processes, and mechanisms as well as their establishment within the organization is seen as vital. However, organizations today usually act within bigger networks of organizations to achieve value gains usually consisting of a set of heterogeneous stakeholders pursuing their own goals and having their own IT infrastructures. Especially the way data is exchanged through IT and the quality of this data is of high relevance for inter-organizational business processes. Based on a comparative case study approach, we analyze the challenges of governing IT and data within buyer-supplier relationships drawing upon findings from both IT governance and transaction cost economics. The identified challenges are then used to derive implications for an organization's governance framework based on a maturity model. This can help organizations to assess their maturity in terms of value chain governance concerning both IT infrastructures and data exchange processes.*

*Keywords: Governance, IT, Value Chain, Stakeholder, Case Study*

## 1 Introduction

Value creation happens through the exchange of resources and services among organizations in so called value chains. Hence, organizations typically do not act in an isolated and individual manner but within a larger ecosystem consisting of heterogeneous stakeholders and complex buyer-supplier relationships (Hu et al. 2011; Chatterjee and Ravichandran, 2013). These value chains have been discussed in several publications and from various perspectives emphasizing the importance of these inter-organizational exchanges. Researchers elucidated reasons for the existence of organizations, the differing performances in terms of success and efficiency – being the constituents of competitive advantage – as well as the diverse modes of governance of such value chains thereby drawing upon several theoretical assumptions (cf., e.g., Pfeffer and Salancik, 1978; Porter, 1979; Rumelt et al., 1991; Barney, 1991; Clemons et al., 1993; Peteraf, 1993; Coromiras-Bosch, 2003; Gereffi et al., 2006). Despite diverging approaches for explanation, in essence the resource-dependency theory (RDT), transaction cost economics (TCE) as well as the market-based view of the firm (MBV) as the main underlying theoretical approaches in that field agree up to the point that every organization acts in a steady state of exchange (Clemons et al., 1993; Trang et al., 2014). This exchange of services and goods can take place in several modes. Depending on the characteristics of the product or service and the company's strategic environment, the procurement can be either accomplished in arms-length relationships or intra-organizational (Gereffi et al., 2006).

However, recent articles on the analysis of such collaborative networks have shown that there is a significant explanatory as well as exploratory gap in the governance of interfirm networks (cf. Provan and

Kenis 2008; Chatterjee and Ravichandran, 2013; Tiwana et al., 2013; Trang et al., 2014). Despite the observation that strategic networks are of ever growing importance, analysis and elaboration of such collaborative networks is still missing or, respectively, has been focusing on other units of analysis (cf. Allen et al., 2000; Lu, Huang, and Heng, 2006; Provan and Kenis, 2008; Hu et al., 2011; Sivadas, Holmes, and Dwyer, 2012; Kreuzer et al., 2013; Kroenung, and Bernius, 2014). Considering the discrepancy between the practical importance of collaborative value chains and the research gap on corresponding mechanisms to ensure global IT alignment from a governance perspective, our efforts focus on this existing phenomenon.

Our article intends to contribute to this research gap from an IT and Data governance perspective by analyzing inter-organizational relationships and the effects that emanate from these interactions. As data and information exchange is not only a technical issue, we also consider the behavioral aspect of inter-organizational relationships. In particular, the paper addresses the following research questions:

- (1) What are the challenges of aligning informational infrastructures and processes?
- (2) Do IT governance structures and mechanisms affect adjacent organizations and inter-organizational relationships?
- (3) How can organizations assess their governance functions with regard to inter-organizational data exchange?

For this purpose we present an exploratory case study approach that consists of a three-tiered inquiry with support of two organizations of which each represents one of the extremes of the IT governance classification following the approach by Luftman (2000; cf. also Weill and Ross, 2004 as well as Section 3). By considering two players within a value chain that are entirely different in terms of their benchmark data, we analyze the case studies in a comparative way by drawing upon both governance and value chain research. In terms of methodology, we hence make use of a comparative approach to case study research (cf. Robey and Sahay, 1996; Yin, 2013) contrasting two groups which differ in terms of their position within a value chain (*SME vs. large enterprise*) as well as of their governance functions (*unconscious vs. optimized*) but are players within the same industry (*automotive*) and the same group (*tier 1 suppliers*). Hence, we make use of a qualitative research approach using existing literature as well as case studies and interviews as data sources. Moreover, this paper is embedded within a larger research project focusing on IT and data governance (cf. also, e.g., Choi and Kröschel 2014).

This paper is structured as follows. The subsequent section 2 first introduces the theoretical basis for our research focusing on governance and inter-organizational relationships also motivating our research questions. In the following section 3, we present our case study analysis approach. Section 4 then summarizes our results from the comparison and in-depth analysis of both case studies and discusses implications resulting from these insights. Section 5 provides a conclusion as well as prospects for further research.

## **2 Governance and Value Chains – Fundamentals and Research Gaps**

In the following subsections we present the fundamental theoretical assumptions for our research approach, mainly referring to governance and TCE-based value chain research. In Section 2.1 we first outline the fundamental concepts of governance research before addressing different perspectives on IT governance based on the IT Governance Cube by (Tiwana et al., 2013) helping us to delineate our research approach in Section 2.2. Section 2.3 then deals with the role of IT for buyer-supplier relationships within a value chain relying on the market-based view of the firm and transaction cost economics.

## 2.1 On the Notion of Governance

Since the mid-1990s, the term *governance* has intensively been discussed within the economic and information systems literature. Depending on national law, legal and business regulations have made it more or less mandatory for companies to implement a governance function within their organizations in order to ensure a transparent, risk-aware, and controlled management of value-adding processes and activities (Corporate Governance or Enterprise Governance, CG) (cf. e.g., Shleifer and Vishny, 1997; Weill and Ross, 2004; OECD, 2004).

In this context, IT governance (ITG) ensures the controlled and valuable use of IT in line with the organization's objectives (Weill and Ross, 2004; De Haes and van Grembergen, 2004). However, research on ITG often lacks an operational perspective mainly pointing out for strategic aspects, whereas data and data production are of highly operational nature leading to approaches accounting for the governance of data. In terms of the above mentioned dimensions, the focus here is typically found to be on *IT artifacts* where governance is mostly addressed by a set of mechanisms subsuming the definition of decision rights, aspects of control as well as architecture centered mechanisms (cf. e.g., Weill and Ross, 2004; van Grembergen et al., 2004; De Haes and van Grembergen, 2004).

In turn, Data governance (DG) describes the “total of data related processes and decisions that encourage desirable behavior for an organization in the use and production of data” (Choi and Kröschel, 2013). This definition shows that the principles and fundamental conceptions are related to the field of ITG in various aspects. Early publications in the field of DG lack a certain theoretical foundation and rigor (cf. e.g., Thomas, 2006; Russom, 2006; Dyché, 2007), or are limited to isolated fields of data management (Wende, 2007; Weber et al., 2008). Subsequently, scholars developed a first theoretical foundation to the discipline of DG as a starting point and to mature the field of research. Kathri and Brown (2010) were among the first to deploy a framework that was appropriate to lay a theoretical foundation. Based upon principles from ITG research and frameworks the authors defined a theoretical framework that derives data assets and decision domains in reference to the work of Weill and Ross (2004). Also Choi and Kröschel (2013) account for the need of an integrated approach to Corporate, IT, and Data Governance.

## 2.2 Perspectives on IT Governance: The Blind Spot

In the past, previous research in the field of ITG has predominantly focused on rather internal structuring and alignment mechanisms (Shleifer and Vishny, 1997; Luftman, 2000; Weill and Ross, 2004). External stakeholders to the IT of an organization are mainly considered to be public stakeholders, e.g. finance authorities (van Grembergen and de Haes, 2005; Raghupathi, 2007). For the case of DG, the perspective on external stakeholders has been slightly extended and usually includes customers as stakeholders outside of the organization (Dyché, 2007; Otto, 2011). However, the stakeholder idea still hasn't been extensively applied in terms of interfirm ecosystems as the unit of analysis. This “blind spot” within governance literature has been elucidated recently by (Tiwana et al., 2013). In contrast to the rich body of literature on the governance of value and supply chains (e.g. Gereffi et al., 2005; Ponte and Gibbon, 2006), research on the governance of inter-organizational exchange of information is scarce.

Based on the *IT Governance Cube* which we use as a framework for identifying research gaps in governance literature, we delineate our research from other governance approaches by focusing on the governance within ecosystems of firms and systems with regard to governance of IT artifacts, contents, or stakeholders, as well as appropriate mechanisms. The three dimensional cube covers the dimensions of who, what, and how is it governed. Whereas these dimensions and aspects in our view cannot be understood selectively but rather as overlapping fields of interest, the cube however provides a reasonable instrument for structuring a field of research that has been discussed from different point of views and heterogeneous perspectives in previous works.

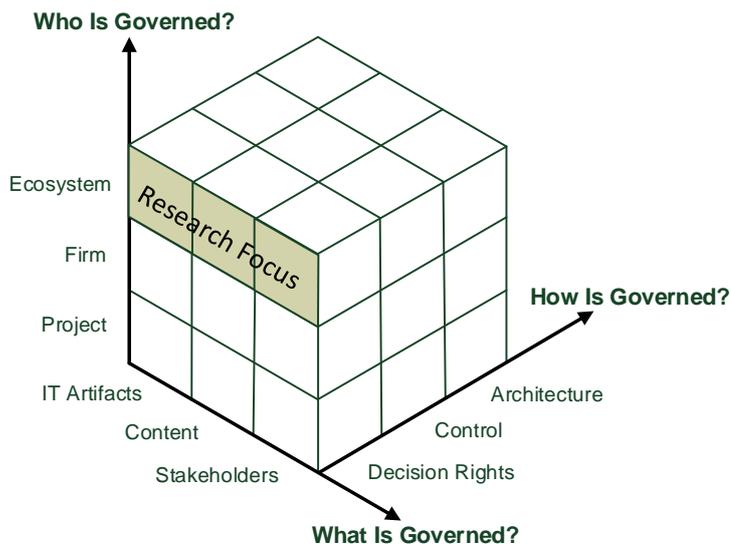


Figure 1 IT Governance Cube (adapted from Tiwana et al. 2013)

In terms of the first dimension (“Who is governed”), i.e., the scope of a governance approach as regards the particular unit of analysis, we focus on interfirm networks and relations between firms. Hence, we rather consider governance on ecosystem level instead of firm or project level. Concerning the question of “What is governed” (second dimension), i.e., the object of interest of the research approach such as IT artifacts (hardware and software), their contents (data and information), or the stakeholders producing and consuming these contents, we mainly consider the aspect of content but also address stakeholders and IT artifacts for the production and usage of content. Considering the third dimension (“How is governed”), i.e., the particular governance mechanisms, we find it appropriate to make use of a set of mechanisms including both formal and informal mechanisms in order to account for the diversity and dynamics of the particular environment.

Moreover, in distinction to the field of inter-organizational information systems (IOIS), we here do not investigate the patterns of the establishment and usage of jointly operated information systems. Instead, we focus on the interaction in general and – resulting from that – possible conflicts that occur when contradicting governance mechanisms collide. Typically, there is a high amount of data being heterogeneous with regard to formats, contents, or recipients, that “flows” into the organization. This goes along with ever changing requirements for internal information systems in such a fast pace which many organization can hardly manage. In particular, small and medium-sized enterprises (SMEs) are often claimed to be “data sinks” for customers and suppliers (Begg and Cairn, 2012) as these usually miss the structures and processes for dealing with these issues. Here, we see IT and Data Governance mechanisms to be promising.

### 2.3 IT as a Game Changer for Value Chains

In general, value creation happens on the basis of the exchange of services among organizations (Trang et al., 2014). This exchange of services and goods is underlying terms and conditions which are established in the form of contracts. In this context, Transaction Cost Economics (TCE) describes organizations as a “nexus of contracts”. The more efficient an organization can exert and design contractual relationships the higher is the competitive advantage towards competitors (Coff, 1999). From a TCE perspective every given organization has to decide about the specific arrangement of its value chains. Every available option comes with its own consequences and benefits that should be taken into account (cf. Table 1).

The two extremes in this continuum are represented by market and hierarchy based types of relationships. Complexity of transactions describes the degree of required information and knowledge to transfer to sustain the transaction. For the case of market-based transactions the complexity is relatively low. Reason is that services purchased via market relationships are mostly commodity goods. For hierarchical transactions the complexity increases on the assumption that crucial services with an intense usage of knowledge are most likely internalized by an organization to secure the competitive advantage originating from these information and knowledge – or simply because a supplier that can provide such complex products cannot be found (Gereffi et al., 2005).

Governance type	Complexity of transactions	Ability to codify transactions	Capabilities in the supply-base	Degree of explicit coordination and power asymmetry
Market	Low	High	High	Low
Modular	High	High	High	
Relational	High	Low	High	
Captive	High	High	Low	
Hierarchy	High	Low	Low	

Table 1 Key determinants of global value chain governance (Gereffi et al., 2005)

Hence, the degree of complexity of transactions increases the higher the degree of internalization between buyer and supplier. For the dimension of the degree of explicit coordination and power asymmetry, hierarchical transactions are characterized by a high degree of explicit coordination and power asymmetry, while, in contrast to the complexity of transactions, this degree decreases when having the lowest amount on market participants. This conception is quite meaningful to the choice to make for a buyer of how many suppliers he should employ.

From a market-based view (MBV), the relational network of buyers and suppliers is a strategic concern where the goal is to prevent and avoid strong bargaining positions of respective partners (cf. Porter, 1979). It is assumed that organizations will widen their network of suppliers since information technology enables for efficient and fast explicit coordination leading to the fact that organizations should rely on market transactions to a greater extent (Malone et al., 1987). In fact, many organizations carried out the so called “*move to the middle*” (Clemons et al., 1993; Bakos and Brynjolfsson, 1993). Instead of increasing the supplier base, value chains have shifted towards partnerships that encourage for non-contractible investments, e.g., innovation, adoption of new technology, and quality (cf. Bakos and Brynjolfsson, 1993; Subramani, 2004).

To summarize the discussion, value chains have shifted towards closer and long-time oriented relationships or respectively towards a network of partnerships driven by IT. As a consequence, the holistic governance along the value chain is a necessity since IT is the enabling factor behind the “*move to the middle*” and integration becomes more important. Referring back to ITG and DG, this raises the question of how to govern these inter-organizational relationships while accounting for different positions and perspectives within a value network.

### 3 Case Study Analysis

In the following subsections, we outline our case study approach which mainly focuses on the comparison of two extremes within one group of cases in order to derive insights on how organizations deal with the above mentioned issues. Section 3.1 first describes our approach regarding data collection while Section 3.2 focuses on the comparative analysis of both cases.

### 3.1 Research Approach and Methodology

To examine the objects of our case study we chose a three-stage inquiry approach as illustrated in Figure 2. In the first stage, we identified possible research participants by using a number of selected criteria, such as size, turnover, and branch. In particular, these criteria were further used to build two groups of organizations covering different positions but within a value chain of the same industry (automotive industry). While the groups are located in the same industry, they are distinct in every other dimension. This approach was chosen in order to cover two extremes within one group that can be compared in terms of our research questions. We then contacted all of the possible organizations that met our criteria of which two organizations were willing to participate in our research project.

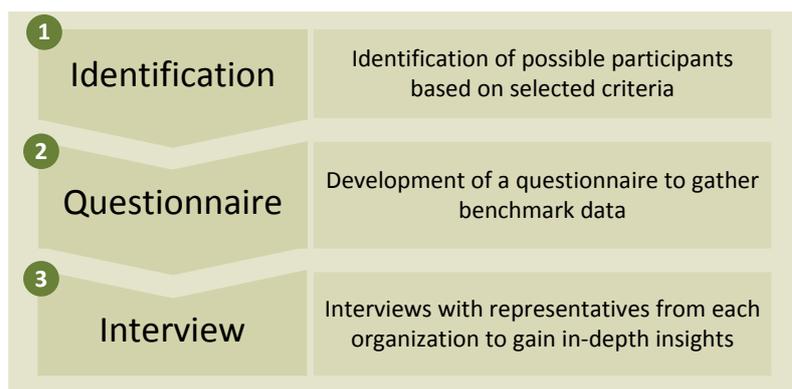


Figure 2 Three-stage inquiry approach

In the second stage, we used a questionnaire that was designed to gather benchmark data on each respective participant (see also Section 3.2). The purpose of these data was twofold. First of all, the benchmark is to depict the differences of the organizations in most crucial aspects (e.g., number of employees, maturity of IT function). The second purpose is to describe the participants in general in terms of their characteristics. The collected benchmark data underpin the differing types of leadership and organizational maturity in terms of IT and data governance. Besides questions that were aimed to gather fundamental facts on the company we also included one open question about the issue of highest priority in the perception of the respondent in terms of data and information sharing with business partners to get a first impression on possible challenges concerning this matter.

The third stage was to conduct an interview with representatives from each organization to gain in-depth insights into the respective company and its processes. The interviews picked up on data from the benchmark questionnaire and especially the results from the open question. For the interviews we used a guided structured interview approach. This assured a comparable set of questions and contents while still allowing for slight deviations during the course of the interview. Missing statements or queries were handed in afterwards via email.

Based on this data we comparatively analyzed each case with the aim to assess the ways and mechanisms which the companies use to address challenges in inter-organizational relations with regard to their governance structures and processes. We iteratively analyzed the interview data and initially set up categories of statements which were cleansed in each iterative step (cf. Mayring, 2010:12, Gläser and Laudel, 2010:212). This process ended up with four major categories, namely (I) IT capabilities within the organization, (II) methods of data and information exchange, (III) IT related challenges emerging from market interactions, and corresponding (IV) solution mechanisms. While statements from the categories (I) and (II) were predominantly useful to assess the organizations' IT capabilities, category (III) and (IV) provided insights to our research questions<sup>1</sup>.

<sup>1</sup> We translated the according statements from the interviews from German into English.

To assess the ITG maturity of the participating organizations, we draw upon a combination of data from the questionnaire as well as indications from the interviews. In order to provide a structured means of assessment, we make use of the framework for IT Governance maturity by Luftman (2000) which provides a classification scheme for the maturity of IT Governance functions ranging from “*Non-existent*” to “*Optimized*”. However, for our analysis, we slightly adjusted the model by excluding the “*Non-Existent*” level and including the level of “*Unconscious*” governance as proposed by Weill and Ross (2004) (see Table 2). The reason for this is that this level hardly exists. Even without explicitly installed or designed mechanisms for the alignment of business and IT we assume that every organization has implicit mechanisms in place and hence path trajectories that shape the IT strategy of an organization: “*All enterprises have IT governance*” (Weill and Ross, 2004, p. 2).

Degree of Maturity	Descriptive Characteristics
1 Unconscious	The organization has recognized IT as a productive factor and as crucial for its processes. There are, however, no standardized review processes, but instead management considers IT management on a case-by-case basis.
2 Repeatable but intuitive	There is awareness of IT governance objectives, and practices are developed and applied by individual managers. IT governance practices are becoming established within the organization’s change management process, with active senior involvement and oversight.
3 Defined Processes	The need to act with respect to IT governance is understood and accepted. A baseline set of IT governance indicators is developed, where linkages between outcome measures and performance drivers are filled.
4 Managed and Measurable	There is full understanding of IT governance issues at all levels, supported by formal training. There is a clear understanding of who the customer is and responsibilities are defined and monitored through service level agreements.
5 Optimized	There is advanced and forward-looking understanding of IT governance issues and solutions. Training and communication are supported by leading-edge concepts and techniques. Processes have been refined to a level of external best practice, based on results of continuous improvement and maturity modeling with other organizations.

Table 2 *IT governance maturity model (adapted from Luftman, 2000; cf. also Weill and Ross, 2004)*

### 3.2 Comparison and Maturity Assessment

As explained above, besides the theoretical underpinning of our research, we make use of data from two types of organization that represent the extreme positions in the IT governance maturity framework. This section introduces the focal objects and their characteristics. Table 3 provides an overview of both cases. Typical benchmark data such as turnover and number of employees depict the distinctive nature of these organizations. In addition, to assess and describe the organizations’ IT maturity level and decision making paths we investigated the existence of internal IT departments and the ERP system in use since the choice of an ERP system can have strong impact on the overall structuring of both processes (Shang and Seddon, 2000; Powell et al., 2013) and data within the organization.

	A	B
Industry	Automotive	Automotive
Annual Turnover	< 50,000,000€	> 1,000,000,000€
Employees	< 50	> 10,000
IT department	No	Yes
IT costs/Turnover	0.5%	1.4%
ERP system	Branch specific	Standard
ITGMaturity	Unconscious	Optimized

Table 3 Case overview

Company (A) is a SME with about 50 employees of which the majority is employed in the production. The respective interviewee for our study was the company's executive director. For both cases, we explicitly asked for the person in a company that is responsible for the organization's IT. Since there is no dedicated IT department in this company, we interviewed the executive director who is ultimately steering every aspect of this SME. The company's overall annual turnover for the year of 2013 was roughly about 50,000,000 €. (A) provides injection-moulded parts and directly delivers these to Original Equipment Manufacturers (OEMs). The product portfolio is tightly bound to the above mentioned parts. The company can be described as a specialized contractual manufacturer since it does not develop its own products but provides the capacities to achieve high quality parts. As it is typical for SMEs, the scarce personnel makes it necessary that several roles and functions are executed by a single person. For the case of company A, the executive director also is the "chief information officer" at the same time. Even without having an IT background, the director is accountable for both the business and the IT side of the company. Since there is no dedicated IT function, the entire infrastructure and maintenance of IT systems is outsourced to service contractors. As the listed facts in Table 3 illustrate, company (A) does not have any ITG or DG structures in place. This is a typical case for the "unconscious" type of governance as referring to Weill and Ross (2004; cf. also Table 2).

Hence, for the case of (A) we assess a maturity degree of unconsciousness (level 1). Due to scarce personnel and missing expertise the organization outsourced almost every aspect of the IT infrastructure and maintenance. The ERP system in use at organization A is specific to the plastics industry. These two facts alone outline a constitutive set of decisions that had been made – namely to use resources outside of the company to compensate for lacking competencies on the inside. At the same time customization of existing software and information systems are held frequently to meet business needs. This type of alignment is not defined by a standard process but rather by contractual constraints and conditions between the SME and its service providers. In addition, IT investments were done in order to tighten networks with long term partners. These investments encompass information systems for the automated exchange of product information as well as the above mentioned customizations for the ERP system.

In turn company (B) is a first-tier supplier that has about 70,000 employees and more than 70 establishments all over the world. The annual turnover for (B) for the year 2013 was about 17,000,000,000 €. The portfolio of products is highly diversified and almost unique to the market. The product's uniqueness results from the complexity of the self-developed parts that company B is manufacturing. In opposition to our case study above (A), this company (B) has a high degree of maturity concerning its IT

organization. The interviewee for our case study was the head of the Master Data Governance Committee for the Finance department. The function and role of our respondent indicates that B has a governance structure in place that deploys decision-rights and obligations within the company. In particular, every functional silo has a Data governance council (cf. also Choi and Kröschel 2014) in place that locally sets data standards and policies. However, a company-wide data governance council is not yet in place. This allows for local optimization and alignment of business and IT needs but not on a global level. None the less, processes and structures can be labeled as optimized which corresponds to the classification of “optimized” (see Table 2).

Thus, for organization (B) we constitute an IT governance maturity degree of “optimized” (level 5). The company has a distinguished governance structure in place and defines as well as executes policies and guidelines on the local business level. Despite the still missing central governance body for Data governance a company-wide set of so-called data classes have been defined and deployed. These classes are defined by a central steering committee and predetermine most contents throughout the enterprise. The predominantly used ERP system is a sector-independent product which grants general connectivity and compatibility through standardization. Most important is the fact that (B) has metrics in place that make IT investments measurable on an infrastructure as well as process level.

## 4 Findings from the Case Study Analysis

The following section depicts our findings from the comparative case study analysis. The subsequent subsections (4.1, 4.2, and 4.3) each describe a particular field of challenges we observed in both cases. In Section 4.4, then implications resulting from these observations are discussed and we provide means for governance maturity assessments in an inter-organizational context based on our findings.

### 4.1 IT Governance and Maturity Effects

Despite the distinct nature of the investigated organizations both representatives report concordantly on an issue concerning incoming data from outside the company. While both of the organizations accordingly experience undistorted data exchange relationships with their supplier base, exchanging data with buyers is characterized by many challenges. For example, for the case of (B), the earlier mentioned data classes become obsolete in the context of buyer relationships. Whereas the differing data standards with their suppliers were solved by installing data mapping tables and arrangements to achieve transparency and traceability of material flows as well as processes, this does not apply to the exchange with buyers (Interviewee company (B): “*For suppliers we define the interfaces and vice versa for buyers.*”; II, III).

For the case of the interaction with buyer-organizations incoming data still has to be cleansed and mapped manually bearing severe effects on data quality. This described problem requires a flexible IT infrastructure that is capable to react on manual manipulation and extension of data models as well as established data management practices. The matured governance structures and the general IT capabilities of organization B do support this type of flexibility (Interviewee company (B): “*We do not alter the processes but we put high efforts into mapping.*”; IV).

Organization (A), in turn, has a low governance maturity as explained above. One of the main concerns when talking to the interviewee is the occurrence of changing requirements in conjunction with ad-hoc processes that these altered requirements evoke. Despite the fact that most matters of data exchange, as in case B, are contractually modulated, buyers often ask or demand for data transmission deviating from the arrangements that have been agreed upon in the past (Interviewee company (A): “*For instance, one of our large customers uses several different information systems in different production plants.*”; III).

The fact that these requests appear erratically exacerbates the organization’s ability to react on these issues on a technical or infrastructure level but requires again more or less flexible processes. In contrast to (B), where flexibility and the ability to react on changing requirements are achieved by governance maturity and the availability of IT knowledge and capabilities within the organization, (A) relies on the process flexibility for data-handling. None the less, the redesign of existing processes towards ad-hoc

solutions and the dedication of manpower for data-handling activities are costly and cannot be easily compensated for an organization of this size (Interviewee company (A): “[...] I would say that we employ two persons for the order processing, 8 hours a day.”; IV).

Still, both organizations achieve to fulfill requirements of their customers each in its specific way. However, while the installation of ad-hoc processes as described for the organization of (A) is linked to relatively high efforts, the created infrastructure and organizational maturity at (B) are costly as well.

## 4.2 Buy-in for Strategic Networks

As mentioned above, value chains constitute the predominant form of value creation. Despite the increased information base and possibilities to retrieve and analyze the information on available suppliers and thus the increased possibility to procure resources and service via spot markets, many organizations have decreased their number of suppliers (Clemons et al., 1993). Reasons for such a behavior can be found, e.g., in (Bakos and Brynjolfsson, 1993; Subramani 2004). First of all, although information can be processed in real time and thus spot markets can be substitute to long term relationships to suppliers, the search for and analysis of supplier information come at their own cost, i.e. the search and contracting costs. In addition, buyers set several incentives in various directions for their suppliers and thereby forego possible gains from optimized procurement in terms of price in opposition to assumptions on leveraging from a larger supplier base as assumed by the MBV. These incentives for the suppliers are the membership of a stable value creation network and the practice of partnership. This in turn can motivate suppliers to invest into innovation and quality (cf. Bakos and Brynjolfsson, 1993).

Our interviews both indicate that there is a certain buy-in price for such networks. To be part of a value chain and in order to leverage the long term relationships an inter-organizational brokered IOIS has been purchased as suggested by the major buyer of (A). We consider this type of purchasing activity as a sort of buy-in that suppliers have to pay in order to receive the benefits of a reliable and stable network. In addition, the adoption of boundary spanning IS that is used by all members of the value chain can be viewed as a tool for alignment on the infrastructure level.

## 4.3 The Spillover Effect and Stakeholder Neglect

Spillover effects have been discussed largely in previous works (cf. e.g., Martynova and Renneboog, 2008; Goergen and Renneboog, 2008; Nooteboom, 2004) but rather for direct involvement such as mergers and acquisitions as well as majority holdings. For the underlying case study we assume a spillover of governance flaws and information related processes.

As mentioned earlier, joining a network for value creation is tied to investments as a buy-in. However, the purchase of an information system specific to a certain network is linked with the introduction of new processes in reference to maintenance and usage of the information system (Interviewee company (A): “We retrieve most of the information via [IOIS] but we have to create solutions to transfer these data into our systems.”; III).

Furthermore, in case (A) we observe violation of contracts due to infrastructure deficits on the buyer side. Although the buyer convinced the supplier base to join the network and to install a specific IOS to handle procurement and quality assurance, the buyer-organization itself frequently requests connected partners to violate against the contractual agreements (Interviewee company (A): “This means that we have to send data via email or even fax.”; IV). In this case, delivery and product quality data were not transmitted via the IOS – as contracted – but rather via deviating and even non-electronic transmission due to missing infrastructures in the production plants of the buyer organization.

These violations indicate that missing infrastructure in one organization causes connected suppliers to violate against contracts and standardized processes. Ultimately, this means that the suppliers have to react to these requests by installing ad-hoc processes. We observed this to be a crucial phenomenon in this context.. Given that the theoretical assumptions are true and that forewent potential gains from a value chain are an incentive to related partners to invest into innovation, quality, and adoption of new

technology this can nullify the signaling effect of the incentive. It can be argued here that costs and efforts arising from deferred investments into IT infrastructure as a result of failed governance on an architectural level can discourage value chain partners from these non-contractible investments (Crook and Combs, 2007).

However, in contrast to recent research we haven't found any evidence in our case study for stakeholder implementation or consideration (cf. Chatterjee and Ravichandran, 2013). There was little to no support for connected organizations of the IOIS. Moreover, external stakeholders are being more or less ignored. This observation is concordant to the conception of power asymmetry in value chains as mentioned above (Gereffi et al. 2005). In the context of IOIS power asymmetry translates into arbitrary behavior towards suppliers in terms of information and data exchange. As shown earlier, suppliers have to react to incoming data and deviating transmission paths to fulfill the needs of their respective buyer organization stretching their organizational capabilities.

#### **4.4 Implications and the Assessment of Governance Maturity in Value Chains**

Although we found indicators and mechanisms for an alignment at infrastructure level (cf. Section 4.2), there is no direct observation of conjoint governance mechanisms with regard to the cases discussed above. Our interviewees indicated that IT departments or the ones responsible for IT related decisions are not consulted in a timely manner when contracting new partners or relations to other organizations in order to participate in the design of the relationships in terms of IT or Data Governance. In reference to insights from the ITG research to fully leverage on the value chain, it is a necessity to ensure stakeholder participation as well as a strategic dialog when governing a boundary spanning value creation (cf. De Haes and van Grembergen, 2004). The establishment of cross-organizational strategic mechanisms requires the cognition that the organization's IT does not only affect the value creation inside of the organization but at the same time affects stakeholders on the outside, i.e. the ecosystem of organizations along the value chain, which have to be considered by appropriate mechanisms.

Based on the above delineated observations, we notice that means for assessing governance on an overarching value chain level appear necessary for organizations in order to ensure stakeholder involvement and global alignment of IT processes. As argued by Tiwana et al. (2013), governance of an ecosystem where different organizations and stakeholders exchange data appears to be crucial to leverage the gains from a value chain by executing defined and measurable mechanisms. Those value chain governance mechanisms should underpin the strategic goals from the organization's overall goal in the same manner as the IT governance does and thus should amend an organization's internal governance mechanisms. In response, we introduce maturity levels that help organizations to assess the maturity of their value chains from an IT governance perspective and identify potential weaknesses in their ecosystem as presented in Figure 3. Based on this maturity evaluation, companies may widen their internal governance system. This may finally lead to reduced costs and optimized processes leading to higher revenues.

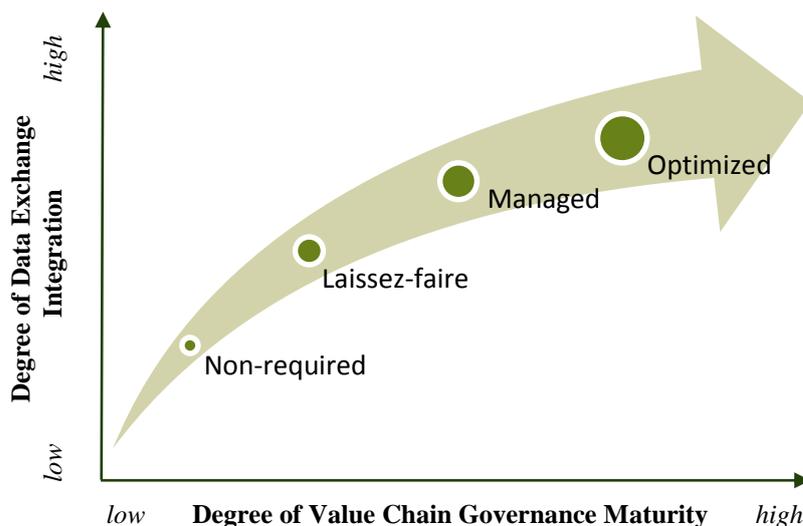


Figure 3 Value chain governance maturity levels

Starting from the framework as defined by Luftman (2000; see Section 3.1), we derive an approach that encompasses four levels of maturity for the governance of value chains based on the previous findings. For the initial stage, we suggest the term “*Non-required*”, since there is no permanent or at least long-term network of value creation but merely short-term transactions are realized on a spot market. This means that there is no need for the governance of a value chain since interaction of organizations is sporadic.

The second level is the “*Laissez-Faire*” level of governance. This level of maturity is characterized by the existence of a networked and long-term oriented value chain and the awareness about IT and data transmission related issues, however lacking standardized processes or global policies. The terms of exchange for data and/or information is partially negotiated on a bi-lateral level.

The third stage then is “*Managed*”. This level describes a state where at least one member of the value chain has a clear understanding of the governance of the value chain and there is a clear understanding about value creation mechanisms and their linkage to the company’s IT. This goes along with standardized data formats and processes aligned with the activities of the value chain. Additionally, it is possible to connect the most important partners to an inter-organizational information system.

The highest degree of value chain governance is “*Optimized*”. In this stage the entire value chain is aligned with a unified strategic goal in terms of infrastructure and data exchange and all members of the chain agree up on this goal. There are boundary-spanning mechanisms and information systems that support for global alignment of infrastructure, processes, and relational mechanisms combined with a forward-looking understanding of value-chain issues and solutions. A boundary spanning strategic dialog and shared learning mechanisms are installed.

## 5 Conclusion and Outlook

We started our research on the basis of the anecdotal evidence that SME’s often face issues about data quality and transmission. Thus, they often feel like “data sinks” (Caira and Begg, 2012). We then shed light on the ecosystem of such data and delineated the typical value chain and incorporated concepts from the TCE as well as MBV of the firm forming a theoretical basis for our research. We found indication for several assumptions by other researchers, e.g., the tendency of value chains to compromise fewer members instead of calling upon more potential suppliers or buyers to strengthen the bargaining position.

We then used case study data provided by two different organizations to investigate further the occurrence of IT and data related issues within a value chain, how organizations with a different degree of IT

governance maturity handle the challenges, and how their IT capabilities come into play. Any degree of maturity showed to be effective in its own particular way, may it be by optimized infrastructure and trained personnel or by installing ad-hoc processes to counter the lack of resources.

Our exploratory approach to derive a framework for the maturity of governance in value chains is based on the observations we made during our interviews and data sampling as well as insights from ITG and DG research. This approach is to be understood as an initial point or discussion to achieve higher effectiveness of distributed value creation by installing unified data related processes, infrastructures, and standards. This has to be the ultimate goal for value creation networks to leverage the gains from this collaborative network. In accordance with prior research (Peteraf, 1993; Crook and Combs, 2007; Caira and Begg, 2012) organizations of larger magnitude have the bargaining power to dictate terms and conditions of informational exchange and thus are the ones within a networked value-chain to enforce global alignments and policies.

Hence, the presented approach for value chain governance maturity assessment is a first step towards the establishment and optimization of boundary-spanning processes for the exchange of information within arms-length relationships. The derived levels of maturity draw upon our findings and transfer established ITG understanding to the field of IOIS governance and may enhance internal governance structures and mechanisms. In terms of our research questions as outlined in Section 1, we identified three major challenges of aligning informational infrastructures and processes based on the case study data (1) and discussed their impacts on IT and Data Governance related issues (2). We also derived a maturity model in order to enable organizations to assess their governance functions with regard to inter-organizational data exchange within a value chain by transferring insights from an existing maturity model for internal governance to our approach (3).

For future research we suggest to widen the scope and investigate other industries and use a larger data sample. Especially the comparison of different organizational settings may reveal further challenges that can be used to derive appropriate governance mechanisms helping to achieve a high level of value chain governance maturity. In addition, we did not discuss who could take a leading position in this effort for value chain governance within an ecosystem and what this could mean for the interactions within the value chain. As it seems, buyer-organizations of large magnitude are preferably those to introduce and promote such governance. However, this also requires appropriate incentives and support for smaller companies participating in a value chain. Future research should focus on how the different players may interact and establish relationships achieving advantages on both sides and how a company-wide governance system may be enhanced by appropriate value chain spanning mechanisms in order to enhance data exchange processes within inter-organizational relationships.

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