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Research article

Achieving social alignment between business and IT – an empirical evaluation of the efficacy of IT governance mechanisms

Frank Schlosser[1], Daniel Beimborn[2], Tim Weitzel[1], Heinz-Theo Wagner[3]

[1]University of Bamberg, Bamberg, Germany;
[2]Frankfurt School of Finance & Management, Frankfurt, Germany;
[3]German Graduate School of Management & Law, Heilbronn, Germany

Correspondence:
F Schlosser, University of Bamberg, PO Box 1549, Bamberg 96045, Germany.
Tel: +49 951 863 2871;
Fax: +49 951 863 2872;
E-mail: frank.schlosser@uni-bamberg.de

Abstract
How can firms improve the degree of social alignment between their business and IT units? Many years of research have shown the importance of business-IT alignment and its various facets, yet research on the efficacy of IT governance mechanisms to improve business-IT alignment is scarce. In this paper, we develop a model of social alignment at the operational level that considers the degree of social capital between an organization's business and IT units, IT personnel's business understanding, and a set of formal and informal IT governance mechanisms that drive the creation of social alignment and business value. Using survey data from 132 US banks, we show that social alignment is driven to varying degrees by a broad variety of IT governance mechanisms ranging from top management support and IT representation on the executive board to joint IT planning and IS training, regular meeting cycles, and liaison units. Our research contributes substantially to the practical demand on business-IT alignment research for an effective toolkit of IT governance mechanisms.
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Introduction

Researchers and practitioners agree that business-IT alignment contributes significantly to IT-related business performance (Chan and Reich, 2007a, b; Yayla and Hu, 2012) and profitability (Luftman and Brier, 1999). Several dimensions of business-IT alignment have been proposed, the most frequently studied of which include strategic/intellectual alignment, structural alignment, and social alignment (Chan and Reich, 2007b). While all three dimensions have been found to be of high relevance for organizational success, the social dimension of alignment between business and IT – representing the relationships and shared understanding between these units – has received increasing attention over the past 15 years (e.g., Reich and Benbasat, 2000) and builds the foundation for the other dimensions of alignment (Preston and Karahanna, 2009). While previous research has focused more on investigating the nature and effects of social alignment (e.g., Karahanna and Preston, 2013), we complement this research by focusing on how social alignment between business and IT (which we will simply call 'social alignment') is *achieved*.

The IS literature offers insights into antecedents of strategic IT alignment, such as shared domain knowledge and communication links between business and IT executives (e.g., Luftman *et al.*, 1999; Reich and Benbasat, 2000; Preston and Karahanna, 2009). However, achieving alignment between business and IT remains an open challenge. Indeed, better aligning IT and business units has remained a top CIO challenge for decades (Kappelman *et al.*, 2013). We propose that integrating an IT governance perspective into alignment studies can help us better understand and manage the creation of alignment in all its facets. IT governance can be defined as the organizational capacity exercised by the board, executive management, and IT management to control the formulation and implementation of IT strategy and in this way ensure the harmonization of business and IT (Van Grembergen, 2002). On a strategic level, the role of IT governance and related mechanisms in coordinating business and IT activities has been investigated in terms of decision-making authority

between business and IT functions (Peterson *et al.*, 2000) but has not yet found its way into alignment research (Wu *et al.*, forthcoming). Hence, embracing the literature on IT governance mechanisms (e.g., Peterson *et al.*, 2000; De Haes and Van Grembergen, 2009) and applying it to the quest for ways of creating social alignment and better coordinating business and IT activities is promising. This paper looks at which IT governance mechanisms are truly effective in enhancing social alignment by developing greater social linkage and improved understanding between business and IT units.

We draw on social capital theory and adopt a social view of business-IT alignment and how IT governance mechanisms shape this alignment. Specifically, we focus on business-IT relationships (Reich and Benbasat, 2000; Karahanna and Preston, 2013) and consider the importance of social alignment at the operational level where strategies are implemented and coordinated business-IT activities have direct effects on firm performance. While various studies have investigated alignment at the strategic level including social alignment among CIOs and other board members (Reich and Benbasat, 2000), our study investigates how business and IT units can be brought closer together at the operational level where IS changes are implemented. Concretely, we ask the following research question:

What is the role of IT governance mechanisms in achieving social alignment between business and IT at the operational level and, thus, in improving business performance?

As the effect of alignment is likely to be particularly strong and nuanced in firms that rely heavily on IT, we focus on alignment in the financial services industry. Banks tend to spend more on IT than most other industries.[1] This is in part because IT is a key way for banks facing strong competition to achieve both customer intimacy and operational excellence (Tallon, 2010). Consequently, investing in IT governance affects the return on IT spending in banking to a greater extent than in other industries. In other words, the return on IT governance is potentially higher in banks and in financial services than in other industry sectors. Business processes in banks are either run entirely by information systems (IS) or rely on the interplay between the implemented IS, manual process steps, and the bank-technical skills of business employees to use all relevant system functionality effectively and efficiently in the business context (Wagner *et al.*, 2014). Hence, when studying business-IT alignment, we can expect that its effects can be detected most clearly in the banking industry. However, regardless of the industry, we argue that alignment is critical to the effective implementation and usage of IS by ensuring close business-IT interconnection.

In the following sections, we will develop a theory-based research model and test it using PLS and data from a survey of 132 large US banks. The findings contribute to the literature by creating a better understanding of the relationship between IT governance mechanisms and social alignment at the operational level and by generating insights into the effectiveness and role of single IT governance mechanisms.

Model development

Figure 1 illustrates our research model, which is based on the argument that formal and informal IT governance mechanisms influence social business-IT alignment, which in turn increases business performance; the theoretical arguments and hypotheses are developed below.

Impact of social alignment between business and IT on business performance

IT can be applied to support a wide range of firm goals, such as increasing efficiency or creating value by enabling the development of innovative products and sales channels (DeLone and McLean, 1992), often referred to as 'IT business value' (Melville *et al.*, 2004). In our study of business operations in banks, IT business value manifests as 'business performance' which has been shown in numerous studies to be positively affected by business-IT alignment (e.g., Chan *et al.*, 1997; Sabherwal and Chan, 2001; Cragg *et al.*, 2002; Karahanna and Preston, 2013).

Our concept of social alignment between business and IT is connected with the strategic IT alignment literature in that it draws on the social perspective of IT alignment focusing on relationships between executives (Reich and Benbasat, 2000) that has been extended to informal relations among business and IT staff (Chan, 2002; Ghosh and Scott, 2009). Recent literature uses the framing of Social Capital Theory to conceptualize the social dimension of alignment (e.g., Karahanna and Preston, 2013) and extends this perspective to the operational level (Wagner *et al.*, 2014). To understand how alignment can be achieved in daily business, we adopt the conceptualization of Wagner *et al.* (2014) and define social alignment as cross-domain interconnectedness comprising both *social capital between business and IT* (SC) and *IT*

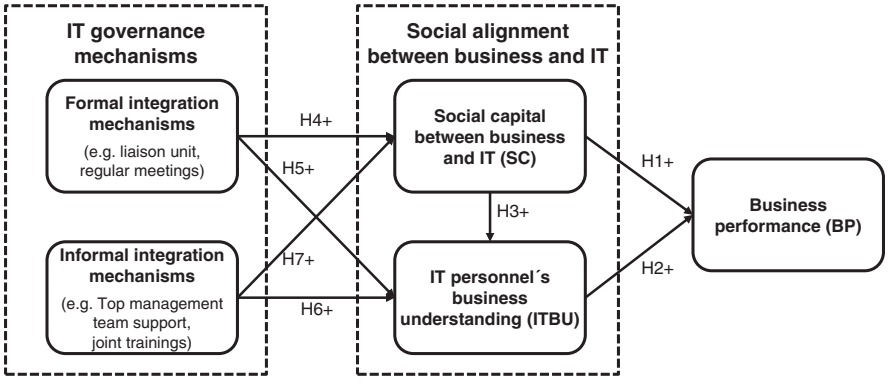


Figure 1 Research model.

personnel's business understanding (ITBU). Social capital captures the relationships between business and IT personnel while IT personnel's business understanding refers to the outcomes of these relationships, such as IT staff understanding business processes and having a shared language with business staff.

Social capital between business and IT is particularly important to enable smooth collaboration between business and IT in developing and providing the best-possible IT solutions. Research shows that social capital promotes the exchange and combination of resources as well as value creation (Tsai and Ghoshal, 1998). If a firm has established strong social relationships between business and IT, people are willing to solve problems together, discuss issues openly, and support each other (e.g., Tiwana *et al.*, 2003; Baum *et al.*, 2010). This makes project-based collaboration and day-to-day interaction easier and more effective. By contrast, if the common 'deep trench' between business and IT units exists, people avoid (informal) communication, minimize collaboration, and would rather point fingers than solve conflicts and problems effectively. This all leads to a lack of mutual interest and goals in creating IT business value. Therefore, and in line with previous research that used social capital theory (Karahanna and Preston, 2013; Wagner *et al.*, 2014), we hypothesize that:

Hypothesis 1: Social capital between business and IT positively impacts business performance.

IT personnel's business understanding refers to 'the business knowledge that is interpreted by IT personnel on the basis of their background knowledge' (Wagner *et al.*, 2014: 246) and can be understood as the integrated pool of business and IT knowledge held by IT personnel. Combining knowledge goes beyond sharing knowledge, where it is sufficient that business and IT staff know the same things.

IT personnel's business understanding affects business performance by providing collective knowledge, for example, about business needs, contributing to the realization of appropriate IT solutions (Holsapple and Luo, 1996), making changes to information systems in place to promote their effective usage (Ravichandran and Lertwongsatien, 2002), and facilitating IS deployment in congruence with business requirements (Segars and Grover, 1998). The more IT employees know about the business processes that are supported by IT and the better they are able to understand the problems of the business, the more likely the full potential of IT will be leveraged to support the business.

Hypothesis 2: IT personnel's business understanding positively impacts business performance.

The internal mechanics of social alignment have been described extensively using social capital theory, which argues that social capital lays the foundation for the exchange and combination of knowledge, and thus contributes to the creation of intellectual capital (Nahapiet and Ghoshal, 1998: 250). Particularly, social capital comprises whether IT and business staff trust and respect each other and each other's work (Karahanna and Preston, 2013). This mutual respect is a key ingredient in creating high-quality communication among business and IT and in providing coherence and stability even in times of crisis (Wagner and Weitzel, 2012). Another crucial facet of a strong business-IT relationship is the degree to which IT and business personnel regularly consult each other on topics related to business processes and the underlying IT. Studies have shown that IT personnel in organizations that have high levels of social capital among business and IT employees are more likely to have a higher level of business understanding, which is consistent with social capital theory (Nahapiet and Ghoshal, 1998). This is because in business-IT relationships characterized by trust and respect, where business and IT collaborate eye-to-eye, most personnel are rather open in their interactions and willing to share relevant knowledge to a greater extent and more effectively (Tsai, 2000; Tiwana *et al.*, 2003). This enables IT staff to better understand, interpret and solve business problems. Considering the above arguments, we hypothesize that:

Hypothesis 3: Social capital between business and IT positively impacts IT personnel's business understanding.

IT governance mechanisms

IT governance pertains to the locus of IT decision-making authority covering organizational issues regarding differentiation and the division of responsibilities on the one hand, and integration mechanisms on the other (Peterson *et al.*, 2000; De Haes and Van Grembergen, 2009). Accordingly, the IT governance literature deals with the allocation of decision-making rights and responsibilities across business and IT functions (Weill, 2004), and proposes a variety of specific integration mechanisms that forge a collective approach and ensure that IT strategies and projects are effectively put into action. Thus, integration mechanisms directly tap into the alignment concept that 'organizational performance is the consequence of fit between two or more factors such as strategy, structure, technology, culture, and environment' (Bergeron *et al.*, 2004: 1004) and foster cross-domain interconnectedness between business and IT departments (De Haes and Van Grembergen, 2009; Wu *et al.*, forthcoming). These integration mechanisms serve as a 'means of coordination' where coordination is defined as 'the timely and purposeful adjustment of decisions pertaining to values of different aspects, between stakeholders involved in decision making' (Peterson *et al.*, 2000: 436). In this respect, these coordination mechanisms have also been found to drive performance through IS innovation (Sharma and Yetton, 2003).

We categorize IT governance mechanisms that are designed for integration purposes by adapting the scheme proposed by Peterson *et al.* (2000: 438). We distinguish between

- *formal* integration mechanisms concerning the formal organization structure (e.g., liaison function) and formal coordination as part of the way processes are organized (e.g., regular meetings); and
- *informal* integration mechanisms concerning the development of network relationships by supporting working toward a common goal and increasing dependency among team members (e.g., cross-functional events and cooperative activities).

Informal integration mechanisms do not directly influence the formal organization structure and formal coordination, but rather complement them. Both kinds of mechanisms are dedicated to promoting cross-domain interconnectedness,

which is appropriate for our research purposes and fits our conceptualization of alignment.

In the following paragraphs, we focus on IT governance mechanisms that directly or indirectly contribute to the creation of social alignment between business and IT units. Coleman (1988: 98) argues that social capital 'is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors […] within the structure.' Our conceptualization of social alignment between business and IT comprises social capital between business and IT in addition to IT personnel's business understanding. The former deals with structural, relational, and cognitive relationships and taps into what Coleman calls 'social structure'. The latter results from the social structure and the actions of actors within the structure (cf. Nahapiet and Ghoshal, 1998).

Coleman (1988: 105, 107) identifies two forms of social structure that facilitate social capital: (1) the degree of interconnectedness, which he views as 'a necessary but not sufficient condition for the emergence of effective norms' and as beneficial for 'the proliferation of obligations and expectations'; and (2) appropriable social organization providing voluntary, multiplex relationships such as social clubs.

Considering the two categories of integration mechanisms introduced above we can now distinguish among (a) those having an effect on social structure by creating conditions which enable the formation and expansion of multiplex relationships and higher interconnectedness; and (b) those having an effect on forming expectations and obligations, information channels, and norms, which are forms of social structure, and the outcome of social capital (i.e. IT personnel's business understanding).

Formal integration mechanisms

Formal integration mechanisms concerning the formal organization structure and formal coordination as part of the way processes are organized are directed toward creating an environment that allows relationships to be built and thus affects social structures that facilitate social capital. Hence, formal integration mechanisms influence social capital and in turn business understanding of IT personnel because they create the conditions for social capital formation, allowing business understanding to develop and are thus a necessary but not sufficient condition for the development of effective norms (Coleman, 1988).

IT representation on the executive board is one of the most prominent formal integration mechanisms. Not only well-aligned business and IT strategies and plans (Reich and Benbasat, 1996; Kearns and Lederer, 2003), but also effective partnerships among IT and C-level business executives are important drivers of success (Preston and Karahanna, 2009). For example, the top management team (TMT) has the position and visibility to be a role model for all other employees (De Haes and Van Grembergen, 2009). 'Such role models not only provide behavioral cues on what to do, but more important, they permit the target to psychologically identify with the model and thereby absorb some of the new cognitive point of view' (Schein, 1992: 84). Consequently, positive effects down the hierarchy ladder can be induced when the ground staff realizes that business and IT executives are working closely together and supporting the business-IT interplay across the whole organization. Similarly, such partnerships can positively affect IT personnel's business understanding by providing a new cognitive point of view and background knowledge needed to interpret business topics from a new perspective. Ideally, this will motivate business and IT personnel to meet regularly, develop ideas, find solutions, and get operational tasks done effectively and efficiently. Hence, we argue that IT representation on the executive board (formal integration mechanism (FIM) – item FIM1 in our survey) fosters the creation of social capital between IT and business and also IT personnel's business understanding.

Moreover, many organizations, and banks in particular, implement liaison units or roles to improve interactions at the business-IT interface (FIM2) (Dhaliwal *et al.*, 2011). This measure is effective not only when colocation of business and IT employees is not possible or preferred, but also when people work at the same site, particularly when the knowledge gap between business and IT is too big or when severe communication problems exist which cannot be solved by the employees involved. Consequently, this mechanism is not only designed to foster relationships but also to close the knowledge gap, and thus might influence both social capital between IT and business as well as IT personnel's business understanding.

Communication has been identified as crucial for improving social capital between business and IT (Reich and Benbasat, 2000; Campbell, 2005). A widely accepted and effective way to promote close partnerships and knowledge exchange is to introduce at least partially institutionalized, regular joint meetings between business and IT (e.g., Kearns and Lederer, 2003; Sledgianowski and Luftman, 2005) (FIM3/4). This structure provides room to build relationships but also to transfer knowledge and exchange information. On the basis of the above, we hypothesize that:

Hypothesis 4: Formal integration mechanisms are positively related to social capital between business and IT.

Hypothesis 5: Formal integration mechanisms are positively related to IT personnel's business understanding.

Informal integration mechanisms

Informal integration mechanisms are not directed toward creating conditions in which social capital may grow, but rather support working toward a common goal and increasing dependency among team members. This in turn is directly related to facilitating the forming of expectations and obligations, norms, and information channels, which are forms of social capital (Coleman, 1988).

Top management team support for business-IT collaboration (informal integration mechanism (IIM1)) is important to fostering the creation of social capital (Luftman *et al.*, 1999; Teo and Ang, 1999). Other informal integration mechanisms include monetary incentives or other forms of acknowledgment such as 'cross-domain team of the month' set as a form of extrinsic motivation to drive knowledge exchange between IT and business units, and to encourage staff to work together toward common goals (Peterson *et al.*, 2000; Peterson, 2003) (IIM2).

Colocation of business and IT staff (IIM3) is widely considered to drive both team performance and social capital (Govindarajan and Gupta, 2001), and thus alignment

(Broadbent and Weill, 1993). When team members meet each other on a daily basis, they get to know each other, share knowledge, avoid misunderstandings, and communicate more directly.

Business understanding of IT personnel can also be improved by joint IT planning among business and IT units (IIM4). This mechanism has been the subject of several studies and has been shown to support mutual understanding and relational linkage by ensuring that business and IT discuss and define key goals together (e.g., Reich and Benbasat, 1996; Chung *et al.*, 2003). Such goals are better understood and accepted by both sides. Another informal integration mechanism that is expected to bridge the mental and knowledge gap between IT and business are joint IS training (IIM5), for example, to learn with and from one another (e.g., Reich and Benbasat, 1996). Finally, studies have found evidence that jointly working on business process documentation (IIM6) is a means to spread knowledge across the business-IT boundary, thereby increasing IT employees' business understanding (e.g., Wagner and Weitzel, 2012). This last item (IIM6) is adopted from the strategic alignment literature, which indicates that documentation of strategies and plans improve social alignment at the strategic level (Powell and Dent-Micallef, 1997).

Hypothesis 6: Informal integration mechanisms are positively related to social capital between business and IT.

Hypothesis 7: Informal integration mechanisms are positively related to IT personnel's business understanding.

We argue that formal integration mechanisms create the conditions for the formation of social capital by creating an organizational context that affects the formation of relationships. This argument is connected to discussions about the organizational context shaping IS success variables (Ein-Dor and Segev, 1982; Raymond, 1990). In this respect, the literature highlights organizational maturity as a key variable corresponding to the formalization of processes and procedures. This could lead to further effects through a reduction in ambiguity since it implies standard procedures and rules (Dewett and Jones, 2001). As mentioned earlier, formal integration mechanisms aim primarily at setting the stage for building relationships, social linkage, and knowledge exchange. This leads to the expectation that the effect of formal integration mechanisms on social alignment and business performance will be weaker than the effect of informal integration mechanisms. Informal integration mechanisms directly create social capital and affect its outcome, namely IT personnel's business understanding. These mechanisms are directed explicitly at improving the facets of social alignment rather than just providing favorable environmental conditions. Hence, we expect informal integration mechanisms to affect social alignment and business performance more strongly.

Hypothesis 8: Informal integration mechanisms exhibit a larger effect on both social alignment between business and IT and business performance compared with formal integration mechanisms.

Research methodology

On the basis of the IT governance literature, in general (cf. model development section), and using the work of Peterson *et al.* (2000), in particular, as a starting point we performed a keyword search of the IS literature to identify IT governance mechanisms that are relevant to our research question. We used the search terms 'IT governance mechanisms', 'alignment' and 'antecedents', and similar combinations to screen various databases (e.g., Business Source Premier, AIS eLibrary). All major IS journals (including the 'Senior Scholars' basket') and large IS conferences (e.g., ICIS, ECIS) were considered. Two key inclusion criteria were then applied. First, we were only interested in IT governance mechanisms that can be implemented by managerial decision (referred to as 'foreground antecedents / behaviors' by Chan and Reich (2007b)), thus omitting general antecedents of alignment (referred to as 'background antecedents' by Chan and Reich (2007b); e.g., IT implementation success which cannot be created through single decisions or by implementing one specific practice). Second, as we are interested in analyzing how social alignment at the operational level can be achieved, we excluded IT governance mechanisms that are expected to unfold only at a strategic level (e.g., installation of an IT strategy committee). Finally, we used insights from a series of case studies to support our selection. For example, we did not include job rotation in our study as we had strong indications from case studies that this mechanism is seldom implemented in banks and would not provide sufficient variance. Table 1 depicts the identified IT governance mechanisms, which are all intended to bring high-level IT governance policies and decision-making authority to life.

To collect data for testing our hypotheses, we conducted a survey of the largest 1500 US banks (according to total assets at the end of 2006), based on a 2007 list of all US financial institutions in the US FDIC[2] database. The data were gathered in the context of one particular business process being conducted by two business units, sales and back office/after-sales, to grant and manage investment loans to small and medium-sized enterprises (SME credit process). Using a key-informant approach, we focused on the manager in charge of this particular business process. Focusing on a single business process enabled us to ensure that key informants were very knowledgeable about the interaction between business and IT units and business performance. To identify the manager in charge of the SME credit process, we contacted each bank by phone. We then sent the questionnaire directly to each key informant. 1213 out of the 1500 managers agreed to participate in our study and receive the questionnaire. After two reminders, we received 149 completed questionnaires, of which 132 data sets remained for analysis after 17 were removed because of missing values[3] (indicating a response rate of 10.9%). Since collecting data from top managers is challenging, the sample size is reasonable and comparable to other surveys in the alignment literature (e.g., Kearns and Lederer, 2003; Bergeron *et al.*, 2004; Valorinta, 2011).

With the smallest bank in our population accounting for total assets of US$423 million, all top 1500 banks are large banks, according to the FDIC definition. However, the risk of bias because of the inclusion of very large banks is small since we did not get a response from the top 50 banks which together account for more than 71% of all total assets among the largest 1500 banks. The largest bank in our sample is ranked #64 (total assets of $21 billion, see Table 2) and only eight banks report total assets of more than $5 billion. An overview of the distribution of different bank types (i.e. commercial *vs* thrift) is provided in Table 3.[4]

Table 1 Overview of IT governance mechanisms (categorized based on Peterson *et al.* (2000))

Category	*IT governance mechanism*	*Exemplary sources*
Formal integration mechanisms	IT represented on the executive board	(Brown and Magill, 1994; Armstrong and Sambamurthy, 1999; Weill, 2004; Preston and Karahanna, 2009; Tallon, 2013)
	Existence of a liaison unit/function for business-IT communication	(Luftman, 2000; Chatterjee *et al.*, 2002; Dhaliwal *et al.*, 2011; Zolper *et al.*, 2014)
	Regular joint meetings to control change processes	(Kearns and Lederer, 2003; Boddy and Paton, 2005; Sledgianowski and Luftman, 2005; Tarafdar and Qrunfleh, 2009; Dulipovici and Robey, 2013)
	Regular joint meetings to identify business process improvements	
Informal integration mechanisms	Top management support for business-IT collaboration	(Luftman *et al.*, 1999; Teo and Ang, 1999; Sharma and Yetton, 2003; Karahanna and Preston, 2013)
	Incentives for business-IT interaction	(Peterson *et al.*, 2000; Peterson, 2003)
	Colocation of business and IT staff (i.e. no geographical separation)	(Luftman, 2000; Govindarajan and Gupta, 2001; De Haes and Van Grembergen, 2009)
	Joint IT planning (i.e. high business involvement)	(Reich and Benbasat, 1996; Chatterjee *et al.*, 2002; Cragg *et al.*, 2002; Bradley *et al.*, 2012)
	Joint IS training (led by IT staff for business colleagues)	(Reich and Benbasat, 1996; Luftman, 2000; Peterson *et al.*, 2000; De Haes and Van Grembergen, 2009)
	Joint business process documentation between business and IT	(Onita and Dhaliwal, 2011; Wagner and Weitzel, 2012; Dulipovici and Robey, 2013)

Table 2 Data on size and financial performance of banks in sample and population[11]

Description	*Sample (n = 132)*	*Population (n = 1500)*
Total assets mean	$1717 million	$6947 million
Total assets standard deviation	$3083 million	$51,974 million
Total assets minimum	$423 million	$421 million
Total assets maximum	$20,840 million	$1,160,260 million
Total assets median	$724 million	$833 million
Return on assets (ROA) mean (end of Q1/2007)	1.06	1.04
Return on assets (ROA) standard deviation	0.52	0.81

Table 3 Proportion of different bank types (classification according to FDIC)[12]

Bank type ID	*Bank type description*	*Sample (n = 132)*	*Population (n = 1500)*
N	Commercial banks (national charter and Fed members)	34 (26%)	330 (22%)
SM	Commercial banks (state charter and Fed members)	17 (13%)	210 (14%)
NM	Commercial banks (state charter and Fed non-members)	53 (40%)	615 (41%)
SA	Federal savings associations	13 (10%)	150 (10%)
SB	Federal savings banks	15 (11%)	195 (13%)

Table A1 in the appendix gives an overview on the operationalization of each construct. The alignment components (SC and ITBU) and business performance were measured by reflective multi-item constructs. The measures were derived from previous literature, adapted to the financial services (credit business) domain, and validated in expert workshops and pre-tests before the formal survey in order to minimize semantic bias.[5] Both the formal and informal IT governance mechanism constructs were measured formatively by multiple items.

We used five control variables: (1) firm size (total assets, secondary data (FDIC)); (2) bank type (commercials *vs* thrifts, FDIC); (3) mergers and acquisitions activities (past 5 years before data collection, FDIC)[6]; (4) firm strategy[7]; and

(5) competitiveness of the environment.[8] Since it can be problematic to rely only on perceptual performance measures, we tested for correlations among self-reported measures and bank performance data (Return On Equity (ROE), Return On Assets (ROA)) from secondary sources (FDIC statistics for the first quarter of 2007). All correlations were significant at $P<0.05$ (Pearson coefficient). However, it has to be considered that ROA and ROE are firm-level measures while our study focuses on a single business process and so our items were assessing the performance of the SME credit business. This is also the reason why we could not use secondary data for testing our model. Overall, we can assume that it is adequate to use our collected performance data for the analysis.

In our analysis, we used Partial Least Squares (PLS) and applied smartPLS 2.0 M3 (Ringle *et al.*, 2007). PLS is used widely in the information systems field and has been chosen because we have a relatively small sample size, used formative measures, and because our study follows a rather exploratory approach regarding the question of effective IT governance mechanisms (cf. Gefen *et al.*, 2011). In order to determine the significance levels, we used bootstrapping with 2000 samples.

Data analysis and results

Measurement validation

In accordance with other studies (e.g., Henseler *et al.*, 2009), we performed tests to ensure the validity and reliability of all items and constructs in our model. First, as can be seen from the skewness and kurtosis values in Table A1 in the appendix, some of the items are not normally distributed – which is another reason why we preferred using PLS instead of covariance-based SEM. Next, we checked for indications of non-response bias. We compared the total assets of different groups within our population: (1) the overall population of 1500 *vs* the 1213 who initially agreed to participate; (2) the 132 usable responses *vs* the group of 1213; and (3) the 58 early respondents *vs* the 74 late respondents who answered after at least one reminder. No significant differences in any of the three comparisons were revealed. Moreover, we did not find any significant differences in the items used in our measurement model when comparing early and late respondents, except for the meeting items (FIM3/4). The early respondents stated having significantly fewer regular meetings than the late respondents. However, a comparison of the two groups in regards to the correlation between FIM3/4 and the endogenous variables (SC and ITBU) showed no significant structural differences.

Further, we tested for the possible existence of common method bias by applying the Harman single factor test (Podsakoff *et al.*, 2003), the results of which confirmed that no single component explains more than 50% of total variance shared by all items (the highest fraction of variance explained by a single factor is 31.8%). Finally, we tested the reliability and validity of the measurement instruments. All items load highly on their respective construct (>0.707) (Hulland, 1999). Similarly, the commonly accepted criteria for construct reliability, convergent and discriminant validity are fulfilled (see Appendix, Table A2): the composite reliabilities are clearly above the 0.7 threshold (Nunnally, 1978), average variances extracted (AVE) are above the minimum cutoff of 0.5 suggested by Chin (1998), the square root of the AVE is higher than the cross-correlations among the latent variables in all cases (Gefen *et al.*, 2000).

In addition to the reflective measurement models, we applied tests regarding the two formatively measured constructs. Just one out of the ten items was not significant at $P \leqslant 0.05$. We also checked for possible inflation from multicollinearity by calculating the variance inflation factors (VIFs). VIF values did not exceed 2.9, thus attesting to the absence of multicollinearity in our items. The key reason for using a formative measurement model was that the model consists of clearly defined, single IT governance mechanisms. For measurement model specification, we followed the approach of Jarvis *et al.* (2003), which revealed that the IT governance mechanisms form their constructs as each of these is an individual measure that can be implemented by an organization at will. Accordingly, the items are not interchangeable and therefore have to be aggregated to a formatively rather than a reflectively measured construct.

Overall, our tests on data quality as well as measurement validity and reliability led us to conclude that we have a solid foundation for evaluating the structural model in the next section.

Test of structural model

The PLS test results are presented in Figure 2. Both the social capital between business and IT (H1; $\beta = 0.194$; $P<0.05$) and the business understanding of IT personnel (H2; $\beta = 0.174$; $P<0.05$) of social alignment are positively and significantly related to business performance. Furthermore, there is a significant positive effect of social capital between business and IT on IT personnel's business understanding (H3; $\beta = 0.152$; $P<0.05$). Formal integration mechanisms reveal a

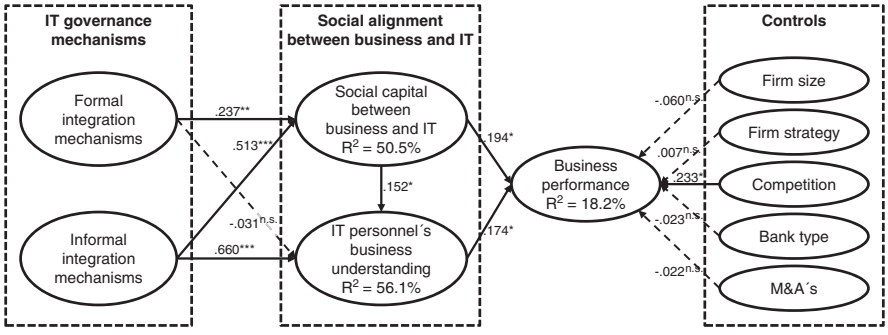


Figure 2 Results of the PLS analysis (* $P<0.05$, ** $P<0.01$, *** $P<0.001$).

positive and significant effect on social capital between business and IT (H4; $\beta = 0.237$; $P<0.01$), while informal integration mechanisms show positive and significant effects on both business understanding of IT personnel (H6; $\beta = 0.660$; $P<0.001$) and social capital between business and IT (H7; $\beta = 0.513$; $P<0.001$).

To evaluate the differential impacts of FIM and IIM (H8), we compared the total effects of both variables on SC, ITBU, business performance (group comparison of total effects are based on 500 bootstraps). The informal integration mechanisms reveal significantly stronger total effects on business performance (FIM: 0.047 *vs* IIM: 0.228; $P<0.001$ based on a Mann-Whitney test), on SC (FIM: 0.237 *vs* IIM: 0.513; $P<0.001$), and on ITBU (FIM: 0.005 *vs* IIM: 0.737; $P<0.001$), leading to a full support of H8. Thus, with the exception of H5 (FIM→ITBU), all hypotheses are supported.

Relationship between governance mechanisms and business performance

In this section, we leave the construct level and turn to the individual IT governance mechanisms, that is, indicator level, and report the results of a post hoc analysis to better understand how these individual governance mechanisms influence business performance. We first reduced the PLS model tested above to include only one governance mechanism at a time (instead of the two exogenous formative constructs), leaving the remainder of the model intact. Table 4 shows the total effects on each of the endogenous constructs. We are particularly interested in the total effect on business performance in the last column.

TMT support of business-IT interplay, IT representation on the executive board, and joint IS training exhibit the strongest relationships with business performance, while incentives, regular meetings to control changes, and colocation show the lowest total effects.

We then examined how the relationship between each IT governance mechanism and performance is mediated by SC *vs* ITBU, that is, what proportion of the total effect of an IT governance mechanism on business performance (as exhibited in Table 4) is explained by which component of social alignment. This mediation analysis complements the previous model test results since it allows us to investigate not only *whether* there is a contribution of a certain IT governance mechanism to business performance, but also *how* it contributes. In this step, we again used the reduced models that only include one single governance mechanism at a time to avoid distortion by the other mechanisms. Since we are only interested in the variance accounted for by the different paths from the mechanism to the ultimate dependent variable, but not in the variance accounted for by the mechanism itself, this approach produces clearer results.

Table 5 provides the VAFs (variance accounted for), which answer the question of *how* IT governance mechanisms contribute to business performance (Shrout and Bolger, 2002). Since our model contains multiple paths from an IT governance mechanism to performance, we provide several VAF scores, both including and excluding each of the alignment components (cf. Figure 3 for clarification). Table 5 states the relative proportion of the total effect that can be attributed to the different paths running from the particular governance mechanism to performance. For example, the impact of 'IT on board' on performance can be separated into one portion explained by the path: 'IT on board' → SC → performance (VAF = 20.7 %), a second portion explained by the paths: IT on board → ITBU → SC → performance *and* IT on board → ITBU → performance (VAF = 17.0 %) and the residual path: 'IT on board' → performance (VAF = 62.3 %).[9] Figure 3 clarifies the differences.

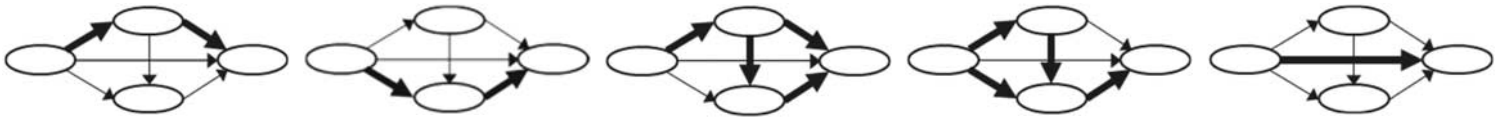
The results reveal the following:

First, the effect of most IT governance mechanisms on performance is explained to a significant degree by social alignment. The only exception is *IT representation on the executive board*, where 62.3% of the impact on performance is *not* explained by social alignment (cf. column V).

Table 4 Total effects of IT governance mechanisms (*$P<0.05$; **$P<0.01$; ***$P<0.001$)

	IT governance mechanisms	*Mean score of implementation level 1 (low) to 5 (high)*	*Total effects of IT governance mechanisms on …*		
			… social capital between business and IT	*… IT personnel's business understanding*	*… business performance*
Formal integration mechanisms	FIM1 IT on executive board	3.66	0.390***	0.242**	0.247**
	FIM2 Liaison unit	2.66	0.318***	0.448***	0.207*
	FIM3 Regular meetings to control change processes	3.33	0.580***	0.486***	0.119*
	FIM4 Regular meetings for process improvements	3.09	0.553***	0.504***	0.180*
Informal integration mechanisms	IIM1 TMT support	3.67	0.566***	0.480***	0.270**
	IIM2 Incentives	2.24	0.172*	0.377***	0.136*
	IIM3 Colocation	2.90	0.112$^{n.s.}$	0.127$^{n.s.}$	0.047$^{n.s.}$
	IIM4 Joint IT planning	3.05	0.594***	0.630***	0.216**
	IIM5 Joint IS training	2.52	0.427***	0.572***	0.244**
	IIM6 Joint process documentation	3.03	0.519***	0.562***	0.214**

Table 5 Variance accounted for (VAF) regarding the mediation of the impact of IT governance mechanisms on performance by social alignment (columns (I)+(IV)+(V) = (II)+(III)+(V) = 100%)

IT governance mechanism	*Proportion of impact of a certain IT governance mechanism on performance (VAF: Variance Accounted For)*				
	… explained solely by SC (%)	*… explained solely by ITBU (%)*	*… explained by SC (incl. via ITBU) (%)*	*… explained by ITBU (incl. via SC) (%)*	*… residual effect (direct) (%)*
IT on board	20.7	1.0	36.7	17.0	62.3
TMT support	28.5	11.8	43.3	26.7	44.8
Incentives	23.8	34.1	35.0	45.3	30.9
Liaison unit	27.6	20.3	38.7	31.5	41.0
Colocation	45.2	23.3	70.2	48.3	6.5
Regular meetings for process improvements	39.4	12.0	54.6	27.3	33.4
Regular meetings to control change processes	46.6	21.8	67.9	43.1	10.3
Joint IT planning	46.4	32.3	61.3	47.1	6.5
Joint IS training	30.4	21.3	40.2	31.1	38.5
Joint process documentation	43.2	27.8	60.1	44.6	12.2
Paths in focus					
	(I)	(II)	(III)	(IV)	(V)

As a way to facilitate greater understanding of Table 5, consider the example of 'joint process documentation'. The two dimensions of social alignment, that is, SC and ITBU, mediate the effect of this IT governance mechanism on performance by 27.8%+60.1% (columns II+III) = 43.2%+44.6% (columns I+IV) = 87.8 %. The residual direct effect explains the remaining 12.2 % (column V).

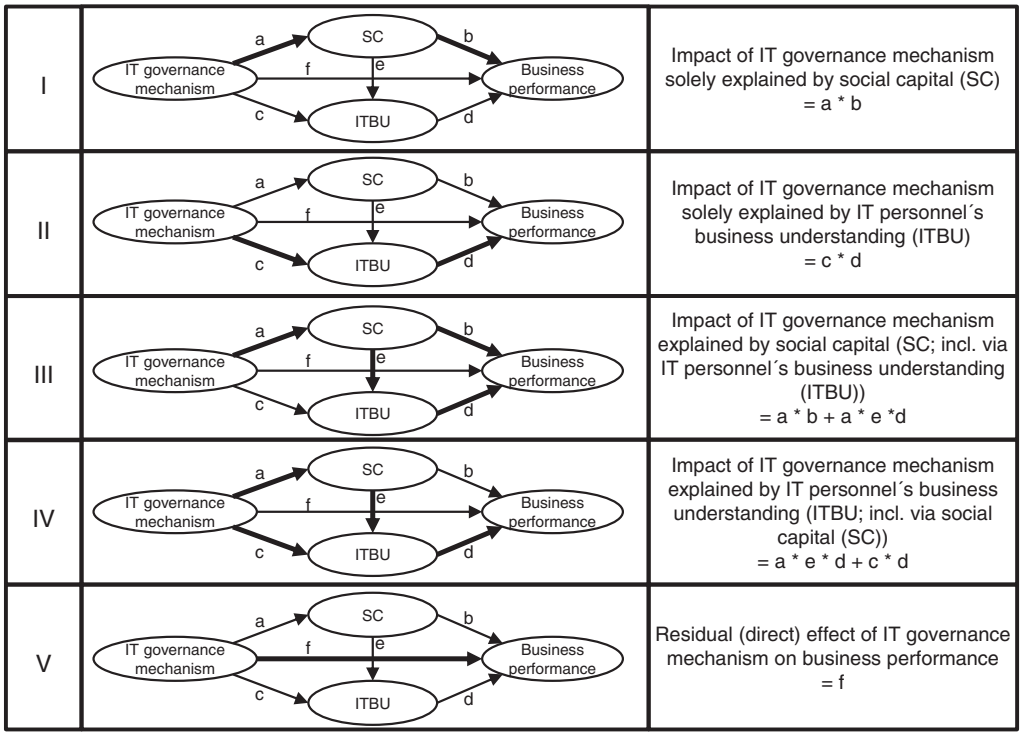


Figure 3 Different explanations (causal chains) of the impact of an IT governance mechanism on performance.

Second, when comparing columns I (i.e., the impact of an IT governance mechanism explained solely by SC) *vs* IV (the portion of this IT governance mechanism's impact explained by ITBU) we find that, for most IT governance mechanisms, the mediation by only social capital (column I) bears a substantial proportion for explaining the impact on performance. In most cases the value in column I is quite similar in size and in some cases is even larger than the value in column IV. This highlights the importance of social linkages not only for effective knowledge exchange but also for social embeddedness that fosters, for example, joint problem solving (Uzzi, 1997) or clan control (Kirsch *et al.*, 2010). The only exception is *incentives for interaction*. This might indicate the challenge of creating incentive compatibility through financial or other means.

Third, comparing columns II and III allows an analysis of the degree to which IT governance mechanisms have a *direct* impact on knowledge exchange *vs* an impact that is mediated by social capital. These values refer to the different types of knowledge to be exchanged. The transfer of codifiable knowledge does not require a social linkage between sender and recipient while the transfer of tacit knowledge does. It is characteristic that even an action which is, primarily, focused on the exchange of codifiable knowledge such as the joint creation of a process documentation induces its stronger effect via social capital. To varying degrees, this holds true for all analyzed IT governance mechanisms.

Discussion

In the following discussion of our findings, we will first focus on the supported *vs* rejected hypotheses before we turn to the role of single governance mechanisms. Finally, the limitations of our approach and data as well as avenues for further research are discussed.

Relationship of IT governance mechanisms, social alignment and performance

Both dimensions of social business-IT alignment positively influence business performance

As hypothesized, our results show that both dimensions of social alignment (SC and ITBU) positively influence business performance. This is in line with the extant literature (Tsai and Ghoshal, 1998). In a similar vein, we show that SC positively affects ITBU. This is consistent with a major assertion of social capital theory (Nahapiet and Ghoshal, 1998). These parts of our model build intentionally upon existing research and are fully consistent with findings elsewhere in the literature.

Formal IT governance integration mechanisms improve social capital between business and IT, but not (directly) IT personnel's understanding of business

Formal integration mechanisms influence social capital by supporting relationships between business and IT. For example, liaison units are designed to span the business-IT boundary and to facilitate interaction and collaboration. However, these mechanisms are not intentionally designed to *directly* improve IT personnel's understanding of business. Exchange of experiences and often tacit knowledge requires tight social linkages (which might emerge as a consequence of formal mechanisms, such as regular meetings) and informal mechanisms that are explicitly intended to bring people together in an environment in which they can exchange ideas and learn both from each other and together.

Informal IT governance integration mechanisms have a positive effect on both dimensions of social alignment
Informal integration mechanisms strongly impact IT personnel's understanding of business by fostering business and IT knowledge as a way, for example, to develop integrated plans. Mechanisms such as joint work have been found to foster knowledge sharing and the social construction of knowledge (Eisenhardt and Santos, 2002). Joint elaboration and alignment of business process documentation reinforces knowledge exchange across domains, critical discussion, and new combinations of knowledge (Wagner and Weitzel, 2012). Such collaborative work is an example of an informal integration mechanism requiring exchange of knowledge and discourse. It also influences social capital by ensuring frequent interactions between business units and IT, creating a shared vocabulary, and trust.

Informal IT governance integration mechanisms have a larger effect on social alignment and performance than formal integration mechanisms
Our study indicates that informal integration mechanisms have a significantly larger effect on all dependent variables than formal integration mechanisms. This suggests that organizations should not primarily focus on practices like liaison functions but should rather implement joint IS training and foster collaborative IT planning as a way to increase social alignment. We propose that informal integration mechanisms allow for more flexible collaboration between business and IT, while formal mechanisms can, particularly in the fast-changing banking industry, maneuver the firm into a 'rigidity trap' because of an overbearing alignment process. The need for a minimum baseline of flexibility and informality is also supported by Ciborra (1994), who argued that IS alignment was more a process of bricolage, improvisation and tinkering, rather than the execution of an intended strategy.

Effectiveness of IT governance mechanisms

Considering the question of how to implement social alignment, that is, what are effective IT governance mechanisms, the PLS analysis has revealed a significant but diverse impact of various mechanisms on social alignment and performance. As shown in Table 4, the mechanisms most strongly related to business performance are, with decreasing total effects[10]: *top management support of business-IT interplay; IT represented on the executive board; joint IS training, joint IT planning, joint development of business process documentation; and liaison units*.

Interestingly, some of the IT governance mechanisms often mentioned as alignment remedies, such as *meetings, incentives and reward systems*, or *colocation* show lower total effects on business performance (cf. Table 4). Possible reasons for this are discussed in the examination of the impact of selected governance mechanisms below.

Joint development of business process documentation is very important, yet rarely completely implemented
Mutual activities increase social alignment as the process of joint work creates interactions that facilitate knowledge transfer. This result supports recent findings showing that jointly developing process documentation in a global aerospace firm was the most important mechanism for fostering social alignment at an operational level (Wagner and Weitzel, 2012). Process mapping helps to go beyond transferring explicit knowledge about *how* things are done in other units (know-how) to also include *why* things are done in a specific way (know-why). Given its high impact, it is surprising how infrequently jointly documenting business processes is implemented in the surveyed banks (mean of 3.03 on a scale from 1 (low implementation) to 5 (high implementation)). This mechanism may be an effective way to achieve two goals, that is, well-documented processes and an increase in social alignment. While studies have identified the positive effect of documenting strategies and plans at a strategic level, our study empirically underscores that joint documentation is also effective at an operational level. This opens opportunities for further research regarding optimal documentation procedures.

Regular meetings on specific topics only have comparatively small effects on social alignment
Somewhat surprisingly, although regular meetings are frequently instituted to achieve social alignment, they have comparably low effects on business performance, even though they are quite effective in fostering relationships and building social capital. One reason that meetings among staff have a relatively low total effect on business performance is that they do not add value *per se* but rather enable possible advances in shared knowledge and cognitive linkage. We think this is one of many focal areas deserving longitudinal research on the development of IT governance mechanisms and alignment. Our data also show that the respondents were satisfied with the number but not with the quality of their meetings. This emphasizes the superior effectiveness of other mechanisms like jointly developing process documentations, joint IS training, and joint IT planning, as all of those mechanisms give participants something particular to interact on. At the same time, the results of interaction triggered by these mechanisms provide a foundation for later and better-informed discussions, for instance about improvements in a business process or an information system.

Top management support for business-IT collaboration and IT representation on the executive board are key to social alignment at an operational level
These 'cross-level' effects of strategic-level mechanisms on operational-level social alignment are comparably strong. Moreover, and in contrast to the other mechanisms, Table 5 shows that, while some variance of their impact is explained through the social capital component, the most substantial impact is via the residual effect (i.e., *neither* explained by the creation of social capital *nor* by an increase in IT personnel's business understanding). These findings are in line with previous studies on alignment (e.g., Kearns and Lederer, 2003; Preston and Karahanna, 2009), but additionally indicate that social coherence among the TMT not only fosters alignment on the shop floor but also directly improves IT service provisioning, for example by driving firm-wide integration and utilization of resources.

Varying implementation levels of the high-impact mechanisms reveal potential for improvement in organizations with poor social alignment

Looking at how well the surveyed firms have implemented the various IT governance mechanisms (see mean values in Table 4), it is interesting to see that banks seem to perform exceptionally well at those mechanisms that have a long implementation history in IT governance, such as top management support (mean of 3.67 on a scale from 1 (low implementation) to 5 (high implementation)) and IT representation on the executive board (3.66). We find surprisingly low degrees of implementation for other mechanisms such as joint IS training (2.52) and joint IT planning (3.05) but, as mentioned above, also for jointly developed process documentation (3.03). Accordingly, banks can better exploit the potential of bringing business and IT together by implementing those simple, inexpensive, and highly effective measures.

These findings support our conclusion that the transfer of explicit or codifiable knowledge is important but does not require a particular social linkage among individuals. In contrast, effectively exchanging tacit knowledge does involve social capital, which is more difficult to create and manage. Conjointly, these findings offer a plausible case for why implementing alignment is so notoriously challenging.

Colocation and interaction incentives only play minor roles in the creation of social alignment in the banking industry

Both mechanisms exhibit low total effects with regard to all dependent variables. While colocation might be generally difficult to implement in larger banks with distributed business structures but centralized IT units, colocation seems to have lesser relevance in operational settings than in, for example, IT project environments, where much more interaction between business and IT is needed to create new IS that supports the business in a highly effective way.

One possible explanation for why incentives play a minor role could be that sales employees are primarily rewarded for actual loan sales, which are easy to measure. Since social business-IT alignment is more difficult to quantify, using incentives to promote this alignment is more challenging, and employees, as it is known from agency theory, will prefer to focus on the easy-to-measure indicators to meet their performance objectives.

Limitations

As with all empirical research, our work faces several limitations. First, the list of investigated IT governance mechanisms does not represent an exhaustive list. While many of these mechanisms depend on context and change, we have focused on mechanisms that have been investigated by previous studies, though mostly not conjointly or based on data sets not allowing for statistical comparison. Although we could have considered further mechanisms (e.g., job rotation or job shadowing), our literature review, expert workshops, and pre-study interviews indicate that our mechanisms are relevant and our results support their importance for social alignment and business performance. Future research could enhance our understanding of specific IT governance mechanisms and add other relevant IT governance mechanisms.

Second, we collected data from a single source at a single point in time. Although our tests did not indicate common method variance, we still cannot exclude this possibility. However, our focus on comparative arguments (i.e., the relative impact of different IT governance mechanisms) would reduce an impact of common method bias on our results.

Third, our construct IT personnel's business understanding refers to business domain knowledge of IT personnel but not business personnel's IT knowledge. While studies show that business and IT personnel are not required to both have deep knowledge of each other's domains (Tiwana, 2012), a dyadic assessment would more comprehensively illuminate the effects of business and IT understanding. While business staff should be able to use all relevant functionality of IT applications effectively and efficiently without being burdened by technical issues, especially in bank branches where employees should spend as much time as possible meeting customers' needs, we argue that ITBU is significantly more important than how well business personnel understand IT at an operational level because IT personnel need sufficient business knowledge to design, implement, and change IT to meet business requirements. We reduced potential respondent bias by asking business unit employees to assess IT personnel's understanding of business.

Fourth, we collected data in a single country, a single industry, a single business domain, and regarding a single business process, which limits the generalizability of our findings. However, the strength of our approach is that the measurement is close to the locus of where business value of IT is actually created (Tallon *et al.*, 2000). For instance, IT intensity, alignment, and performance will naturally differ across business processes in a firm – measurement at the firm level will only capture an aggregated 'average picture'. We chose the banking industry and the business units involved in granting and managing SME loans because it is a very IT-intense industry in which alignment is particularly important and because the credit process requires both technical and human involvement, which makes collaboration between business departments and IT units even more important. We expect that the overall importance of alignment and of the mechanisms we identified will be lower in processes and industries in which IT plays a smaller role than in banking, since with lower IT investment the potential for both cost and value-adding synergies will be smaller, thus also reducing the need for highly effective IT governance.

Future research

As discussed in the limitations section above, our study took a uni-dimensional perspective, assessing only the business understanding of IT personnel. While we argue that ITBU is more relevant, a dyadic perspective that also considers the impact of how well business personnel understand IT's impact on business performance may yield a more complete picture. Generally speaking, our model and the IT governance mechanisms we identified need to be tested in other contexts, business processes, and industries. Consistent testing would also allow the impact of social alignment between IT and business units on business performance to be compared among high, medium and low IT spenders. As additional relevant mechanisms are identified, they should be added to the model to further strengthen our understanding of their relative efficacy. Future research into possible synergies, complementarities, and dependencies between and among IT

governance mechanisms may take a configurational approach to unravel additional insights in terms of effective *combinations* of multiple IT governance mechanisms. Finally, as with any research that takes a snapshot perspective, it would be useful to track the impact of IT governance mechanisms over time. By using a panel of participating firms, early stage findings from longitudinal case studies such as by Wagner and Weitzel (2012), could be extended to significantly deepen our understanding of how social alignment is created.

Conclusion

Our findings contribute to research by supporting the operational level view of social alignment and by theoretically and empirically linking IT governance mechanisms to social alignment (in terms of a social capital component and IT personnel's business understanding) and business performance. We have shown that social capital is critical in transferring explicit and tacit knowledge across firm unit boundaries. This helps explain hitherto baffling observations that simply communicating more often does not, contrary to expectations, improve alignment or relevant knowledge transfer. From a managerial perspective, our results are useful as they reveal the importance of considering the social embeddedness of actors and actions when assessing potential relevance. This implies focusing more on creating social alignment in terms of social capital among business and IT personnel and IT personnel's business understanding by instituting various IT governance mechanisms such as joint IT planning and top management support. In our study, we unraveled the differential impact of formal *vs* informal integration mechanisms on social alignment and performance, identifying informal mechanisms as being more effective when it comes to promoting social alignment at the operational level, guiding researchers and practitioners alike to pay closer attention to informal IT governance mechanisms in their work.

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Notes

1 According to the InformationWeek Analytics Surveys of InformationWeek 500 executives (2002–2010), the financial services industry (including banks) spends, on average, around 7% of annual revenues on IT (www.informationweek.com).
2 Federal Deposit Insurance Corporation, www.fdic.gov.
3 For those items that contained only a few missing values (less than 12.5 % of the used data set), we applied the regression algorithm for missing value treatment in SPSS 18.
4 Since collecting our data, 11 (8.3%) of the participating banks have disappeared from the market, compared with 132 (8.8%) of the largest 1500 banks which have disappeared from the market according to FDIC's failed bank list (https://www.fdic.gov/bank/individual/failed/banklist.html). Thus, there is no indication of a survivorship bias in our sample.
5 We conducted a workshop with banking industry experts from a renowned consultancy firm. Further, we involved two university research groups that specialize in banking research. To validate the assignment of the different governance mechanisms to either the group of formal or informal governance mechanisms (based on Peterson (2003)), we conducted a card sorting with nine IT governance experts who assigned each governance mechanism to one of the groups. Five of the ten governance mechanisms were assigned to the correct category by each respondent; overall, eight mechanisms were assigned to the correct category by more than 75% of the respondents. The two remaining mechanisms (colocation and joint IT planning) were also assigned to the right category by the majority, but the percentage was lower. Therefore, we also tested the PLS model with intentionally incorrectly specified measurement models (each of the mechanisms assigned to the wrong category); this robustness check showed no structurally different results compared to the ones shown in Figure 2. Finally, we did several pre-tests with managers from banks using a think-aloud approach.
6 Binary item built from the 'change codes' in the FDIC list (0 if no absorption, consolidation, or merger related code was included for the past 5 years before data collection; 1 if at least one such code was present).
7 Single survey item providing three statements of which the one best representing the bank's strategy type should be marked: first mover (13.6%; 'We are always the first to introduce new technologies and products.') *vs* fast follower (34.1%; 'We observe the actions of our competitors and follow rapidly.') *vs* secure follower (52.3%; 'We take over new technologies and processes if they have been proved to be successful by others.').
8 Single survey item: 'Our corporate loans business acts in a highly competitive environment.' (5-point Likert scale ranging from 'strongly agree' to 'strongly disagree').
9 The VAFs are calculated by multiplying the path coefficients along the causal chain and dividing the resulting product by the total effect (which is in turn the sum of the products of the coefficients along *all* causal chains).
10 Note that the total effect means of the integration mechanisms are significantly different (according to Mann-Whitney) except those among 'IT on executive board' and 'joint IS training' ($t = 0.206$) as well as between 'joint development of process documentation' and 'joint IT planning' ($t = 0.530$), 'joint development of process documentation' and 'liaison unit' ($t = 0.259$), and 'joint IT planning' and 'liaison unit' ($t = 0.090$).
11 We conducted Mann-Whitney tests to check for equal distribution of both total assets and return on assets when comparing our sample and the population (total assets: $t = 0.064$, $P<0.05$; return on assets: $t = 0.461$, $P<0.05$).
12 A χ^2 test revealed no significant differences between population and sample in regard to bank types ($\chi^2 = 1.448$, $P = 0.836$).

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About the Authors

Frank Schlosser is Doctoral student at the Department of Information Systems and Services at the University of Bamberg, Germany, where he also worked as a Graduate Research Assistant before joining Softplant GmbH, Germany, as a Consultant in Enterprise Architecture Management. His work on business-IT alignment, service-oriented architectures, IT governance, and IT/IS outsourcing has been published at all major IS conferences.

Daniel Beimborn is Professor of Information Systems at the Frankfurt School of Finance and Management, Germany. His research on outsourcing, service-oriented architectures, shared services, standardization, and IT management has been published in journals including *MIS Quarterly, Journal of Strategic Information Systems, International Journal of Information Management*, and *Business and Information Systems Engineering*.

Tim Weitzel is Professor and Chair of Information Systems and Services at the University of Bamberg, Germany. His research on IT management, standardization, eHRM, and technostress has been published in *MIS Quarterly, Journal of MIS, European Journal of IS, Information Systems Journal, Journal of Information Technology, Journal of Strategic IS, MIS Quarterly Executive*, and *Business and Information Systems Engineering*.

Heinz-Theo Wagner is Professor of Management and Innovation at the German Graduate School of Management and Law (GGS), Heilbronn. He received his Ph.D. for his research on IT business alignment from Goethe University in Frankfurt. His research on IT business alignment, IT management, and innovation has been published in journals such as *MIS Quarterly Executive, International Journal of Innovation Management, International Journal of Information Management*, and Conference Proceedings such as the International Conference on Information Systems.

Appendix

Table A1 Overview of constructs and items (including descriptive statistics; all items were measured on a 5-point Likert scale): 5 – totally agree; 1 – totally disagree

ID	*Item*	*Mean*	*S.D.*	*Skewness*	*Kurtosis*	*Exemplary sources*
Formal IT governance integration mechanisms						
FIM1	The IT unit is sufficiently represented in our bank's executive board.	3.66	1.192	−0.725	−0.299	(Armstrong and Sambamurthy, 1999; Weill, 2004; Preston and Karahanna, 2009; Tallon, 2013)
FIM2	There is a specific organizational unit or function to improve the communication between IT and the back office.	2.66	1.098	0.103	−0.685	(Luftman, 2000; Chatterjee *et al.*, 2002; Dhaliwal *et al.*, 2011)
FIM3	There are meetings on a regular basis between IT and back office to control change processes.	3.33	1.030	−0.481	−0.087	(Kearns and Lederer, 2003; Boddy and Paton, 2005; Sledgianowski and Luftman, 2005; Tarafdar and Qrunfleh, 2009; Dulipovici and Robey, 2013)
FIM4	There are meetings on a regular basis between IT and back office to identify business process improvements.	3.09	1.056	−0.187	−0.510	
Informal IT governance integration mechanisms						
IIM1	Top management actively supports interplay between business and IT.	3.67	1.061	−0.759	0.319	(Luftman *et al.*, 1999; Teo and Ang, 1999; Sharma and Yetton, 2003; Karahanna and Preston, 2013)
IIM2	There are explicit incentives rewarding good interaction with the IT unit.	2.24	1.011	0.456	−0.277	(Peterson *et al.*, 2000; Peterson, 2003)
IIM3	IT and back office operations are geographically separated. *(reverse item)*	2.90	1.517	0.234	−1.433	(Luftman, 2000; Govindarajan and Gupta, 2001; De Haes and Van Grembergen, 2009)
IIM4	The back office is proactively involved into IT planning.	3.05	1.146	−0.166	−0.791	(Reich and Benbasat, 1996; Chatterjee *et al.*, 2002; Cragg *et al.*, 2002; Bradley *et al.*, 2012)
IIM5	IT employees lead IS technical training for sales and back office people.	2.52	1.132	0.091	−1.149	(Reich and Benbasat, 1996; Luftman, 2000; Peterson *et al.*, 2000)
IIM6	Any process documentation is developed/ maintained in close interaction between business departments and IT unit.	3.03	1.049	−0.205	−0.315	(Onita and Dhaliwal, 2011; Wagner and Weitzel, 2012; Dulipovici and Robey, 2013)
Social capital component of social business-IT alignment						
SC1	There is mutual trust and respect between IT unit and the back office.	3.69	1.023	−0.762	0.166	(Teo and Ang, 1999; Bhatt, 2003; Luftman, 2003)
SC2	IT and back office are equal partners when it comes to credit application software changes.	3.19	1.054	−0.290	−0.406	(Luftman, 2003)
SC3	A change to the credit application software used in the credit process is implemented in close interaction between back office and IT.	3.70	0.981	−0.865	0.778	(Broadbent and Weill, 1993; Chung *et al.*, 2003)
Business understanding of IT personnel component of social business-IT alignment						
ITBU1	IT employees are able to interpret business related problems and develop solutions.	3.06	1.062	−0.115	−0.568	(Broadbent and Weill, 1993; Reich and Benbasat, 1996; Teo and Ang, 1999; Bhatt, 2003)
ITBU2	IT employees know the SME credit business process.	2.38	1.075	0.347	−0.842	(Broadbent and Weill, 1993; Reich and Benbasat, 1996; Teo and Ang, 1999; Bhatt, 2003)
ITBU3	IT employees inform the back office about IT-specific issues using non-technical and business-related terminology.	3.07	0.991	−0.465	−0.305	(Reich and Benbasat, 2000; Bassellier and Benbasat, 2004)

Table A1 Continued

ID	*Item*	*Mean*	*S.D.*	*Skewness*	*Kurtosis*	*Exemplary sources*
Business performance						
BP1	The configuration of our credit process allows us to sustain a competitive advantage in the relevant market.	3.81	0.982	−0.838	0.355	(Griffiths and Finlay, 2004)
BP2	The configuration of our credit process allows us to differentiate ourselves from the competitors in the relevant market.	3.77	0.964	−0.654	0.201	(Hult *et al.*, 2002; Griffiths and Finlay, 2004)
BP3	Compared with our competitors, the design of our business loans process is … (much better 1 … 5 much worse).	3.58	0.838	−0.189	−0.107	(Gopal *et al.*, 1993; Chan *et al.*, 1997; Wagner, 2007)

Table A2 Construct reliability and validity, inter-construct correlations

	Construct	*Cronbach's Alpha*	*C.R.*	*AVE*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
IT governance mechanisms	1 – FIM	formative measurement			n/a									
	2 – IIM				0.662	n/a								
Social business-IT alignment	3 – SC	0.777	0.870	0.691	0.628	0.594	0.831							
	4 – ITBU	0.724	0.845	0.646	0.567	0.641	0.590	0.804						
Performance	5 – BP	0.839	0.903	0.755	0.242	0.330	0.314	0.315	0.869					
Controls	6 – Firm size	single items			−0.042	−0.098	0.007	−0.095	−0.080	n/a				
	7 – Strategy				−0.171	−0.102	−0.143	−0.053	−0.036	−0.028	n/a			
	8 – Competition				0.046	0.091	0.094	0.080	0.263	0.011	−0.025	n/a		
	9 – Bank type				−0.041	0.045	0.130	−0.014	0.031	0.022	0.123	0.134	n/a	
	10 – M&A's				−0.140	−0.058	0.010	−0.075	−0.073	0.287	−0.011	−0.097	0.003	n/a