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OPERATIONAL ALIGNMENT IN HOSPITALS – THE ROLE OF SOCIAL CAPITAL BETWEEN IT AND MEDICAL DEPARTMENTS

Complete Research

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Abstract

This research examines how business-IT alignment at the operational level in hospitals is constituted and how operational business-IT alignment facilitates value creation. A conceptual model of operational alignment is developed and empirically tested in German hospitals. Conceptualized as cross-functional interconnectedness enabling purposeful collaborative processes between business and IT, it is shown that operational alignment is particularly constituted by strong relations between business and IT, mutual trust and cognitive linkages. Results show a strong impact of cross-functional cooperation on IT business value. Cross-functional cooperation is found to influence value both directly and mediated through the degree to which information systems fit with requirements, working processes, and existing practices of medical departments. Overall, it is demonstrated that social capital between business and IT unfolding in effective collaboration at the operational level facilitate the creation of IT business value. The results may motivate practitioners to take measures in order to strengthen social capital and, hence, blur boundaries between business and IT, particularly in hospitals.

Keywords: Business-IT alignment, hospital, social capital theory, cross-functional cooperation

1 Introduction

Aligning business and information technology (IT) is a long-standing issue of discussion both in information systems (IS) research and practice (Chan and Reich, 2007; Kappelman et al., 2013). Cultivating business-IT alignment is expected to intensify utilization of IT, increase profitability and generate sustainable competitive advantage (Gerow et al., 2014; Kearns and Lederer, 2003). In contrast, failing to evolve business-IT alignment could lead to poor resource allocation and failed IT initiatives, which adversely affects firm performance (Chen et al., 2010; Ravishankar et al., 2011).

Prior research proposes that alignment is required at strategic and operational levels within and across business and IT (Chan and Reich, 2007; Venkatraman, 1989). However, past research predominantly focused on the strategic perspective of alignment, that is, the fit between IT/business mission, objective, and plans (Reich and Benbasat, 2000). Reaping the fruit of aligned strategies most likely requires reconfiguration of organizational structures, processes and related IT assets (Baker et al., 2011), which occurs at the operational level. Alignment at this level aims at maintaining an optimal fit between business infrastructures and processes and IT infrastructure and processes (Henderson and Venkatraman, 1999), which requires business and IT staff to cooperate. Unfortunately, divergent interests and points of views are inevitable when individuals from multiple functional areas work together (Pinto et al., 1993). This underlines the importance of social aspects of business-IT alignment, particularly regarding the effectiveness of business-IT relationships (Chan, 2002; Luftman et al., 2013). Lately, Wagner et al. (2014) demonstrate that matured business-IT alignment at the operational level enables organizations to

better leverage their IT resources. Their studies show that particularly the interaction between business and IT in daily business positively impacts IT staff's ability to solve operational problems and to fulfil change requests (Wagner et al., 2014; Wagner et al., 2006).

Since mechanisms facilitating business-IT alignment at non-strategic levels have only received limited attention in academia (Ward, 2012), we focus our research on social business-IT linkages at the operational level. With this in mind, we draw on social capital theory (SCT) to examine the interrelationships of business and IT in daily business operations and how these affect IT business value. Defined as "the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet and Ghoshal, 1998, p. 243), social capital is found to be positively related to diverse organizational outcomes generated through social interactions (Newell et al., 2004; Reagans and Zuckerman, 2001; Subramaniam and Youndt, 2005; Wang et al., 2006). Building on these arguments, we propose that social capital drives cross-functional cooperation between business and IT at operational levels and, in turn, creates IT business value.

We further follow Chan and Reich (2007) suggestion to focus on specific industries by examining operational alignment in hospitals. Driven by strategic considerations about digitizing healthcare processes, expectations in IT are very high (Chaudhry et al., 2006; Erstad, 2003; Hillestad et al., 2005; Stead, 2007; Zheng et al., 2005). Many hospitals, however, are characterized by a deep alignment-gap between IT and medical departments. This gap is reflected by information systems that do not fit to the requirements of medical structures and processes (Weeger and Gewald, 2014; Weeger et al., 2013). Further, the unique characteristics of hospitals and their actors, particularly in terms of structural and professional differentiation, are expected to enhance the understanding on the constitutive elements of operational alignment. Investigating clinician-IT linkage on non-strategic levels and their impact on IT business value is expected to contribute to our knowledge on the nature and role of business-IT alignment at an operational level. Therefore, our paper addresses two research questions:

What are the mechanisms that constitute business-IT alignment at an operational level?

How does operational business-IT alignment impact business value of IT in German hospitals?

We argue that investigating the social factors determining the business-IT cooperation and their interrelationships, will contribute to our understanding on how operational alignment impacts organizational performance. We expect the results of this study to help practitioners to understand how to deploy IT in order to maximize business value. Encouraged by the work of Wagner et al. (2014), we draw on Social Capital Theory (SCT) and develop a model to explain how cognitive, relational and structural linkage affect cross-functional cooperation and how they influence IT business value. Subsequently, we present the results of our empirical study in German hospitals, discuss the results and present the implications. We begin with a discussion of the research background.

2 Research Background

2.1 Business-IT alignment research

Driven by the importance of alignment in academia and practice, researchers have contributed many different models to explain how alignment creates value for organizations. However, prior research has failed to provide a consistent definition and robust theoretical foundation of alignment (Chan and Reich, 2007; Gerow et al., 2014).

In general, alignment is defined as "the degree to which the needs, demands, objectives, and/or structures of one component are consistent with the needs, demands, goals, objectives, and/or structures of another component." (Nadler and Tushman, 1983, p. 119) Drawing on this general concept, the Strategic Alignment Model (SAM) proposes that business and IT have to be aligned across the strategic and operational level (Venkatraman, 1989). Based on these considerations, Gerow et al. (2014) isolated six different types of alignment: alignment between business and IT strategies (i.e. strategic or intellectual alignment), between business and IT infrastructures and processes (i.e., operational alignment), and across these two levels such that strategies are linked with infrastructures and processes.

Prior research predominantly focuses on alignment between business and IT strategies and "deals with how business strategy supports and is supported by the IT strategy" (Gerow et al., 2014, p. 6). Strategic alignment is usually examined from an intellectual and social perspective (Chan and Reich, 2007). Former analyses the extent to which "a high quality set of interrelated business and IT plans exists" (Reich and Benbasat, 2000, p. 82), while the latter addresses the mutual understanding and commitment of objectives and plans among business and IT executives (Wagner et al., 2014, p. 243).

The ability to evolve strategic alignment is expected to be a source of competitive advantage (Baker et al., 2011). However, in order to unlock the potential of alignment, the strategic plans have to be implemented in daily business operations. Alignment between business and IT on this level is referred to as operational alignment and "deals with how the business infrastructure and processes align with the IT infrastructure and processes" (Gerow et al., 2014). This kind of alignment involves interactions between business and IT that "are not part of the strategic level and do not involve high-level executives, or involve them only to a minor degree" (Wagner et al., 2014, p. 244). Operational alignment, hence, puts the focus on the lower levels of the organization where the strategies are eventually executed. This kind of alignment emphasizes the fit between the demands triggered by strategic business changes and the capability of IT to deliver IT projects and change requests. This should naturally result in operationally aligned infrastructures processes throughout the company.

Research aiming at the operational level predominantly addresses a structural viewpoint, focusing on formal arrangements such as reporting structures, formal decision making processes, meetings and steering committees (Benbya and McKelvey, 2006; Chan, 2002; Wagner et al., 2014). However, many of the mechanisms leading to efficient cooperation between business and IT staff are informal (Chan, 2002). Putting a particular focus on informal relationship-based structures beyond the formal division of responsibilities and coordination of tasks (Chan, 2002, p., p. 107), more recent research addresses this view. Lately, Wagner et al. (2014) focused on cross-domain interconnectedness between business and IT at the operational level. Drawing on SCT, they demonstrate that operational alignment significantly impacts organizational performance. Considering IT service quality, their findings further suggest that alignment at an operational level is at least as important as strategic alignment. However, there is only few research addressing questions about the mechanisms and effects of alignment at the operational level (Jenkin and Chan, 2010; Wagner et al., 2014; Wagner and Weitzel, 2012).

The definitions given above indicate that alignment is an end state that organizations pursue. However, recent research takes the perspective that alignment is rather a dynamic process of reconfiguring the business-IT relationships and activities then a static configuration (Baker et al., 2011; Burton-Jones et al., 2013; Chan and Reich, 2007; Raisch et al., 2009). Subsequently, business-IT alignment is increasingly conceptualized as "a continuous co-evolutionary process that reconciles top-down 'rational designs' and bottom-up 'emergent processes' of consciously and coherently interrelating all components of the business-IT relationships in order to contribute to an organization's performance over time." (Benbya and McKelvey, 2006, p. 284). Adopting a process view, we assume that all components of the business-IT relationships have to be continually adjusted to keep the organization on the road towards alignment. Further, we assume that "alignment is a collaborative process between all actors and divisions" and hence, social in nature (Chan and Reich, 2007, p. 309).

Following this view and building upon the definition of Wagner et al. (2014), we define operational business-IT alignment as cross-domain interconnectedness in terms of social capital between business and IT that unfolds in purposeful cross-functional cooperation. We argue that the contribution of IT to an organization's performance is determined by the extent to which business and IT staff at the operational level have the opportunity to interact, know how to interact effectively and are able to maintain strong relationships (Hsu and Hung, 2013). In this regard, social capital "reflects the conducting paths for sharing and exchanging knowledge within and across an organizations boundaries" (Subramaniam and Youndt, 2005, p. 452). Social capital between business and IT, therefore, determines the quality of cross-functional cooperation. In this way, social capital is expected to act as a facilitator of the continuous process of aligning business infrastructure and processes with their respective IT counterparts.

2.2 Hospitals as Research Object

The organizational culture in German hospitals is traditionally characterized by a low degree of cooperation between physicians and other staff (Badura and Feuerstein, 1994). In contrast to for-profit corporations, which typically have a single hierarchical authority structure, German hospitals are characterized by three parallel and often disconnected hierarchical authorities: the medical directorate, nursing services and administration directorate (Moers, 2003). Consequently, hospitals are referred to as 'decoupled organizations' (Doege and Martini, 2008) and structural, relational and cognitive linkages between medical departments and administrative units (e.g. IT) are frequently underdeveloped.

Further, physicians claim a professional status, which particularly reflects their command of exclusive competence to define content and standards of medical practices (Freidson, 1988). Physicians' professional status leads to privileges like greater control over critical resources and healthcare-related tasks performed by non-professionals (Walter and Lopez, 2008) as well as to a special kind of independence, referred to as 'professional autonomy'. In general, professional autonomy reflects physicians feeling that she should be able to make independent decisions without external pressures particularly from non-professionals and the employing organization (Hall, 1968). Furthermore, physicians' professional ethics requires that they are committed to their professional standards above the standards set by their organization (Engel, 1969; McGimpsey et al., 2011).

Diverse professional backgrounds of physicians and administrative staff and different contexts of the organizational functions they belong to are expected to create differences in their understanding of the goal they jointly try to achieve. For instance, physicians' professional ethics require them to focus on patients' welfare, while the administration is under constant pressure to improve efficiency in order to cope with everlasting budget restrictions (Klauber et al., 2010). Therefore, difficulties in aligning physicians and hospital administration are somehow inevitable (Longo, 1994). On the same line of argument, aligning medical departments and the IT organization is expected to be a major challenge on both strategic and operational level.

Many hospitals have a strategy to push the digitization of medical information (bvitg, 2012). This is expected to avoid unnecessary treatments, improve the quality of care, enhance patient safety, and increase physicians' productivity (see e.g. Chaudhry et al., 2006; Hillestad et al., 2005; Stead, 2007). The deployment of IS, which force health care personnel to conduct documentation electronically, indicates a sufficient degree of strategic alignment. However, so far, many hospitals have not realized the potential of electronic documentation (Hübner et al., 2012). This evidence suggests that the strategic plans are not adequately implemented at the operational level. A lack of alignment at this level is further emphasized by physicians who claim that information systems deployed in hospitals are frequently not aligned to their working routines and not efficient to use (Weeger and Gewald, 2014).

Information systems supporting medical documentation are part of the so-called hospital information systems (HIS). These systems are intended to satisfy comprehensive information requirements of stakeholders during the entire treatment process across all functions and departments (Brailer and Thompson, 2004; Lehmann, 2005). Several HIS subsystems provide centralized and location-independent access to all relevant medical and administrative data (i.e. electronic medical record) and enable physicians to digitally record medical findings and write the doctor's letter, for instance.

To a greater or lesser extent, the medical documentation process and its requirements differ between medical disciplines. Further, many of these processes are even hospital specific. In contrast to paper-based solutions that provide greater flexibility to adapt to peculiarities of processes and disciplines, HIS systems do frequently not fit without making sort of adaptation and customization efforts. Considering these conditions and the goal to execute digitization strategies, the IT unit is increasingly required to adapt and integrate IS. Preceding this study, we conducted several case studies in hospitals, which show that there are major gaps between the characteristics of HIS supporting medical documentation and organizational and regulatory requirements (Weeger and Gewald, 2014; Weeger et al., 2013). As findings indicate that these gaps can be in large part attributed to insufficient cooperation between clinicians and the IT unit, further research is needed.

3 Hypothesis Development

As explicated above, our work is based on Wagner et al. (2014) who argue that social capital, that is, cognitive, structural, and relational linkage, constitutes the pattern of relationships between business and IT. In contrast to Wagner et al. (2014), who combined business-IT knowledge as determinants of social capital, we argue that operational alignment in terms of cross-domain interconnectedness is better reflected by the degree to which business and IT units cooperate at operational levels. Since the cognitive dimension focusses on the shared meaning and mutual understanding of individuals or groups (Nahapiet and Ghoshal, 1998, p. 244), we take the view that business knowledge of IT is reflected by the cognitive dimension of social capital. Further, we argue that the relationship structures represented by social capital determine the cross-functional cooperation between business and IT. This, in turn, leads to IS which are aligned with business processes and structures and, ultimately, drive IT business value. Our hypotheses are depicted in Figure 1 and explicated in detail below.

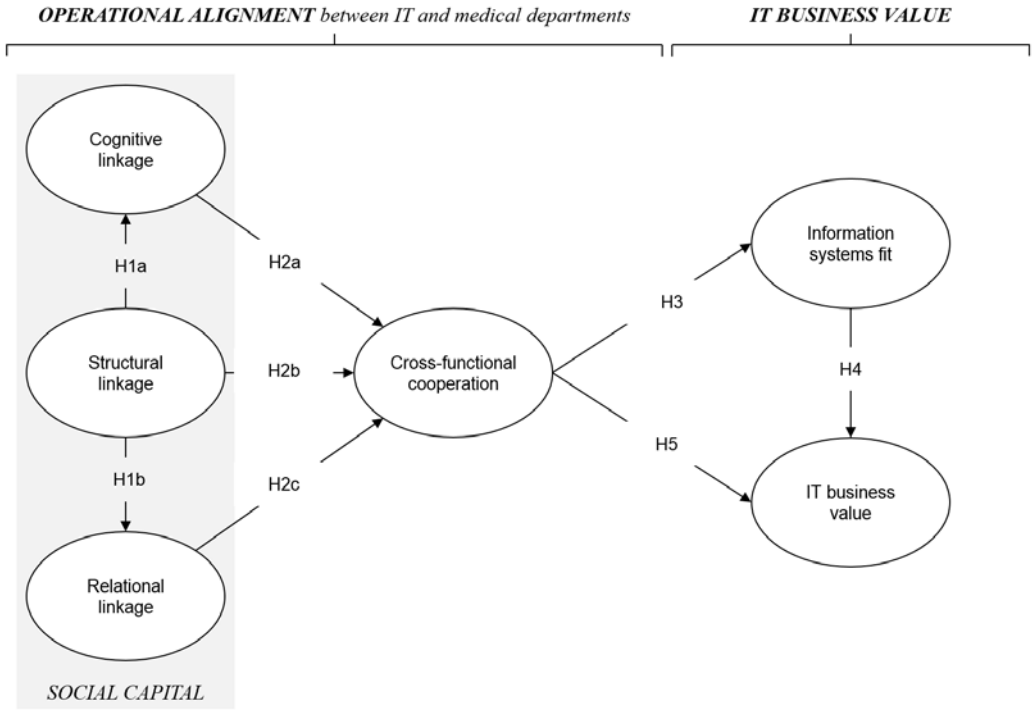

Figure 1. Research model

3.1 Social capital facilitates cross-functional cooperation

Social capital is defined as "the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet and Ghoshal, 1998, p. 243). The central assumption of SCT is that the social structure in which an individual or social unit is located constitutes a valuable resource for social action, that is, "the network and the assets that may be mobilized through that network" (ibid, p. 243).

Nahapiet and Ghoshal (1998) conceptualize three distinct, but highly interrelated dimensions of social capital: structural, cognitive and relational dimensions. Linkages in these dimensions constitute important aspects of the social structure and facilitate the social actions of individuals within. The structural dimension (structural linkage) refers to the "the overall pattern of connections between actors" (Nahapiet and Ghoshal, 1998, p. 244). This dimension reflects who business and IT staff can reach from the other function and how they can reach one another, such as during formal and informal meetings. The relational dimension "relates to the nature and quality of the relationships among team members and how

those relationships affect behavior" (Robert et al., 2008, p. 319) and reflects behavioral as opposed to structural interconnectedness of actors (Nahapiet and Ghoshal, 1998). These linkages represent "the extent to which business and IT staff trust each other and respect each other's work" and, hence, characterizes the quality of their partnership (Wagner et al., 2014, p. 246). The cognitive dimension refers to "those resources providing shared representations, interpretations, and systems of meaning among parties" (Nahapiet and Ghoshal, 1998, p. 244). The resources related to this dimension encompass shared language and codes, and viewpoints. Cognitive linkage enables business and IT to interpret each other's view of reality, a cornerstone of fruitful cross-functional cooperation.

Although distinguishing the dimensions analytically, Nahapiet and Ghoshal (1998) admit that they are most likely interrelated and that some dimensions are mutually reinforcing. In this paper, we focus on the effects of structural linkage on relational and cognitive linkage. Since medical departments (i.e. business) and IT units largely work within their silos, the opportunity for interaction and exchange will ost likely contribute to the development of social structure. Based on Tsai and Ghoshal (1998) we posit that structural linkages, reflected by regular meetings etc., contributes to the development of cognitive and relational linkage.

H1(a,b): Structural linkage between business and IT increases cognitive and relational linkage.

Several studies demonstrate that social capital is positively related to diverse organizational outcomes generated through social interactions such as effective knowledge integration (Newell et al., 2004), ERP implementation success (Wang et al., 2006), and productivity of R&D teams (Reagans and Zuckerman, 2001). Further, Subramaniam and Youndt (2005) show that an organization's social capital improves the quality of group work and facilitates information exchange. Without having SCT in mind, Pinto et al. (1993) demonstrate that cognitive linkage (i.e. shared goals and rules) and structural linkage (i.e. physical proximity and frequent interactions) have significant effects on project outcomes by influencing cross-functional cooperation. We therefore assume that social capital is an important driver of cross-functional cooperation within organizations, particularly between business and IT.

Within our research context, cross-functional cooperation refers to the extent to which there is a state of purposeful collaboration between medical departments and IT at the operational level, characterized by joint efforts (Korhonen-Sande and Sande, 2014). Cross functional-cooperation is reflected by the degree to which adaptations to IS (i.e. change requests, IT projects) are implemented in close cooperation between business and IT. Therefore we propose:

H2(a,b,c): Social capital in terms of cognitive, structural, and relational linkage between business and IT positively impacts cross-functional cooperation.

3.2 Operational business-IT alignment creates IT business value

IT business value is defined as "the impact of investments in particular IS assets on the multidimensional performance and capabilities of economic entities at various levels" (Schryen, 2012, p. 141). It encompasses two orthogonal dimensions: the locus of vale (internal and external) and the nature of value (tangible and intangible). While tangible value refers to productivity and capacity utilization, which can be operationalized through performance measures, intangible value refers to organizational capabilities or the strategic position of the firm. Internal value is achieved when IS contributes to productivity and quality gains induced by redesigned business processes (Schryen, 2012). In this paper, we focus on internal tangible IT business value and define IT business value as the degree to which the business perceives that IT contributes to business process performance (Tallon et al., 2000).

Literature indicates that value creation is predominantly dependent on the exchange and combination of resources through intra-organizational networks (Tsai and Ghoshal, 1998). Cross-functional cooperation between business and IT blurs the boundaries of organizational silos. As such, it increases opportunities to exchange or to combine resources and, hence, facilitates value creation. For instance, process innovations are largely IT-enabled and require the combination of business and IT resources, particularly the respective specialized knowledge-stocks (Sambamurthy et al., 2003). Low levels of interconnectedness between business and IT is found to cause "issues of communication and matching of resources, objectives and implementation priorities, between IT and the business at the execution levels" (Tarafdar and

Qrunfleh, 2010, p. 107). Subsequently, failure to generate IT business value can be particularly attributed to poor cross-functional cooperation (Pinto et al., 1993; Tarafdar and Qrunfleh, 2010). On the other hand, tight and adaptive coupling between business and IT professionals is found to be the basis for creating business value through IT (Agarwal and Sambamurthy, 2002; Sambamurthy and Zmud, 2000). For instance, Hsu and Hung (2013) demonstrate that IS reveal better alignment when key-users and IT staff jointly engage in change processes.

We further argue that the effect of cross-functional cooperation on IT business value is in part mediated through the fit of the information systems deployed. Building on IS-fit theories (Goodhue and Thompson, 1995; Strong and Volkoff, 2010), we define IS fit as the degree to which the IS align with requirements, working processes, and existing practices of business departments. Related to our research context, improvements in the quality of medical documentation, standardization of work processes, and optimization of the exchange of patient-related information reflect tangible facets of internal business value through IS (Chaudhry et al., 2006; Hillestad et al., 2005; Stead, 2007). These performance impacts are most likely realized if the IS adequately support documentation processes. Furthermore, we argue that cross-functional cooperation directly impacts IT business value as it provides the opportunity to promote effective support and training for users and, hence, facilitates system support, improves sensing of IT-induced changes as well as increases support for these changes and lowers the cost of adapting to these changes, for instance. In summary, we propose following hypotheses:

H3: Cross-functional cooperation between business and IT positively influences IS fit

H4: IS fit partly mediates the effect of cross-functional cooperation on IT business value

H5: Cross-functional cooperation between business and IT positively impacts IT business value.

4 Research Methodology

We examined the impact of operational alignment on IT business value by means of a quantitative study among German hospitals. We focused our analysis on medical documentation, a critical business process in hospitals. This approach allows us to examine the effects of operational alignment more closely compared to organizational-level studies (Chan and Reich, 2007).

4.1 Measurement instrument

The items for the variables of our research model were derived from literature and adapted to the healthcare context. All constructs were measured by reflective multi-item scales. Validating the adapted items, we followed the guidelines for measurement development as proposed by MacKenzie et al. (2011). Discussions with two academic experts, three assistant medical directors and one CIO asserted content validity and comprehensibility of almost all items (Lawshe, 1975). However, the discussions revealed that we have to drop some items and modify the wording of others to improve comprehensibility. Furthermore, the experts confirmed that physicians, who are responsible for the enhancement to information systems supporting the medical documentation process, are able to assess performance impacts of IT on this process. The items used and related sources are depicted in Table 1.

In order to mitigate common method bias (CMB), we separated the measurement of the independent and dependent variables by adding additional questions on the medical documentation process, assuring anonymity, and asking to answer the questions as honest as possible (Podsakoff et al., 2003a). Furthermore, the measurement instrument begins with an introduction to the context that makes certain that the respondents focus on the process of medical documentation and the related IS. The introduction was reviewed as part of the expert discussion as well.

Construct	ID	Item (translated from German)	Related sources
Structural linkage	Str1	Changes regarding the information systems supporting medical documentation are discussed in regular meetings between the IT unit and the medical departments.	Wagner et al. (2014), Reich and Benbasat (1996)
	Str2	There are regular meetings between IT staff and physicians where potential enhancements of the information systems supporting medical documentation are discussed.	
	Str3[1]	There are no joint meetings between the IT unit and the medical departments.	
Cognitive linkage	Cog1	The physicians in our hospital are not aware of the processes and procedures of the IT unit.	Wagner et al. (2014), Reich and Benbasat (1996), Ravichandran and Lertwongsatien (2005), Teo and Ang (1999), Fink and Neumann (2009)
	Cog2	The employees of the IT unit have a deep understanding of the medical procedures.	
	Cog3	The employees of the IT unit deeply understand the functioning of medical documentation.	
Relational linkage	Rel1	IT unit and medical departments respect each other.	Wagner et al. (2014), Teo and Ang (1999), Karahanna and Preston (2013), Fink and Sukenik (2011)
	Rel2	There exists a lot of mutual trust between the IT unit and the medical departments.	
Cross-functional cooperation	Coop1	Projects to adapt the information systems supporting the documentation process are planned in close cooperation between the IT unit and the medical departments.	Chung et al. (2003), Fink and Sukenik (2011), Wang et al. (2012),
	Coop2	Changes to information systems are implemented in close cooperation between the IT unit and the medical departments.	
	Coop3[1]	The cooperation between the medical departments and the IT department is insufficient.	
Information systems fit	ASys1	The information systems in support of the medical documentation are easy for physicians to use.	Wang et al. (2012), Weeger and Gewald (2014)
	ASys2	The information systems provided by the IT department are geared to the needs of the medical documentation.	
	ASys3	Physicians can easily integrate information systems for medical documentation in their documentation processes.	
IT business value	ITbv1	The information systems contribute to the standardization of documentation processes in our hospital.	Schryen (2012), Melville et al. (2004), Fink and Sukenik (2011), Wang et al. (2012), Kearns and Lederer (2000); Sabherwal and Chan (2001)
	ITbv2	The information systems contribute to optimizing the exchange of information in our hospital.	
	ITbv3	The information systems contribute to improving the quality of medical documentation in our hospital.	

Table 1. Measurement items, a seven-point Likert scale was used for all the items (1 = 'strongly disagree'; 4 = 'neutral'; 7 = 'strongly agree')

4.2 Data collection

Using the Bisnode company database for universities (Bisnode, 2014), we selected 500 German hospitals for which the CIO or the highest ranked IT executive could be identified. We contacted the CIO and kindly asked him to name a physician who is responsible for the enhancement to IS supporting the medical documentation process at operational level (i.e. middle-managers). In total 430 physicians could be identified. During a four-week period in June/July 2014, we contacted these physicians via telephone and email and asked them to fill out our online questionnaire, followed by reminder calls. In addition, the participants were incentivized by offering a management report. We received 85 completed questionnaires (approx. 20% response rate). Analyzing the data resulted in the exclusion of 9 responses with

missing data and 25 responses of physicians, who were not directly involved in the enhancement processes of medical documentation systems. These were mostly assistant physicians with less than one year professional experience. The final sample consists of 51 complete responses.

Turnover		Employees		Type	
< $50M	43%	< 500	39%	Public	29%
$50-100M	41%	500-2.000	57%	Nonprofit	29%
> $100M	16%	> 2.000	4%	For-profit	41%

Table 2. Demographics of dataset (hospital characteristics)

4.3 Data analysis

We tested our model with PLS, a structural equation modelling method for complex predictive models and theory building (Barclay et al., 1995; Chin, 1998a). We chose PLS since it is in particular suitable for exploratory research, does not require multivariate normality assumptions and works well with small-to-medium sized samples (Gefen et al., 2011). We used SmartPLS 2.0 (Ringle et al., 2005) to estimate the model. Determining the significance of the paths in the structural model, we conducted bootstrap re-sampling method (using 5,000 samples).

Since we have a common informant for our independent and dependent variables, we first examined if CMB is a concern for our data employing two common method variance tests (Lindell and Whitney, 2001; Podsakoff et al., 2003b). First, employing Harman's single-factor test, we found no single factor accounting for the majority of the covariance among the measures. Second, we compared the variances of each observed indicator explained by its substantive construct and the method factor, respectively (Liang et al., 2007). The results indicate a ratio of substantive variance to method variance of about 36:1. This leads us to conclude that CMB is not particularly problematic in our study. However, we acknowledge that there are limitations to this techniques testing for CMB (Chin et al., 2012).

Construct	AVE	CR	ID	S.D.	Mean	Loading
Cognitive Linkage (COG)	0.683	0.866	Cog1	1.601	4.510	0.826***
			Cog2	1.263	3.176	0.799***
			Cog3	1.362	3.549	0.853***
Relational Linkage (REL)	0.921	0.959	Rel1	1.149	5.333	0.951***
			Rel2	1.227	4.843	0.969***
Structural linkage (STR)	0.833	0.937	Str1	1.440	2.922	0.928***
			Str2	1.376	2.549	0.901***
			Str3[1]	2.102	4.667	0.907***
Cross-functional cooperation (COOP)	0.822	0.933	Coop1	1.579	3.765	0.876***
			Coop2	1.550	3.902	0.934***
			Coop3[1]	1.808	4.216	0.908***
Information systems fit (ISF)	0.715	0.883	ASys1	1.475	4.020	0.877***
			ASys2	1.365	4.020	0.809***
			ASys3	1.433	3.843	0.849***
IT business value (ITBV)	0.619	0.829	ITbv1	1.498	4.902	0.858***
			ITbv2	1.169	5.745	0.703***
			ITbv3	1.229	5.314	0.791***

Table 3. Descriptive statistics, convergent validity, internal consistency and reliability

We tested the validity of the measurement model following the guidelines proposed by the literature (Gefen and Straub, 2005a; Hulland, 1999). Principal component analysis was used to examine the constructs independent of the theoretical connections. Results reveal six distinct factors with Eigenvalues

greater than 1.0, indicating validity of the hypothesized factors and their related items. As depicted in Table 3, all item loadings are significant and above 0.7, which indicates convergent validity of the measurement model. Composite reliability (CR) and average variance extracted (AVE) scores exceed the proposed thresholds of 0.7 and 0.5, respectively. These results indicate that all items with one construct have the same range and meaning. As proposed by literature, we further assessed discriminant validity. As depicted in Table 4, the correlations between all constructs are well below the thresholds (Brown, 2006) and the square root of AVE exceeds the inter-construct correlations for each construct (Gefen and Straub, 2005b).

	ISF	COG	COOP	ITBV	REL	STR
ISF	**0.845**					
COG	0.285	**0.826**				
COOP	0.569	0.603	**0.907**			
ITBV	0.560	0.384	0.555	**0.787**		
REL	0.442	0.459	0.570	0.168	**0.960**	
STR	0.217	0.309	0.486	0.158	0.330	**0.913**

Table 4. Inter-construct correlation matrix (notes: square root of AVE shown in bold)

4.4 Results

The results of our structural model assessment are depicted in Figure 2. R^2 measures can be considered as moderate (Chin, 1998b), except the coefficients of cognitive and relational linkage. Further, significance levels of the path coefficients for all proposed relationships exceed .05 (Gefen et al., 2000) and predictive relevance (Stone-Geisser Criterion, Q^2) of all endogenous constructs exceeds the threshold value of 0 (Chin, 1998b). Overall, the model reveals sufficient model validity.

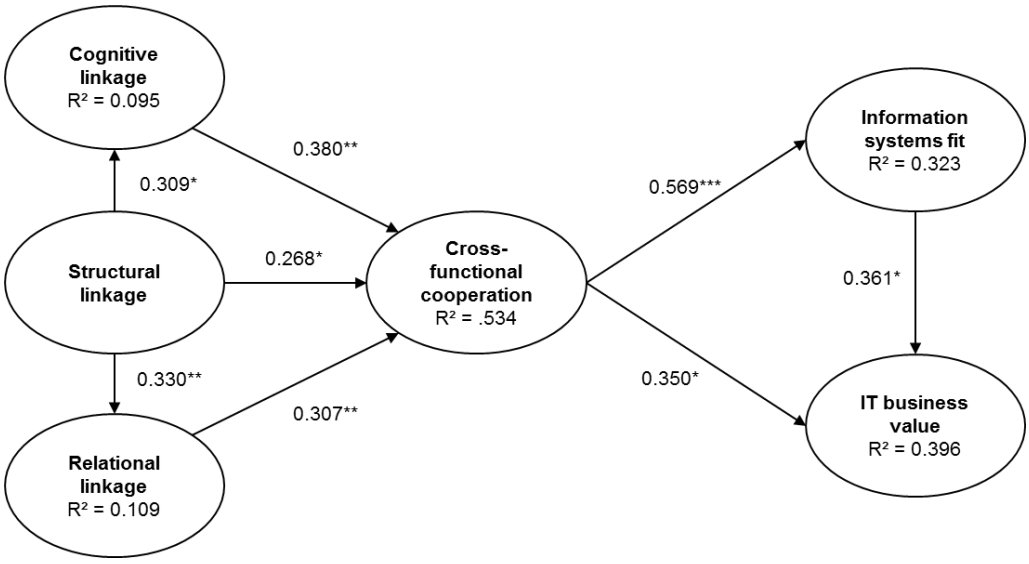

*Figure 2. PLS estimation results (notes: *** p < 0.001; ** p < 0.01; * p < 0.05)*

Significant relations between structural linkage (STR) and cognitive linkage (COG) as well as between STR and relational linkage (REL) confirm H1a and H1b. Overall, social capital accounts for about 53.4% of the variance in cross-functional cooperation (COOP). COG evolves the strongest effect on COOP ($f^2=0.236$), while the effects of STR ($f^2= 0.132$) and REL ($f^2=0.152$) are quite similar. Removing COG and REL from the model leads to a slightly stronger path between STR and COOP (without COG:

β=.332, p < 0.05; without REL: *β=.332, p < 0.05*). This finding indicates that small portions of the effect of STR on COOP are most likely mediated by COG and REL.

Regarding the effects of operational alignment between IT and medical department, COOP and information systems fit (ISF) are significantly related to IT business value (ITBV), confirming H5 and H4. We also tested if cross-functional cooperation does mediate the effect of social capital on cross-functional cooperation. However, there are no significant direct effects of social capital on cross-functional cooperation. Hence, a mediation effect does not hold (Baron and Kenny, 1986).

ISF in conjunction with COOP accounts for about 39.6% of the variance in ITBV. Removing aligned information systems from the model leads to a stronger and more significant path between COOP and ITBV (*β=.557, p < 0.001, f²=0.447*), confirming the mediating effect of ISF as proposed in H4 (Baron and Kenny, 1986). Table 5 summarizes the results of our hypothesis tests.

Hypothesis	Path	Path-coefficient	t-value	Effect size	Effect[1]
H1a	STR → COG	0.309*	2.053	0.105	Medium
H1b	STR → REL	0.330**	2.832	0.122	Medium
H2a	COG → COOP	0.380**	2.843	0.236	Medium
H2b	STR → COOP	0.268*	1.972	0.132	Medium
H2c	REL → COOP	0.307**	2.873	0.152	Medium
H3	COOP → ISF	0.569***	6.868	0.478	Large
H4	ISF → ITBV	0.361*	2.405	0.146	Medium
H5	COOP → ITBV	0.350*	2.210	0.137	Medium

Table 5. Results of the PLS-based regression
*(notes: *** p < 0.001; ** p < 0.01; * p < 0.05, [1] according to Cohen (1988))*

5 Discussion

Prior to discussing our results, limitations of the study need to be considered. First, our results are based on a relatively small sample size, we only involved physicians in the study and ignored other health care professionals who are using HIS supporting medical documentation. Second, collecting data from separate informants for the dependent and independent variables would further minimize the potential of CMB, though analysis does not indicate CMB to be a concern. Third, the study focused on a single industry in an attempt to enable a deeper understanding of how alignment facilitates value creation (Chan and Reich, 2007). It needs to be acknowledged that some antecedents to alignment may be industry specific (Chan et al., 2006). In fact, hospitals are information intensive, increasingly push the implementation of digitization strategies and, hence, should constitute an ideal research focus for operational business-IT alignment. However, the results of the study may not be fully generalizable to other industries. Fourth, in lack of more objective performance data, we used physician's perceptions of the realized impacts of IT on the performance of the documentation process as a proxy for realized IT business value. It is suggested, that further research should focus on developing methods to quantify process performance in hospitals. Last not least, there are perspectives on social capital going behind cognitive, structural and relational linkages. For instance, Adler and Kwon (2002) argue that it is "the goodwill that is engendered by the fabric of social relations" and propose that the sources of social capital are an actor's opportunities for transactions, her willingness to define and act on collective goals and her ability to mobilize their social relations. In order to give a fuller account on the gestalt of social capital facilitating purposeful cross-function cooperation, further research could consider these perspectives on SCT and employ a qualitative research approach.

5.1 Constituting elements of operational alignment

In this paper, we took a socially oriented view on business-IT alignment at the operational level, conceptualized as cross-domain interconnectedness. Using social capital as a theoretical lens allowed us to

examine mechanisms that influence the extent to which business and IT staff interact at the operational level. We theorize that cross-functional cooperation between business and IT is facilitated by the social capital between these organizational entities. Our results support the proposed hypotheses. We find that cross-functional cooperation is influenced by cognitive, structural, and relational linkage while the cognitive dimension evolves the strongest effect.

Considering the relational dimension, our findings provide evidence that regular formal and informal social interaction between business and IT staff strengthens the quality of respective collaboration and causes joint efforts. This statistically significant effect contradicts the findings of Karahanna and Preston (2013) and Wagner et al. (2014). These inconsistencies may be contingent on the specifics of the research context of this study. Characterized as 'decoupled organizations' (Doege and Martini, 2008), organizational structures of hospitals provide –as expected- few operational linkages between physicians and members of the administration / IT personnel. Therefore, strengthening structural linkages—by establishing regular meetings between business and IT— may be specifically important in hospitals compared other contexts.

Results also demonstrate that the structural dimension of social capital influences cognitive and relational linkage. Additionally, parts of the effect of structural linkage are found to be mediated by cognitive and relational dimensions. This implies that formal and informal connections between business and IT support, shared cognition, as well as the creation of trust between the parties help to facilitate cross-domain interconnectedness. However, this also implies that having the opportunity to interact, does not per se positively impact cross-functional cooperation. Rather, formal and informal social interaction between business and IT need to encourage the development of mutual trust and respect (Wagner et al., 2014). In addition, structural linkages have to be effective in creating shared languages, representations, and perspectives. Leading to common viewpoints such as interpretations of the potentials of IT and the core business objectives (Karahanna and Preston, 2013), cognitive linkage enables development of joint efforts, which characterizes fruitful cross-functional cooperation. In essence, this holds true for relational linkages as well. Trusting each other and respecting each other's work is a prerequisite of common endeavor.

Considering the role of social capital, this study emphasizes the social nature of business-IT alignment at the operational level. Conceptualized as cross-functional interconnectedness enabling purposeful collaborative processes between business and IT, we show that alignment is particularly constituted by strong connections between business and IT, mutual trust and shared understanding of the respective core subjects. These findings may motivate practitioners to take measures in attempt to strengthen social capital and, hence, blur boundaries between business and IT, particularly in hospitals.

5.2 Impact of operational alignment on IT business value

Considering IT business value, the results provide evidence that its origins are deeply embedded in social relations and the structure of these relations. In line with prior literature, we posit the process of IT value creation as a mechanism of social construction (Avgerou, 2001). In this regard, an important finding of this study is the strong impact of cross-functional cooperation on IT business value, both directly and mediated through IS fit. Effective collaboration between business and IT at the operational level facilitates the realization of the potential of IT to generate business value, such as contributing to process stability and service quality. Hence, this study supports prior research positing that proper cross-functional cooperation drives understanding of how IT can effectively support business processes (Nelson, 2001; Wagner et al., 2014), effective use of IS (Weeger and Gewald, 2014), exploitation of synergies (Nelson, 2001), and efficient adaptation to changes, for instance (Hsu and Hung, 2013).

An additional key finding of this study is that the effect of cross-functional cooperation on IT business value is partly mediated through IS fit. Interconnectedness between business and IT is found to influence the degree to which the IS align with requirements, working processes, and existing practices of business departments. However, cross-domain cooperation only explains about one-third of the variance in IS fit. This indicates that there are factors impacting IS fit, that can be hardly influenced through purposeful cross-functional cooperation. This may be particular due to the deployment of packaged IS, such as HIS,

which are designed to support generic rather than specific requirements (Strong and Volkoff, 2010). Although many IS provide opportunities to adapt them to organization-specific processes, they most likely still fit improperly in particular instances. This holds particularly true for IS supporting medical documentation (Weeger and Gewald, 2014). Nonetheless, the magnitude of the effect of IS fit on IT business value approximately equals the effect of cross-functional cooperation. This further emphasizes the need for aligning IS with business processes.

According to our empirical evidence, a critical means to increase IS fit is purposeful cooperation between business and IT at an operational level, which, in turn, is driven by the social capital between the two organizational entities. However, our results show that social capital does not evolve any direct effect on IT business value. Rather, social capital has to enhance cross-functional cooperation, which, in turn, facilitates IT business value. In other words, strong structural, cognitive, and relational linkages do not per se facilitate value creation. As social capital does explain only approx. half of the variance in cross-functional cooperation, further research may in addition examine which other factors might foster cross-functional cooperation, such as leadership (Goh et al., 2011; Roepke et al., 2000).

6 Conclusion

The results contribute to theory and practice in several ways. First, the study supports the perspective that alignment is critical at an operational level as well, specifically in view of realizing internal tangible IT business value. As such, it hopefully, motivates scholars to further intensify research on non-strategic levels of alignment (Chan and Reich, 2007). Second, conceptualizing alignment as interconnectedness of business and IT in terms of the structure and content of their social relations, which unfolds in prop cross-functional cooperation, enhances a novel theoretical underpinning of alignment at the operational level (Wagner et al., 2014). Third, our results advise practitioners, specifically executives in hospitals, to strengthen social capital between businesses and IT. Although it is indicated that structural arrangements such as meetings are important to enhance cross-functional cooperation, practitioners should particularly keep in mind that formal and informal social interactions should allow for the reinforcement of mutual understanding and trust. Overall, the results of this study indicate that it is worthwhile to blur the boundaries of the organizational silos and to enhance cross-functional cooperation between business and IT along the way to realizing the potential of IT.

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