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Process Documentation, Operational Alignment, and Flexibility in IT Outsourcing Relationships: A Knowledge-Based Perspective

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PROCESS DOCUMENTATION, OPERATIONAL ALIGNMENT, AND FLEXIBILITY IN IT OUTSOURCING RELATIONSHIPS: A KNOWLEDGE-BASED PERSPECTIVE

Documentation de processus, alignement opérationnel et flexibilité dans les relations d’externalisation des TI: une perspective centrée sur la connaissance

Completed Research Paper

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Abstract

What is the impact of process documentation on the relationship between operational alignment and IT provider flexibility in IT outsourcing relationships? Drawing on a sample of application management outsourcing relationships from the German banking industry, we analyze the connections between interorganizational alignment of IT and business domains and IT provider flexibility. Results show that provider’s tacit knowledge about the client’s business domain is a strong enabler of flexibility on the provider side. If the client’s business processes are poorly documented, tacit knowledge is also the main element that fosters trust, acceptance, and respect (the cognitive dimension of operational alignment) on the client side. However, when extended up-to-date business process documentation is available, tacit knowledge, while still enabling flexibility, becomes irrelevant for fostering cognitive linkages between client and provider. Instead, IT provider flexibility becomes the main driver for the cognitive dimension of operational alignment.

Keywords: Application Management Outsourcing, Operational Alignment, Knowledge-based Theory

Résumé

Quel est l’effet de la documentation de processus des clients sur leur rapport avec les fournisseurs de TI dans les relations d’externalisation ? En analysant un échantillon de 104 relations d’externalisation dans le contexte du système bancaire allemand, nous avons constaté une forte influence de la documentation sur les relations entre les dimensions de l’alignement opérationnel et la flexibilité des fournisseurs.

Introduction

The ability of firms to dynamically reorganize resources in order to shape business strategies and customer relationships (Sambamurthy et al. 2003, p.110; Teece et al. 1997) by means of rapid reconfiguration of resources and their adjustment to changing environmental settings is essential for business success (Young-Ybarra and Wiersema 1999). As Teece (2007, p. 1335) observes, “a key to sustained profitable growth is the ability to recombine and to reconfigure assets and organizational structures as the enterprise grows, and as markets and technologies change...”. Especially in IT-intensive sectors like the financial industry, IT plays an important role for
transforming business processes (Sambamurthy and Zmud 1997), entire firms, and their interactions with suppliers (Brynjolfsson and Hitt 2000). Research has found that IT may act as an enabler for business flexibility (e.g. supply chain flexibility and reconfiguration (Gosain et al. 2004; Lee et al. 2004)), for the development of new products and efficient new business processes (Farrell 2003), and for strategic agility (Weill et al. 2002) – but may also act as a barrier to change (Broadbent et al. 1999).

Over the past years, many banks have outsourced their application management activities (i.e. operations, maintenance, support, and enhancement (see Levina and Ross 2003)) to third-party providers. Through outsourcing, these banks entrusted external providers with the delivery of necessary and often critical IT services, thereby becoming highly dependent on the flexibility with which the providers are able to meet their needs in dynamic and often turbulent business environments. Drawing on Evans’ concept of “ex post flexibility” (Evans 1991), we refer to flexibility as the timeliness and accuracy with which providers are able to make adjustments to the managed application in response to change requests formulated by their clients.

IT providers need to be operationally aligned with their clients in order to gain and maintain the necessary understanding about the relevant technological and business process particularities of their clients that allows them to react flexibly to any change requests. Looking at inner-organizational settings, several authors have discussed the link between IT business alignment and IT flexibility. For example, Chung et al. (2003) regard flexibility as an enabler of alignment; Knoll and Jarvenpaa (1994) view flexibility as a form of alignment in turbulent environments while Duncan (1995) views alignment as both an antecedent and a substitute for flexibility. A positive linkage between operational alignment and IT flexibility has been shown by (Wagner 2007) and (Beimborn et al. 2007) who found that IT business alignment, at an operational level, had a significant positive impact on IT flexibility.

For inter-organizational alignment between business and IT domains, a study by Grover et al. (1996) has shown that outsourcing partnerships based on communication, trust, satisfaction, and cooperation positively impact outsourcing success. In addition to building cognitive relationships between outsourcers and providers, successful outsourcing relationships require extensive exchange of knowledge between the two parties. “This would include the transfer of knowledge about the business processes and the user information needs that are to be reflected by the software application” (Dibbern et al. 2008). For that matter, IT outsourcing relationships have been characterized as complex and knowledge-intensive relationships, requiring the integration of knowledge from different pools – i.e., business and IT domain – across firm boundaries (Dibbern et al. 2008; Tiwana 2003). In order to achieve operational alignment with their clients, IT providers may draw on business process documentation to understand the specifics of their client’s business. However, if this kind of explicit knowledge is not available, the IT provider may have to rely on his own tacit knowledge and understanding of the client’s business.

How does the availability of explicit, up-to-date process documentation influence the operational alignment between client and IT provider? How does this affect IT provider flexibility? With respect to the boundary-spanning, operational alignment between client and IT provider, despite substantial amounts of research on IT management and outsourcing relationship management, there is a twofold gap regarding

- the complex relationships between operational alignment and IT flexibility in IT outsourcing relationships and
- the role of business process documentation in shaping those relationships.

In addressing these issues, we interpret operational IT business alignment between outsourcer and IT service provider as a process of knowledge integration (compare Kearns and Lederer 2003) across firm boundaries and draw upon the knowledge-based theory (KBT) of the firm (Eisenhardt and Santos 2002; Grant 1996a; Grant 1996b; Kogut and Zander 1992) to explore the interplay between alignment dimensions and IT provider flexibility, and how knowledge integration based on up-to-date process documentation affects these links. Our research questions thus are: What connections exist between the different dimensions of operational provider-client alignment and IT provider flexibility? How does the availability of up-to-date process documentation affect these connections?

In order to analyze these issues, we perform a quantitative analysis on a dataset obtained from a survey carried out among Germany’s largest 1,000 banks, focusing on application management outsourcing relationships between banks and IT service providers.
Research Background

Knowledge-based Theory

Scholars contend that “knowledge is arguably the most important asset that firms possess – a key source of both Ricardian and monopoly rents” (Liebeskind 1996, p.93). This statement reflects the importance of knowledge, which is the central tenet of the knowledge-based theory (Grant 1996a). Originating from the resource-based view (RBV) (e.g., Penrose 1959), the KBT views knowledge as the most important resource of the firm and regards knowledge integration, spanning a broad range of knowledge domains, to be the main mechanism for achieving and sustaining competitive advantage (Kogut and Zander 1992).

Two forms of knowledge – explicit and tacit (Nonaka 1994) – are largely discussed in the strategic management literature. Explicit knowledge refers to knowledge that exists in symbolic or written form (Alavi and Leidner 2001). This kind of knowledge is characterized by ease of communication and transportability across individuals and organizations (Nonaka 1994). A typical example for explicit knowledge is written documentation of organizational procedures and processes (Alavi and Leidner 2001). In this respect, Kearns and Lederer (2000) deal with explicit knowledge in the form of IT and business plans that need to be aligned in order to achieve a fit between IT and business domains. The underlying idea hereby is that well-documented processes – i.e. systematized and formalized processes that are well understood – reduce ambiguities and thereby contribute to performance (Raymond 1990).

Drawing on Nonaka (1994), this form of process documentation can be identified as explicit business knowledge – i.e. knowledge about the client’s business domain that is available in symbolic or written form (Alavi and Leidner 2001).

Of course, process documentation is not the only form of documentation that may be used by the provider as a source of explicit knowledge. Technical documentation and requirements specifications, to name a few, may also be useful sources of explicit knowledge dealing with “the expressed and inferred business needs” (Tiwana et al. 2003, p.247) of the client organization. This kind of documentation may be produced for example within the requirements engineering phase of IS development projects. However, in this study we confine ourselves to process documentation, because we focus on operational alignment and flexibility during the daily operations of a business process, as opposed to IS development projects or predominantly technical specifications of IS.

In contrast to explicit knowledge, tacit knowledge is “rooted in action, experience, and involvement in a specific context” (Alavi and Leidner 2001, p.110; Nonaka 1994) and is hard to codify (Teece et al. 1997) or even “cannot be expressed in verbal, symbolic and written form” (Lee 2001, p.324). This makes its transfer across people and organizations (e.g., through apprenticeships) slow, costly, and uncertain. “An example of tacit knowledge is knowledge of the best means of approaching a particular customer – using flattery, using a hard sell, using a no-nonsense approach” (Alavi and Leidner 2001, p.110). The codifiable part of tacit knowledge is sometimes called implicit knowledge and is defined by Lee (2001, p.324) as “knowledge that can be expressed in verbal, symbolic, or written form, but has not yet been expressed”. For the purpose of this paper we follow Nonaka (1994) and distinguish between explicit and tacit knowledge with tacit knowledge encompassing implicit knowledge.

Nelson and Cooprider (1996) and Reich and Benbasat (1996; 2000) developed the notion of shared domain knowledge which refers to the personal, tacit knowledge of IT and business managers about each other’s domain. As we will discuss later, this construct also represents one of the most important factors of operational alignment between IT and business.

In later times, outsourcing relationships have been increasingly investigated from the perspective of knowledge-based theory (e.g., Currie 2003; Dibbern et al. 2008; Tiwana 2003). “Since each organization has its unique set of human resources, it follows that each organization possesses a unique repository of knowledge leading to knowledge asymmetry between firms” (Dibbern et al. 2008). Indeed, outsourcing relationships are typically characterized by knowledge asymmetries between client organization and outsourcing provider (Dibbern et al. 2008). Two knowledge domains, whose sources are being separated by organizational borders, need to be processed and integrated in an outsourcing relationship (Tiwana 2004). First, there is technological knowledge which usually resides on the provider side (Dibbern et al. 2008). This kind of knowledge refers to the technical skills needed to operate the outsourced IT. Second, there is knowledge about the client’s business, whose source resides mainly on the client side (Dibbern et al. 2008), but which needs, to a certain degree, to be acquired by the provider in order for him to be able to provide suitable IT services. For example, if a bank outsources its credit processing system to an IT provider, the IT provider needs to acquire an understanding about how the bank is processing credit applications, in
order to be able to maintain and further develop the system in a way that suites the client’s needs. Using the words of Dibbern et al. (2008),

“the client continually produces new application domain knowledge which reflects its constantly changing business requirements. While it is necessary for the client to keep a certain level of technical understanding, e.g. architectural knowledge, when outsourcing an IS function to an external vendor, the majority of the technological knowledge is the responsibility of the vendor. Accordingly, […] outsourcing brings about the challenge of integrating both types of knowledge.”

This integration is not possible without a prior transfer of business process related knowledge from the client to the provider. How this transfer is being executed depends on whether the knowledge that needs to be transferred exists mainly in the form of explicit knowledge (documentation) or tacit knowledge (i.e. knowledge within the heads of individuals).

In the following, we first introduce the constructs of operational alignment and flexibility before analyzing how the prevalence of either type of knowledge (tacit vs. explicit) affects the relationship between the two constructs.

**Operational IT Business Alignment**

Many research contributions deal with IT business alignment as an important means for delivering business value (Avison et al. 2004; Bergeron et al. 2004; Chan and Reich 2007a; Luftman and Kempaiah 2007). However, although the Strategic Alignment Model (Henderson and Venkatraman 1993) incorporates both, the strategic level of alignment between business and IT strategies, as well as the operational level of alignment between business and IT structure and processes, most research focuses on the strategic level (Bergeron et al. 2004), leaving a gap at the operational level (compare Chan and Reich 2007a). Closing this gap by investigating operational IT business alignment is important for following reasons:

- Strategy needs to be transformed into “daily business” (Gordon and Gordon 2000), because “strategies are only effective when they are translated into actions readily” (Feurer et al. 2000, p.23), so that “one’s strategy gets enacted” at the operational level (Chan and Reich 2007a, p. 47).
- “The ability to translate the business strategy into processes, IS investments and change plans that match the business priorities” as well as “the ability to translate the business strategy into long term information architectures, technology infrastructure and resourcing plans that enable the implementation of the strategy” (Peppard and Ward 2004, p.176) are essential capabilities.
- “Lower-level functioning groups need to interact in order to transform strategy into daily business” (Gordon and Gordon 2000, p.6).
- The operational level of alignment dealing with functional integration rather than with strategic integration is more appropriate for process-level research, which is in the focus of this research.

Drawing on the social dimension of alignment from (Reich and Benbasat 1996) and based on (Nelson and Cooprider 1996), (Reich and Benbasat 2000) as well as (Tiwana et al. 2003), Wagner (2007) has developed an operational alignment construct for process-level research focusing on “run the business” rather than on projects, which differ from daily business in that they require a dedicated budget, a project manager, and a project team. He points out three distinct dimensions of operational alignment, which we will consider in the following: shared knowledge, cognitive relationship, and communication.

Shared knowledge has previously been shown to be an essential predictor of IS performance (Nelson and Cooprider 1996). It is needed for successful knowledge integration (Kearns and Sabherwal 2006) and is termed a key takeaway for practitioners by literature pointing to the importance of sharing knowledge (Chan and Reich 2007b). Moreover, “only shared domain knowledge unambiguously distinguishes high from low achievers” over the long term (Avison et al. 2004, p.229). Shared knowledge refers to both “IT-knowledgeable business managers and business-knowledgeable IT managers” (Reich and Benbasat 2000, p.84), is bound to individuals and thus may be regarded as a form of **tacit knowledge** (Nonaka 1994) – i.e. knowledge that is not codified, representing "the ability of IT and business executives, at a deep level, to understand and be able to participate in the others' key processes and to respect each other's unique contribution and challenges" (Reich and Benbasat 2000, p.86). This perspective is supported by Nelson and Cooprider’s (1996, p.411) definition of shared knowledge as individual-related "understanding and appreciation among IS and line managers for the technologies and processes that affect their mutual performance". For the purpose of this paper, we adopt a unilateral view on shared knowledge in that we are
regarding only one aspect of this dimension, namely the business knowledge of the IT professionals (Bassellier and Benbasat 2004). Therefore, in the following we refer to shared knowledge as *tacit cross-domain knowledge of IT provider employees* about the client firm’s business domain.

The second component of operational alignment, *cognitive relationship*, may be seen as both influencing the development of shared knowledge as well as being influenced by shared knowledge (Hansen 1999; Tiwana et al. 2003). Cognitive relationship encompasses concepts like trust, mutual respect, mutual acceptance, and mutual understanding of common goals – elements which form the critical foundation of a good relationship between IT and business people (Galunic and Rodan 1998; Nelson and Cooprider 1996; Tiwana et al. 2003), regardless of whether both domains are located within or across the confines of a single firm or not. In both cases, high degrees of mutual respect and understanding are reflective for a successful relationship between IT and business domain, as perceived by the client.

Finally, *communication* underlies cognitive relationships and the development of shared knowledge, providing the structural linkage by means of which knowledge can be shared easily (Alavi and Leidner 2001; Tiwana 2003) and tightening cognitive relationships through frequent interaction (Tiwana et al. 2003). Communication refers to the kind and quality of interaction patterns and communication channels between the representatives of IT and business domains in the daily business, encompassing, for example, routines established to enable the process of joint knowledge creation (Reich and Benbasat 2000; Tiwana et al. 2003).

**IT Provider Flexibility**

IT plays a significant role in ensuring a firm’s ability to readjust and reconfigure its resources and business processes to match dynamically changing market demands (Byrd and Turner 2000). In business environments characterized by uncertainty and constant change, flexibility is a critical aspect of success (Young-Ybarra and Wiersema 1999) and a main component of IT service quality, as perceived by the service recipient (Kettinger et al. 1997). In this research, we refer to IT flexibility as an ex-post maneuver in the sense of Evans, who defines this kind of flexibility as “after-the-fact adjustments undertaken once a triggering episode has occurred” (Evans 1991, p.75). In the context of IT outsourcing relationships, investigated in this paper, the triggering episode for the adjustments to be undertaken is represented by change requests posed by the client firm to the IT provider. The flexibility of the IT provider is reflected by the timeliness and accuracy with which the provider reacts to such requests, implementing the IT change.

**Research Model**

Our research model (Figure 1) depicts the hypothesized links between operational alignment (shared knowledge, communication, and cognition), IT provider flexibility, and process documentation which we will discuss in detail in the following section.

In IT outsourcing relationships, operational alignment between the IT domain and the business domain is achieved through knowledge transfer and integration between business client and IT provider. Frequent interaction enhances the transfer of knowledge, thus facilitating knowledge sharing (Alavi and Leidner 2001; Tiwana 2003) between IT and business domain (Reich and Benbasat 1996; Tiwana et al. 2003) and also leads to tight cognitive linkages between the members of both domains (Tiwana et al. 2003). As mentioned above, cognitive linkages refer to trust, respect, acceptance, as well as shared mutual understanding of collective goals, business strategies, organizational work processes, and the work environment among business domain (the banking client) and IT domain (the IT provider). Constant transfer of knowledge between client and provider is only possible with frequent interaction – i.e., transferring knowledge through formal and informal communication. Through this interaction, both shared domain knowledge and cognitive linkages are increasing (Alavi and Leidner 2001; Galunic and Rodan 1998; Hansen 1999). For the operational alignment dimensions, this means that communication is an antecedent of both shared knowledge as well as cognition. Thus, our first two hypotheses are:

**H1**: Frequent communication is associated with higher degrees of shared knowledge.

**H2**: Frequent communication is associated with higher degrees of cognition.

Shared knowledge is important for the coordination among different agents who have different models of the world (Foss 1999). Thus, shared knowledge forms the basis for aligned actions, because it provides the IT domain with the business knowledge necessary to provide effective services for the business side. In IT outsourcing relationships,
customer insight affects the timeliness and accuracy with which the provider firm reacts to its client’s change requests. The more the IT provider understands the specifics of his clients’ business and internal processes, the more likely it is that he will be able to react flexible and knowledgeable to change requests (Wagner 2007). We therefore hypothesize that

**H3:** Shared knowledge positively influences IT provider flexibility.

The availability of explicit, formal documentation (Grover and Segars 2005) is an important indication of organizational maturity and increases efficiency by reducing ambiguities (Dewett and Jones 2001). If explicit knowledge (in form of an up-to-date documentation) about the client’s business processes which are supported by the outsourced application is not available, the only sources of information to which the provider can resort when implementing a change are the provider’s own tacit knowledge about the business specifics of the client and the tacit knowledge incorporated in the client’s personnel. By contrast, if explicit knowledge is available in form of up-to-date documentation, the information needed by the provider for quick and accurate reaction to client demands can be acquired by referring to this documentation. In this case, shared (tacit) knowledge is an important complement to explicit knowledge but not the only source of information. Therefore, we hypothesize:

**H4:** When up-to-date business process documentation is available, shared knowledge loses importance for IT provider flexibility.

![Figure 1: Research Model](image)

Alignment can increase responsiveness to a changing environment as well as to user requests and requirements, regarding the IS as a means to preserve the relationship between the business and the IT domain (Young-Ybarra and Wiersema 1999). This consideration is based on the concept of balanced asset specificity and resembles cognitive linkages between IT and business as it refers to a balanced dependence between the two domains as a collective incentive to maintain the relationship (Young-Ybarra and Wiersema 1999). The reason for this increased responsiveness is that failing to meet business needs by not being fast enough to correct errors or implement changes requested by the business side may result in damaging the relationship between IT and business domain which has been created over time and which is seen as an asset by both sides (Wagner 2007) because it is essential for the success of the relationship. This reasoning holds especially true when there is a client-provider relationship between business and IT domains, as it is the case in IT outsourcing relationships. Therefore, we hypothesize that

**H5:** IT provider flexibility has a positive influence on cognition.

Cognitive linkages may be seen as both a driver as well as an outcome of shared knowledge (Hansen 1999; Tiwana et al. 2003). In support of the positive influence of cognition on shared knowledge one may argue that, once cognitive linkages (e.g. referring to mutual trust) are established, the willingness to share knowledge may increase. At the side of the receiver of knowledge, established cognitive linkages may also increase the willingness to accept knowledge. Thus cognitive linkages facilitate knowledge sharing. This is in line with the study of Nelson and Cooprider (1996) who show that mutual trust and mutual influence positively impact shared knowledge by
alleviating barriers to cooperation and creating a common frame of reference. On the other hand, in support of the inverse effect (shared knowledge on cognition), one may argue that the provider’s knowledge about the clients’ business domain enables him to “speak the client’s language”. This ability may rouse acceptance and respect on the client’s side, thus acting as an enabler for cognitive linkages. This assertion is supported by Bassellier and Benbasat (2004) who found that IT professionals have a greater intention to develop and strengthen relationships when they reach higher levels of business knowledge. Thus, the relationship between the two constructs resembles a spiral, where shared knowledge arouses cognition and cognition arouses the willingness to accept and internalize information stemming from the other party, which translates into higher levels of shared knowledge. However, regardless of the direction of influence, we deem that the relationship between the two constructs is a positive one, since in both cases higher levels of one construct are associated with higher levels of the other construct. Therefore we hypothesize:

**H6:** There is a positive relationship between shared knowledge and cognition.

The earlier hypothesized positive link between flexibility and cognition may be even stronger when explicit knowledge in form of extensive up-to-date documentation is made available to the provider. The reason is that the client may now be more demanding since, from his point of view, all information needed by the provider for timely and accurate reaction is now available in explicit form. On the other hand, merely “speaking the customer’s language” will not be enough anymore to gain the client’s trust and respect. When all information needed for providing flexible services is available, then the provider really needs to “start delivering” rather than just showing business domain knowledge. Therefore, we hypothesize that

**H7:** When up-to-date business process documentation is available, IT provider flexibility gains importance for cognition.

**H8:** When up-to-date business process documentation is available, shared knowledge loses importance for cognition.

Communication relies on formal and informal communication channels and is thus important for knowledge transfer and the development of cognitive linkages. In order to influence IT provider flexibility, it is necessary to transfer content (i.e., knowledge and cognition). This is supported by Tiwana et al. (2003) who found business-IS linkages to be an antecedent of knowledge integration with no direct effect on their dependent variable IS development capability. Therefore we hypothesize that communication per se hardly impacts IT provider flexibility.

**H9:** Communication has a negligible direct impact on IT provider flexibility.

**Methodology**

This study uses a dataset obtained from a survey carried out in 2005 among Germany’s top 1,000 banks (according to total assets). Main focus of the survey was to investigate the role of IT for process performance in the corporate (SME) loans business and to identify critical drivers of effective IT usage. The questionnaire was answered by the chief credit officers of 136 banks, resulting in a response rate of 13.6%. The sample is statistically representative regarding firm size (assets). From the total of 136 received questionnaires, a number of 104 respondents indicated that their credit processing system – which was the IT system that all respondents were asked to refer to when answering the questionnaire – is externally managed and run by an outsourcing provider (compared to 20 banks stating to use an in-house system and 12 respondents who gave no answer). 73 out of them were usable since they showed no missing values in the applied items.

We chose to focus on the German banking sector for several reasons. First, banks employ especially IT-intensive processes, since this is, beside people, their only production resource. Second, high and frequently changing regulations as well as high competition inter alia resulting from quite homogenous products require them to have a highly flexible IT infrastructure and information systems. Third, banks in Germany have usually outsourced the operations and maintenance of their IT/IS. The German banking industry features a particular structure as more than 80% of all German banks are public savings banks or credit cooperatives. Both the credit cooperatives and the public savings banks are organized in quite tight national associations and have founded joint data processing centers in the 70ies or even earlier. Thus, many German banks have never operated their IT internally.

As an important side effect, the choice of just one industry and just one business process avoids heterogeneity. This makes the use of several demographic control variables obsolete (see Chiasson and Davidson 2005) because we focus on similar IT systems, on similar business contexts, on people with comparable backgrounds and on firms acting in the same regulatory environment and in comparable customer segments. We focus on a primary business
process (i.e. the process for granting and managing investment loans to small and medium-sized enterprises or – short – the SME credit process) and its underlying IT application because following Barua et al. (1995), we believe that variance at the aggregation level of a firm will dilute and disguise IT impacts. This can be avoided by focusing on only one core process. Therefore, all constructs are operationalized at the business process level. As suggested by Eisenhardt (1989), the indicator questions have been derived mainly from validated scales from the literature and were adapted to our purpose. This is especially true for operational IT business alignment based on the described set of three dimensions, as research on this issue is very rare.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Indicator</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognition</td>
<td>COG1</td>
<td>There exists a lot of mutual trust and respect between IT unit and business unit.</td>
<td>(Bhatt 2003; Luftman 2003; Ravichandran and Lertwongsatien 2005; Teo and Ang 1999)</td>
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<td></td>
<td>COG2</td>
<td>The IT unit and the business unit regularly consult each other.</td>
<td>(Bhatt 2003; Broadbent and Weill 1993; Chung et al. 2003; Ravichandran and Lertwongsatien 2005; Reich and Benbasat 1996)</td>
</tr>
<tr>
<td></td>
<td>COG3</td>
<td>A change to the IS is implemented in close interaction between business unit and IT unit.</td>
<td>(Bergeron et al. 2004; Broadbent and Weill 1993; Chung et al. 2003; Reich and Benbasat 1996; Segars and Grover 1998)</td>
</tr>
<tr>
<td>Communication</td>
<td>COMM1</td>
<td>There are meetings on a regular basis between IT unit and business unit to control change processes.</td>
<td>(Broadbent and Weill 1993; Chung et al. 2003; Reich and Benbasat 1996)</td>
</tr>
<tr>
<td></td>
<td>COMM2</td>
<td>There are meetings on a regular basis between IT unit and business unit for business process improvements.</td>
<td>(Broadbent and Weill 1993; Chung et al. 2003; Reich and Benbasat 1996)</td>
</tr>
<tr>
<td></td>
<td>COMM3</td>
<td>There exist meetings on a regular basis between IT unit and business unit to ensure an effective and efficient change process.</td>
<td>(Broadbent and Weill 1993; Chung et al. 2003; Reich and Benbasat 1996)</td>
</tr>
<tr>
<td>IT Provider Flexibility</td>
<td>FLEX1</td>
<td>If there are critical bugs in the IT applications, they get fixed in a timely manner.</td>
<td>(Byrd and Turner 2001)</td>
</tr>
<tr>
<td></td>
<td>FLEX2</td>
<td>If there are non-critical bugs in the IT applications, they get fixed in a timely manner.</td>
<td>(Byrd and Turner 2001)</td>
</tr>
<tr>
<td></td>
<td>FLEX3</td>
<td>The IT unit reacts flexible to change requests from the business unit.</td>
<td>(Young-Ybarra and Wiersema 1999)</td>
</tr>
<tr>
<td></td>
<td>FLEX4</td>
<td>The IT unit realizes change requests from the business unit in appropriate time.</td>
<td>(Young-Ybarra and Wiersema 1999)</td>
</tr>
<tr>
<td></td>
<td>FLEX5</td>
<td>The IT unit is very responsive regarding needs of the business unit.</td>
<td>(Chang and King 2005; Segars and Grover 1998; Teo and Ang 1999)</td>
</tr>
<tr>
<td>Shared Knowledge</td>
<td>SK1</td>
<td>The employees of the IT unit are able to interpret business-related problems and to develop solutions.</td>
<td>(Bhatt 2003; Broadbent and Weill 1993; Ravichandran and Lertwongsatien 2005; Reich and Benbasat 1996; Segars and Grover 1998; Teo and Ang 1999)</td>
</tr>
<tr>
<td></td>
<td>SK2</td>
<td>The employees of the IT unit know the SME credit business process.</td>
<td>(Bhatt 2003; Boynton et al. 1994; Broadbent and Weill 1993; Reich and Benbasat 1996; Teo and Ang 1999; Teo and King 1997)</td>
</tr>
<tr>
<td></td>
<td>SK3</td>
<td>The IT unit implements change requests according to the requirements of the business unit.</td>
<td>(Broadbent and Weill 1993; Chang and King 2005; Reich and Benbasat 1996)</td>
</tr>
</tbody>
</table>
For conducting the statistical analysis, we used Partial Least Square (PLS) employing SmartPLS 2.0 (Ringle et al. 2005). PLS was chosen for two reasons. First, PLS is more appropriate if theory is untested in an application domain or tentative (Gopal et al. 1993), and second, our data set predominantly consists of not normally distributed variables, which prevents the use of covariance-based instruments. For testing the model, we used only reflective measures (listed in Table 1).

The effect of process documentation on the links between shared knowledge, cognition, and flexibility (H4, H7, and H8) was tested by conducting a group comparison. We divided the sample into two groups of banks with low vs. high process documentation and performed 2000 bootstraps of the PLS model with each sub sample. The group comparison was done both by a Mann-Whitney test and a T-test on the resulting path coefficients.

Results

Reliability and Validity

This section deals with the statistical validity and reliability of the constructs and their linkages, as well as potential biases and the validity of the mapping between items and constructs. First, non-response bias and common method bias are discussed. Then, the validity and reliability of the PLS measurement model are investigated, including content and construct validity.

Non-Response Bias and Common Method Bias

To test for non-response bias, we distinguished between respondents and late respondents (managers who responded after a reminder (Worren et al. 2002)). Following Kearns and Lederer (2004), the late respondents (52.2% of all respondents) were treated as non-respondents, because they share similarities with non-respondents. We found no significant differences, indicating that non-response bias cannot be assumed.

Common method bias may occur when a single source is being used for assessing both the independent as well as the dependent constructs. Podsakoff et al. (2003) distinguish between procedural and statistical remedies to cope with common method bias. The procedural remedies refer to measures carried out before data collection and are related to the design of the questionnaire. The statistical remedies are tests after data collection. To address procedural remedies we removed ambiguous and complex items from the questionnaire by using pre-tests; reverse-coded items were used to counter acquiescence effects, and anonymity of respondents was assured to counter social desirability effects. To address statistical remedies, we used Harman’s factor test (Podsakoff and Organ 1986) that showed no single factor accounting for the majority of variance. Moreover, we followed the approach described by Liang et al. (2007) by allowing the items to load both on their construct (via single-item constructs) and on a latent common methods factor in order to verify that the common methods factor does not provide a substantial explanation of the variance compared to the original latent variable.

PLS Measurement Model

Content validity refers to the extent to which measures reflect the intended meaning of a construct (Zhu and Kraemer 2002). Content validity was assured by deriving indicator questions from prior research and by implementing pre-tests to test for ambiguities. The insights from the pre-tests were used to adapt single indicator questions to the intended meaning, or to remove them from the questionnaire at all if those items were too complex.

Indicator reliability deals with the statistical fit between an indicator and its corresponding latent variable. Loadings of the indicator to their respective construct must not be below 0.5 and should be above the recommended threshold of 0.707 (Hulland 1999). Loadings between 0.5 and 0.707 can be accepted if all other items belonging to a certain construct are above 0.707 (Chin 1998). Using the PLS bootstrap resampling we created 500 random samples of our data set to test the stability and statistical significance of the estimated constructs (Chin 1998). The resulting T-values from the t-statistics represent the level of significance for each single item. In the model tested, all loadings of the indicators are above the recommended 0.707 parameter value except in two cases (see Table 2) and significant at the 0.01 level, demonstrating indicator reliability.

Construct validity is composed of convergent and discriminant validity and deals with the accuracy by which the measures actually describe the construct (Gefen and Straub 2005). Convergent validity refers to the internal consistency of the set of items and is analyzed by calculating the Average Variance Extracted (AVE) and the
composite reliability. It is recommended to have an AVE greater than 0.5 (Chin 1998) and a composite reliability of greater than 0.7 (Nunnally 1978). Composite reliability is comparable to Cronbach’s Alpha that is also depicted in Table 3 (and in Table 9 for the sub-samples, together with the single R square values) demonstrating that our model exhibits a good correlation between the indicators and their construct.

**Discriminant validity** is concerned with whether the construct, measured by the set of items, is discriminant from other constructs. As shown by Tables 4 and 10 show (see Appendix for Table 10), all correlations between the constructs are lower than the square root of the average variance extracted (presented in the diagonal). Together with Table 5, which shows that the indicators load more strongly on their respective construct than on any other construct, this demonstrates a sufficient statistical separation between the different sets of indicators (Gefen et al. 2000).

### Table 2: Loadings (**: p<.01, *: p<.1)**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Indicator</th>
<th>Total sample</th>
<th>Group with low process documentation</th>
<th>Group with high process documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognition</td>
<td>COG1</td>
<td>.737**</td>
<td>.740**</td>
<td>.770**</td>
</tr>
<tr>
<td></td>
<td>COG2</td>
<td>.737**</td>
<td>.675**</td>
<td>.777**</td>
</tr>
<tr>
<td></td>
<td>COG3</td>
<td>.844**</td>
<td>.853**</td>
<td>.807**</td>
</tr>
<tr>
<td>Communication</td>
<td>COMM1</td>
<td>.908**</td>
<td>.838**</td>
<td>.928**</td>
</tr>
<tr>
<td></td>
<td>COMM2</td>
<td>.937**</td>
<td>.978**</td>
<td>.930**</td>
</tr>
<tr>
<td></td>
<td>COMM3</td>
<td>.953**</td>
<td>.909**</td>
<td>.974**</td>
</tr>
<tr>
<td>IT Provider Flexibility</td>
<td>FLEX1</td>
<td>.780**</td>
<td>.720**</td>
<td>.749**</td>
</tr>
<tr>
<td></td>
<td>FLEX2</td>
<td>.771**</td>
<td>.824**</td>
<td>.715**</td>
</tr>
<tr>
<td></td>
<td>FLEX3</td>
<td>.814**</td>
<td>.796**</td>
<td>.747**</td>
</tr>
<tr>
<td></td>
<td>FLEX4</td>
<td>.836**</td>
<td>.771**</td>
<td>.839**</td>
</tr>
<tr>
<td></td>
<td>FLEX5</td>
<td>.714**</td>
<td>.853**</td>
<td>.816**</td>
</tr>
<tr>
<td>Shared Knowledge</td>
<td>SK1</td>
<td>.808**</td>
<td>.849**</td>
<td>.754**</td>
</tr>
<tr>
<td></td>
<td>SK2</td>
<td>.708**</td>
<td>.857**</td>
<td>.575**</td>
</tr>
<tr>
<td></td>
<td>SK3</td>
<td>.828**</td>
<td>.701**</td>
<td>.891**</td>
</tr>
</tbody>
</table>

### Table 3: Quality Measures for Latent Variables (results from sub-samples are presented in the Appendix)

<table>
<thead>
<tr>
<th></th>
<th>Composite Reliability</th>
<th>AVE</th>
<th>Cronbachs Alpha</th>
<th>R Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognition</td>
<td>.818</td>
<td>.600</td>
<td>.672</td>
<td>.435</td>
</tr>
<tr>
<td>Communication</td>
<td>.952</td>
<td>.870</td>
<td>.925</td>
<td></td>
</tr>
<tr>
<td>IT Provider Flexibility</td>
<td>.888</td>
<td>.615</td>
<td>.845</td>
<td>.338</td>
</tr>
<tr>
<td>Shared Knowledge</td>
<td>.826</td>
<td>.613</td>
<td>.726</td>
<td>.019</td>
</tr>
</tbody>
</table>

### Table 4: Correlations of Latent Variables and AVE Square Root (Shaded Cells) (results from sub-samples are presented in the Appendix)

<table>
<thead>
<tr>
<th></th>
<th>Cognition</th>
<th>Communication</th>
<th>IT Provider Flexibility</th>
<th>Shared Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognition</td>
<td>.775</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>.295</td>
<td>.933</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Provider Flexibility</td>
<td>.619</td>
<td>.151</td>
<td>.784</td>
<td></td>
</tr>
<tr>
<td>Shared Knowledge</td>
<td>.452</td>
<td>.138</td>
<td>.577</td>
<td>.783</td>
</tr>
</tbody>
</table>
Table 5: Cross Loadings of Manifest Variables

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Cognition</th>
<th>Communication</th>
<th>IT Provider Flexibility</th>
<th>Shared Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>COG1</td>
<td>.737</td>
<td>.002</td>
<td>.547</td>
<td>.389</td>
</tr>
<tr>
<td>COG2</td>
<td>.737</td>
<td>.221</td>
<td>.335</td>
<td>.315</td>
</tr>
<tr>
<td>COG3</td>
<td>.844</td>
<td>.403</td>
<td>.539</td>
<td>.355</td>
</tr>
<tr>
<td>COMM1</td>
<td>.265</td>
<td>.908</td>
<td>.110</td>
<td>.102</td>
</tr>
<tr>
<td>COMM2</td>
<td>.247</td>
<td>.937</td>
<td>.145</td>
<td>.159</td>
</tr>
<tr>
<td>COMM3</td>
<td>.310</td>
<td>.953</td>
<td>.162</td>
<td>.123</td>
</tr>
<tr>
<td>FLEX1</td>
<td>.506</td>
<td>.208</td>
<td>.780</td>
<td>.474</td>
</tr>
<tr>
<td>FLEX2</td>
<td>.329</td>
<td>-.040</td>
<td>.771</td>
<td>.332</td>
</tr>
<tr>
<td>FLEX3</td>
<td>.430</td>
<td>.204</td>
<td>.814</td>
<td>.560</td>
</tr>
<tr>
<td>FLEX4</td>
<td>.424</td>
<td>.152</td>
<td>.836</td>
<td>.462</td>
</tr>
<tr>
<td>FLEX5</td>
<td>.684</td>
<td>-.022</td>
<td>.714</td>
<td>.369</td>
</tr>
<tr>
<td>SK1</td>
<td>.366</td>
<td>.044</td>
<td>.325</td>
<td>.808</td>
</tr>
<tr>
<td>SK2</td>
<td>.232</td>
<td>.0430</td>
<td>.234</td>
<td>.708</td>
</tr>
<tr>
<td>SK3</td>
<td>.411</td>
<td>.178</td>
<td>.635</td>
<td>.828</td>
</tr>
</tbody>
</table>

Summarizing the results, each construct showed the required internal consistency, convergent validity, and discriminant validity. The next section copes with the results of testing our research model.

Structural Model and Group Comparison

Figure 2 shows the PLS results for the total sample. For deriving the t-values and the resulting significance levels, we used the bootstrapping procedure with 500 sub-samples (Chin 1998). The results are also depicted in Figure 2.

As a result, we find weakly significant paths from communication to shared knowledge and from shared knowledge to cognition. The paths related with IT provider flexibility are highly significant (shared knowledge → IT provider flexibility (H3), IT provider flexibility → cognition (H5)) and the positive relationship between communication and cognition (H2) is significant as well. By contrast, the direct link from communication to IT provider flexibility is, as proposed above (H9), non-existent.

In order to analyze the moderating effect of process documentation, the data set was divided into two groups, based on the level of high-quality, up-to-date documentation available for the SME credit process. The first group...
contained datasets in which the respondents indicated low and medium levels of high-quality process documentation (39 cases). The second group contained cases with high and very high levels of high-quality process documentation (58 cases). The remaining 7 respondents gave no answer about the level of documentation and therefore these datasets had to be excluded from the analysis. Moreover, missing values led to a reduction of the data sets to 30 and 43 cases in the two groups.

The actual group comparison of the path coefficients is based on a bootstrapping with 500 samples. The distributions of path coefficients between both groups were compared by applying the Mann-Whitney test and the T-test, which both showed consistent results. All path coefficients differ significantly between the two samples, but in different strength and direction. The validity and reliability criteria for the PLS results from testing the model with the two groups are presented in Table 9 in the Appendix.

### Table 6: Group comparison of path coefficients (Test of H4, H7, H8)

<table>
<thead>
<tr>
<th>Path</th>
<th>Original path coefficient (T-value)</th>
<th>Average path coefficient from 2000 bootstraps (st. dev.)</th>
<th>Mann-Whitney test on group difference</th>
<th>T-test on pair-wise difference ≠0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low process documentation (n&lt;sub&gt;low&lt;/sub&gt; = 30)</td>
<td>High process documentation (n&lt;sub&gt;high&lt;/sub&gt; = 43)</td>
<td>Low process documentation (n&lt;sub&gt;low&lt;/sub&gt; = 30)</td>
<td>High process documentation (n&lt;sub&gt;high&lt;/sub&gt; = 43)</td>
</tr>
<tr>
<td>Shared Knowledge → IT Provider Flexibility</td>
<td>.668 (5.16)</td>
<td>.546 (5.41)</td>
<td>.679 (.108)</td>
<td>.569 (.101)</td>
</tr>
<tr>
<td>IT Provider Flexibility → Cognition</td>
<td>.254 (1.53)</td>
<td>.648 (5.72)</td>
<td>.306 (.165)</td>
<td>.637 (.113)</td>
</tr>
<tr>
<td>Shared Knowledge → Cognition</td>
<td>.404 (2.28)</td>
<td>.036 (.32)</td>
<td>.383 (.177)</td>
<td>.051 (.114)</td>
</tr>
</tbody>
</table>

### Table 7: Summary of the Results

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1</strong>: Frequent communication is associated with higher degrees of shared knowledge.</td>
<td>Weakly supported</td>
</tr>
<tr>
<td><strong>H2</strong>: Frequent communication is associated with higher degrees of cognition.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H3</strong>: Shared knowledge positively influences IT provider flexibility.</td>
<td>Strongly supported</td>
</tr>
<tr>
<td><strong>H4</strong>: When up-to-date business process documentation is available, shared knowledge loses importance for IT provider flexibility.</td>
<td>Weakly supported</td>
</tr>
<tr>
<td><strong>H5</strong>: IT provider flexibility has a positive influence on cognition.</td>
<td>Strongly supported</td>
</tr>
<tr>
<td><strong>H6</strong>: There is a positive relationship between shared knowledge and cognition.</td>
<td>Weakly supported</td>
</tr>
<tr>
<td><strong>H7</strong>: When up-to-date business process documentation is available, flexibility gains importance for cognition.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H8</strong>: When up-to-date business process documentation is available, shared (tacit) knowledge loses importance for cognition.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H9</strong>: Communication has a negligible direct impact on IT provider flexibility</td>
<td>Supported</td>
</tr>
</tbody>
</table>

As Table 6 shows, the relationship between shared knowledge and cognition is much stronger in the low-documentation group and becomes, compared to the high-documentation group and to the overall sample, highly significant. Consequently, H8 is strongly confirmed. Inversely, the impact of IT provider flexibility on the outsourcer’s cognition is much higher in the high-documentation group but becomes insignificant in the low-documentation group (confirming H7). Less difference can be found regarding the relationship between shared
knowledge and IT provider flexibility; the low-process documentation group shows only slightly higher path coefficients for this relationship, weakly supporting H4. Table 7 summarizes the overall results:

**Discussion and Limitations**

As hypothesized, the link between shared knowledge and cognition became weaker in the presence of good process documentation (H8) – in fact, the influence of the IT provider’s cross-domain knowledge on cognition even became insignificant in the sample featuring extended process documentation. We also tested the total effects of shared knowledge on cognition (incorporating both the direct relationship and also the one which is mediated by IT provider flexibility) and found, as an overall effect, a significant decrease in this relationship. This supports our reasoning that, in the case of low levels of documentation, the provider has the chance to create a good impression and gain the client’s respect and acceptance by proving to be knowledgeable about the client’s business domain. This may be so because in order to overcome the shortcoming of not having reliable documentation to draw upon, both parties – outsourcer and IT provider – have to fully concentrate on explicating, transferring, and integrating tacit knowledge by writing documents, practicing of procedures, coaching, and mentoring. The predominant direction of knowledge transfer is from the outsourcer to the IT service provider. The ease with which the provider assimilates knowledge about the client’s business procedures, information systems requirements, etc. – which is directly enabled by the amount of business domain knowledge possessed by the provider – creates the proper climate for strong cognitive relationships.

However, if up-to-date documentation is available, the influence of the provider’s tacit business domain knowledge on the cognitive relationship decreases significantly as the client now becomes more demanding, expecting from the provider to “start delivering”, instead of only proving to be knowledgeable about the client’s domain. Flexibility on the provider side proves to be a highly relevant aspect of service quality as perceived by the client (compare Kettinger et al. 1997). This development is supported by the highly significant difference between the flexibility-cognition relationships within the two groups.

A bit unexpectedly, the impact of shared knowledge on IT provider flexibility – although significantly reduced compared to the group with low documentation – still remains strong when up-to-date documentation is available. The reason for this might be that explicit documentation, although it represents a valuable additional source of information, is not a complete substitute for personal domain knowledge. In the presence of up-to-date documentation, the basis for delivering flexible services may be enhanced by explicit, codified information, but the tacit knowledge of the provider’s employees, which is mainly based on experience, continues to be an important driver (compare Alavi and Leidner 2001).

Our approach involves several limitations. First, we used business executives’ perceptions as a proxy for IT provider flexibility which may cause a bias. However, the use of business executives’ perceptions is widely accepted in IS research (Bergeron et al. 2004; Chan et al. 1997; Cragg et al. 2002), because there is evidence in literature that they correlate with objective measures. As Tallon and Kraemer (2007, p.19) put it regarding IT value research: “Perceptions may therefore not be entirely accurate, but, in the subconscious reasoning of executives who are trying to give a reasoned response to the question of IT value, it is accurate enough”. Moreover, the business executives represent the users of the system and are, therefore, the relevant source for evaluating IT provider flexibility from the client’s perspective.

Second, we have only used a single person to capture an organizational perspective. This limitation was relaxed by addressing the expert in charge of the credit process to get the relevant variables (Tallon et al. 2000) and by accompanying the survey by a set of case studies that allowed balancing the view of the manager in charge with other manager’s views where we did not find great deviations in the assessment.

Third, the generalizability of results suffers from the single-person and single-point-in-time measurement (threat of method bias) as well as from the focus on only one industry. However, this narrow focus may also be seen as strength of our study, because it excludes much of the potential side-effects from uncontrolled variables that might occur in a wider frameset.

Fourth, for the group comparison, we had only quite small samples. Particularly, the low-documentation sample was comparably low, since the banking industry has caught up regarding the level of process documentation, also due to regulatory requirements, leaving only few banks behind. The small samples did not allow for a group comparison regarding construct levels (i.e. average levels of latent variable scores) in order to see whether the levels of shared knowledge, flexibility, and cognition themselves differed between banks with low vs. high process documentation.
Due to the small sample sizes, we only found insignificant results. In the future, we will try to gather comparable data from other industries in order to put our findings onto a broader statistical basis.

**Conclusion**

The aim of this study was to explore the interplay of the different dimensions of operational alignment with IT provider flexibility in the context of IT outsourcing relationships and the moderating role of process documentation in affecting this interplay. Table 8 summarizes the contributions of this paper with regard to our research questions and the implications of our findings for theory and practice.

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Main Contribution to Theory</th>
<th>Implications for Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>What connections exist between the different alignment dimensions and IT provider flexibility?</td>
<td>We could demonstrate a strong influence of shared knowledge on IT provider flexibility and a strong influence of IT provider flexibility on cognition. As expected, the third dimension of operational alignment (communication) does not have a direct effect on flexibility. Instead, its effect on flexibility is mediated by shared knowledge.</td>
<td>First of all, management should foster knowledge exchange between the client and the IT service provider because it promotes the development of business understanding and orientation which helps the IT service provider to provide flexible services. This can be done by a) mentoring and on-the-job-training of IT service provider employees through dedicated client personnel; b) fostering communication by means of formal meetings and up-to-date documentation.</td>
</tr>
<tr>
<td>How does the availability of process documentation affect these connections?</td>
<td>In the presence of up-to-date process documentation, the link between shared knowledge and cognition is weaker than it is when the level of documentation is low. Furthermore, the influence of IT provider’s cross-domain tacit knowledge on cognition is highly significant when there is little explicit knowledge in form of up-to-date documentation. This link becomes insignificant when high levels of explicit knowledge in form of process documentation are employed.</td>
<td>While good process documentation enhances the client organization’s outsourcing readiness by fostering knowledge transferability, bank management should be aware that tacit knowledge is also important for IT provider flexibility even in cases where a comprehensive and up-to-date documentation is available. Therefore, banks and their IT providers should not only focus on a perfect documentation (e.g. process description, service level agreements), which certainly is necessary, but also on facilitating the exchange of procedural knowledge between the two domains.</td>
</tr>
</tbody>
</table>

In conclusion, we find that business process documentation plays a subtle role in shaping the relationship between IT providers and their banking clients. This is demonstrated by the unexpectedly strong negative effect of documentation on the link between shared knowledge and cognition (which practically vanishes in the prevalence of good-quality, up-to-date business process documentation), but also on the link between IT flexibility and cognition, which only becomes significant when up-to-date documentation is available.

As stated in the Research Background section, process documentation is not the only source of explicit knowledge about the client’s specifics the provider may draw upon. It may be worthwhile for future research to tackle the question how other kinds of documentation – like technical documentation, job descriptions, or requirements specifications – affect the relationship between clients and IT providers. Future research should also analyze to what extent the effort of keeping a detailed, up-to-date documentation contributes to achieving performance in outsourcing outcomes like relationship quality and service quality.

**Acknowledgement**

This work was developed as part of a research project of the E-Finance Lab, Frankfurt am Main, Germany (www.efinancelab.com). We are indebted to the participating universities and industry partners.
References


### Appendix

#### Table 9: Comparison of Quality Criteria for the Two Sub-Samples

<table>
<thead>
<tr>
<th></th>
<th>Group With Low Levels of Documentation</th>
<th>Group With High Levels of Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AVE</td>
<td>Composite Reliability</td>
</tr>
<tr>
<td>Cognition</td>
<td>.574</td>
<td>.799</td>
</tr>
<tr>
<td>Communication</td>
<td>.855</td>
<td>.946</td>
</tr>
<tr>
<td>IT Provider Flexibility</td>
<td>.631</td>
<td>.895</td>
</tr>
<tr>
<td>Shared Knowledge</td>
<td>.658</td>
<td>.850</td>
</tr>
</tbody>
</table>

#### Table 10: Correlations of Latent Variables and AVE Square Root (Shaded Cells) in the Two Sub-Samples

<table>
<thead>
<tr>
<th></th>
<th>Group With Low Levels of Documentation</th>
<th>Group With High Levels of Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cognition</td>
<td>Communication</td>
</tr>
<tr>
<td>Cognition</td>
<td>.760</td>
<td>.785</td>
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<tr>
<td>Communication</td>
<td>.208</td>
<td>.910</td>
</tr>
<tr>
<td>IT Provider Flexibility</td>
<td>.554</td>
<td>.072</td>
</tr>
<tr>
<td>Shared Knowledge</td>
<td>.580</td>
<td>.069</td>
</tr>
</tbody>
</table>