Transformed Knowledge Sharing Through Business-managed IT and Shadow IT

Completed Research Paper

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Abstract

Business-managed IT and Shadow IT describe the autonomous deployment/management of IT instances by business units. For the former, this happens in alignment with the IT organization of the enterprise, for the latter, without alignment. We analyze why and how Business-managed IT and Shadow IT transform knowledge sharing with two case studies drawing on the theoretical lens of the knowledge-based view. Several motivators lead to the autonomous implementation of knowledge management systems (KMSs), for example, shortcomings of existing systems. The implemented KMSs have multiple benefits for knowledge sharing, such as a reduction of knowledge sharing barriers. However, we notice that the Shadow IT KMS leads to challenges for cross-unit knowledge sharing due to the covert nature of Shadow IT. Based on the findings of our case studies, we develop a mid-range theory to explain the transformation of knowledge sharing in enterprises supported by Business-managed IT and Shadow IT.

Keywords

Business-managed IT, Shadow IT, knowledge sharing, knowledge management system.

Introduction

Business-managed IT and Shadow IT describe the autonomous deployment or management of IT instances (i.e., software incl. SaaS, PaaS, IaaS, hardware, or IT services) by business units (BUs) (Klotz et al. 2019). To provide precise terminology, Kopper et al. (2018) differentiate Business-managed and Shadow IT via a conceptual framework with the two dimensions IT task responsibility and organizational IT task management. For both Business-managed IT and Shadow IT, a high degree of task responsibility resides in the BUs. However, Business-managed IT instances are overtly involved in the organizational task management, i.e., instances overtly created/procured or managed by BUs in alignment with the IT organization or a split responsibility model (Kopper et al. 2018). In contrast, Shadow IT instances are covert, i.e., instances are created, procured or managed by BUs without alignment with or awareness by the IT organization (Kopper et al. 2018). Market researchers predict that 20-40% of IT investments are made by BUs without the involvement of the IT organization in enterprises (GlobalNewswire 2019). Hence, Business-managed IT and Shadow IT seem to become a mainstream deployment option of IT in enterprises. Accordingly, Klotz et al. (2019) call for differentiation of Business-managed IT and Shadow IT in research and for advancing the research field with focused studies, e.g., on outcomes of Business-managed IT or Shadow IT, such as collaboration enhancement.

One major area of Business-managed IT and Shadow IT deployment in enterprises is the use of collaboration tools, e.g., Dropbox, Google Drive, Skype, WhatsApp (Mallmann et al. 2016; Silic and Back 2014). The literature discusses two causes for the deployment of Business-managed IT and Shadow IT for knowledge sharing: First, enterprises rely on inefficient communication and knowledge sharing utilizing the corporate e-mail system (Mallmann et al. 2016). Second, employees are motivated to deploy more
efficient technologies (Klotz et al. 2019) and, in consequence, employees often use unapproved IT in the workplace (Segal 2016). Hence, deploying Business-managed IT and Shadow IT provides employees with a possibility to overcome the limitations of the existing collaboration tools and knowledge management systems (KMSs) (Mallmann et al. 2016). Shadow IT for knowledge sharing might cause specific risks (Mallmann et al. 2018). In contrast, enterprises could leverage the benefits of Business-managed IT for knowledge sharing while reducing the risks of Shadow IT (Klotz et al. 2019). Therefore, a study comparing Business-managed IT and Shadow IT KMSs is beneficial for scholars and practitioners. Considering the importance of Business-managed IT and Shadow IT and its application for knowledge sharing and communication, we pose the following research question: How and why is knowledge sharing transformed by Business-managed IT and Shadow IT KMSs?

To address this exploratory research question, we conducted two case studies and assessed the implementation and usage of Business-managed IT and Shadow IT KMSs. Our findings exhibit common motivators for the implementation of such systems as well as several benefits. Business-managed IT KMSs may have advantages across the whole enterprise, while for Shadow IT KMSs, the benefits are limited to certain BUs. In this vein, Shadow IT KMSs hinder knowledge sharing beyond individual BUs, i.e., across the entire enterprise, even though employees generally do not aim to harm the enterprise with Shadow IT (Haag and Eckhardt 2014). Eventually, an increasing number of uncoupled and scattered KMSs might call for a consolidation of these systems. Based on these findings, we tentatively suggest a mid-range theory for the transformation of knowledge sharing by Business-managed IT and Shadow IT. Hence, this study contributes to the literature of Business-managed IT and Shadow IT by advancing previous research on knowledge sharing with Shadow IT and by providing empirical insight based on two case studies. We also outline practical implications and point out opportunities for future research.

Background

Business-managed IT and Shadow IT for knowledge sharing

The research field of Business-managed IT and Shadow IT has been experiencing growing research attention for the past years (Klotz et al. 2019). Klotz et al. (2019) provide a systematic overview of the research field by conducting a rigorous and comprehensive review of the existing literature in the field with 107 literature items. They conceptualize Business-managed IT and Shadow IT in a framework of causing factors, outcomes, and governance. However, Klotz et al. (2019) find that detailed case studies of Business-managed IT and Shadow IT in enterprises are sparse. For knowledge sharing, we identified two papers analyzing the influence of Shadow IT. They build upon each other: Mallmann et al. (2018) is an extension of a previous contribution, Mallmann et al. (2016), and uses the same qualitative data based on interviews with ten IT users in different companies. Mallmann et al. (2016, 2018) find that several of the interviewees used Shadow IT to share knowledge in enterprises, especially in times of critical situations or in cases where employees are not co-located. In these situations, Shadow IT was beneficial compared to corporate e-mail. Consequently, nine of the ten interviewees believed that Shadow IT can facilitate knowledge sharing. Mallmann et al. (2018) introduce a differentiation of Shadow IT instances by the dimensions (1) device owner, and (2) software/solution to categorize the identified instances and also record negative consequences of Shadow IT implementations, e.g., risk to information security, no technical support, and redundant information leading to inefficiencies. In conclusion, both contributions categorize types of Shadow IT used for knowledge sharing and report positive aspects of the systems on an individual level. Consequently, the existing research is limited to Shadow IT used for knowledge sharing and focuses on the individual level. No study exists, which describes the overarching effects of Business-managed IT and Shadow IT on knowledge sharing on an organizational level. Therefore, a study of Shadow IT and Business-managed IT systems deployed for knowledge sharing capturing perspectives of multiple stakeholders is beneficial to advance the existing research.

Knowledge-based view

The knowledge-based view (KBV) provides the theoretical anchor of our research. The KBV is an outgrowth of the resource-based view as “it focuses upon knowledge as the most strategically important of the firm’s resources” (Grant 1996, p. 110). In the perspective of the KBV, individual employees are the main repository of knowledge and the primary task of enterprises is the integration of knowledge (Grant 1996). Hence, the
KBV implies that enterprises have superior capabilities to apply existing knowledge, integrate multiple knowledge streams, and create new knowledge compared to individuals (Kearns and Sabherwal 2006). Therefore, knowledge considerations can be one justification of enterprise emergence in contrast to single entrepreneurs who could collect and integrate relevant knowledge by individual exchanges (Grant 1996; Jensen and Meckling 1992; Kearns and Sabherwal 2006). This promotes the issue of how to manage knowledge for the benefit of enterprises (Alavi and Leidner 2001). “Knowledge management is the generation, representation, storage, transfer, transformation, application, embedding, and protecting of organizational knowledge”, which is related to the concepts of organizational learning, organizational memory, and information sharing (Schultze and Leidner 2002, p. 218).

As a result, knowledge sharing is a fundamental prerequisite/is an antecedent for knowledge management (Hendriks 1999; Ipe 2003; Iskoujina and Roberts 2015). Ipe (2003) defines knowledge sharing as “the act of making knowledge available to others within the organization” (p. 341). However, in a strict sense, knowledge cannot be shared since it is tied to a knowing individual in contrast to a commodity that can be passed around freely (Hendriks 1999). Hence, knowledge sharing involves two parties, that is, one sending knowledge and one receiving knowledge (Hendriks 1999) which are connected in the process of knowledge sharing: This process involves the subprocess of communicating knowledge by the sending party and the subprocess of understanding the communicated knowledge by the receiving party (Hendriks 1999; Ipe 2003; Iskoujina and Roberts 2015). In fact, knowledge is transformed in the process of sharing, e.g., while articulating or interpreting it (Iskoujina and Roberts 2015). The transformation of knowledge while sharing can also lead to knowledge creation (Nonaka and Takeuchi 1995). In this vein, the term sharing denotes the underlying voluntary act based on a conscious decision of the sender as well as the resulting joint ownership of knowledge of the sender and the recipient (Ipe 2003). Furthermore, knowledge sharing links the level of individual employees, the level at which knowledge resides, with the level of groups and the level of the enterprise, where the knowledge can attain its economic or competitive value (Hendriks 1999; Ipe 2003). Knowledge can be shared formally, e.g., through training programs or technology-based systems, or informally, e.g., through personal relationships or social networks (Ipe 2003). Both formal and informal knowledge sharing can be supported by information systems (IS), i.e., knowledge management systems (Alavi and Leidner 2001) to (1) remove barriers, e.g., temporal distance, physical distance, or social distance, (2) provide access to information, (3) improve process, or (4) locate knowledge carriers, i.e., potential senders, and knowledge seekers, i.e., potential receivers (Hendriks 1999).

According to Tanriverdi (2005), one can distinguish knowledge management within and across BUs. While within-unit knowledge management can improve the performance of individual BUs, cross-unit knowledge management aims to realize knowledge synergies across BUs. As a result, the value of the corporation is increased by cross-unit knowledge management compared to individual BUs and the governance of individual BUs under a corporate parent is justified (Jensen and Meckling 1992; Tanriverdi 2005). Srivardhana and Pawlowski (2007) summarize that cross-unit knowledge management, and thus knowledge sharing, is an essential element of innovation, e.g., “by rearranging information already in use and incorporating information previously neglected” (p. 53). In this vein, standardized KMSs provide the basis for cross-unit knowledge sharing, while KMSs for individual BUs might better meet specific needs of within-unit knowledge sharing (Tanriverdi 2005).

**Methodology**

The case study approach is suitable to examine “a phenomenon in its natural setting” where “no experimental control or manipulation is used” (Benbasat et al. 1987, p. 370). Case studies are suitable to answer “why” and “how” questions enabling in-depth research in new areas (Yin 2013). Therefore, a case study approach seems appropriate to investigate the research question at hand. Gibbert and Ruigrok (2010) call for rigor in case of study research by reporting the concrete research actions taken. The unit of our analysis is the implementation and use of Business-managed IT or Shadow IT KMS in two case companies (Yin 2013). As we collected mostly past data at a single point in time, the cases are mostly retrospective. However, we also asked the interviewees to share with us the future perspective of the systems. We chose a multiple-case design to study contrasting sides of the phenomena and used it for theory testing and as a basis for theory building (Benbasat et al. 1987). Accordingly, we selected the cases based on our existing contacts with the companies (Pan and Tan 2011) in the context of a more extensive study evaluating success factors of Business-managed IT cases. In this study, it emerged that the two instances use a contrasting
approach to implement Business-managed IT and Shadow IT systems for knowledge sharing. Hence, two cases of opposing examples provide a basis for distinct insight and theoretical sampling, i.e., contrary replication of the case study (Eisenhardt and Graebner 2007).

Table 1 illustrates the two case companies, KMSs studied, and interviewees. We collected most data using interviews. In addition, we recorded observations, interview notes, and written case files. Hence, data from different sources of evidence (Yin 2013) could be triangulated to achieve reliability and validity (Gibbert and Ruigrok 2010). For each case, we conducted the interviews with knowledgeable stakeholders from multiple perspectives, i.e., from the IT organization and BUs (Eisenhardt and Graebner 2007). The interviews were semi-structured to enhance the reliability and to allow participants to speak openly about their perceptions (Myers and Newman 2007; Yin 2013). During the interviews, we asked questions on (1) the background of the interviewees, (2) the case context, i.e., the system used for knowledge sharing, (3) the historical development of the system, (4) the evaluation of success or failure of the systems, and (5) factors contributing to success or failure of the systems. Interviews were conducted from December 2018 to February 2019 and lasted for around an hour. After five interviews (I5 and I6 were interviewed jointly), we noticed theoretical saturation (Eisenhardt 1989). Therefore, we did not further extend the data collection for the two cases, which is also justified by the short operation time of the systems and the low system complexities. We conducted three of the interviews in person and two interviews via telephone. All interviews were recorded and transcribed. We ensured anonymity to the interviewees, and the companies in a declaration of data processing and, therefore, all results in this paper are anonymized.

<table>
<thead>
<tr>
<th>Case company</th>
<th>Intranet</th>
<th>Communication Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>Research &amp; consulting services</td>
<td>Industrial machinery</td>
</tr>
<tr>
<td>Location</td>
<td>Germany</td>
<td>Worldwide</td>
</tr>
<tr>
<td>Total # of IT users</td>
<td>200</td>
<td>2,000</td>
</tr>
</tbody>
</table>

KMSs studied

<table>
<thead>
<tr>
<th>Description</th>
<th>Origin: Not functioning cross-unit KMS and scattered systems for within-unit knowledge sharing</th>
<th>Origin: Unsatisfied users with existing cross-unit communication tools/KMSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>System introduction: Implementation of cross-unit Business-managed IT KMS (Intranet)</td>
<td>System introduction: Implementation of within-unit Shadow IT communication tool/KMS (Communication Tool)</td>
<td>Result: Improved within-unit communication/knowledge sharing and an increase of scattered cross-unit communication</td>
</tr>
<tr>
<td>Result: Consolidation of cross-unit knowledge sharing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alignment with IT organization</td>
<td>Regular alignment between BU and IT organization</td>
<td>IT organization not aware of Communication Tool</td>
</tr>
<tr>
<td># of KMS users</td>
<td>200</td>
<td>60</td>
</tr>
<tr>
<td>Time of existence</td>
<td>&lt;1 year</td>
<td>1 year</td>
</tr>
</tbody>
</table>

Interviewed stakeholders

<table>
<thead>
<tr>
<th>Business</th>
<th>• I1: Instance developer</th>
<th>• I3: Instance administrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT</td>
<td>• I2: CDO</td>
<td>• I4: User and designated digital transformation manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I5: CIO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I6: IT team leader</td>
</tr>
</tbody>
</table>

Table 1. Overview of cases and interviewees

We started the data analysis with a within-case analysis following Miles et al. (2014). Hence, we first focused on themes identified in individual interviews. Henceforth, we conducted a cross-case analysis (Miles et al. 2014) to extend external validity and generalizability. Open coding was used for the identification of (sub-)categories (Corbin and Strauss 2015) based on an initial coding scheme derived from the KBV.
Results

Origin of Business-managed IT or Shadow IT KMS

In both cases, KMSs emerged in the BUs. In the Intranet case, regular alignment between the implementing BU and the IT organization took place, i.e., the instance is overtly integrated in the organizational IT management and, thus, is Business-managed IT (Kopper et al. 2018). In the Communication Tool case, the IT organization has not been aware of its existence and usage in the BU. For example, I5 states: "Slack is real shadow IT. I only later recognized that [the business unit] uses [Slack]" (I5). In both cases several motivators for the implementation of a KMS by a BU exist, that is why IT task responsibility resides in the BU, not in the IT organization. Table 2 illustrates the motivators for the implementation of the KMSs in both cases. The most prominent motivator for the interviewees was the possibility to implement and manage the systems fast and autonomously: "I see it at various points that it is an extreme speed advantage if the business unit has [management and administration] in its hands and can do [it] by itself" (I3). However, I2 states that the implementation needs to happen in alignment, i.e., with a "One Team Approach" (I2). Moreover, shortcomings of the existing KMS also motivated the implementation of Intranet. I1 reports user statements of the old system: “People said, 'It sucks: It is old, it does not work. I cannot find anything. It is totally confusing; I do not like it.'” Similarly, in the Communication Tool case, I3 states: “Okay, we need a solution. What we currently have does not work.” Moreover, employees with unfulfilled needs are pulling for new solutions. For example, I2 mentions: ‘There is always a need for teams and employees who say: ‘I cannot find important documents, for example, certain templates or certain guidelines. Where are these?’”

<table>
<thead>
<tr>
<th>Codes</th>
<th>Intranet</th>
<th>Communication Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous &amp; fast implementation</td>
<td>I1, I2</td>
<td>I3, I4</td>
</tr>
<tr>
<td>Shortcomings of the existing KMS</td>
<td>I1, I2</td>
<td>I3</td>
</tr>
<tr>
<td>Unfulfilled user needs/user pull</td>
<td>I2</td>
<td>I4</td>
</tr>
</tbody>
</table>

Table 2. Motivators for implementation of Business-managed IT or Shadow IT KMSs

Impact of Business-managed IT or Shadow IT KMS

Besides the motivators for implementing the systems, our inductive analysis led to a conceptualization of various benefits of the implemented systems. Three subcategories of benefits emerged: Establishing a central, open gateway for knowledge sharing by the implementation of the new systems, a streamlined process of knowledge sharing, and mitigated barriers of knowledge sharing that existed previously. Table 3 displays the detailed codes for the three subcategories of benefits.

The Business-managed IT and Shadow IT systems are aimed to be the central, open gateway for knowledge sharing. This includes that knowledge is stored in one place/knowledge is aggregated. Hence, I2 summarizes: “For me [the intranet] is a tool, which holds the knowledge of the organization as good as possible” and, in particular, “that, you have a platform, in which the documents are stored and in which the important knowledge of the organization is also aggregated”. Also, in the Communication Tool case, a central platform was established to share knowledge, i.e., “the general channel where all know-how is posted” (I3). Besides, knowledge becomes accessibility for everyone through the KMSs, for example, an interviewee stated, “we have very, very few closed channels; instead, most [channels] are open to ensure transparent communication” and “it is very important that everyone has a similar level of knowledge because otherwise things quickly go in the wrong direction” (I3). For Intranet, i.e., a Business-managed IT KMS, the characteristic of being the central, open gateway extends across the enterprise, while for Communication Tool, being Shadow IT, it is limited to the BU itself.

The streamlined process of knowledge sharing becomes evident with a transparent knowledge sharing process. I1 describes the established process for the Business-managed IT system as follows: “To keep the knowledge as up-to-date as possible, we set up a process for it because there are different teams within the [company]. We defined that from now on there will be one responsible person in each team who will monitor [knowledge sharing] with us quarterly and who will provide us with things, of which the person
believes will help others. Besides, the person also tells us what [knowledge] they need from other teams. So that we can then promote the exchange.” In case of Communication Tool, the process is informal: “It has been established in the team that everyone has always opened up Slack when one is available, and everyone reacts to [messages]” (I3). **Simple administration** streamlines continuous management of the system: “You just invite a person to Team Drive, or you invite a person to Sites, that is really no problem. That’s it!” (I1) or “This means that we can add users very quickly when a new employee arrives or when a new colleague - especially in an external team - is there. Then it is a matter of a few minutes” (I3). Furthermore, **knowledge sharing is automated/the efficiency is increased.** I4 estimated that “everyone can save five, ten minutes, if not more [per workday]” through the new system.

Several barriers of knowledge sharing are mitigated by the Business-managed IT or Shadow IT systems. First, the **systems are easy to use/have a high user acceptance.** In the Intranet case, “good user experience” (I2) was achieved by “early testing of the tool and that we were close to the people, who were supposed to use it as early adopters” (I1). For Communication Tool, for example, I3 reports the “simplicity of the tool” and I4 finds that “the real success comes with the fact that it is fun to use [...] and [you] recognize: ‘Ah, yes, now my work becomes better’”. Second, the systems also **reduce temporal distance** for knowledge sharing: “It provides a quick way to get in touch and get a quick answer to your questions” (I3). Furthermore in the perspective of I2, “modern business organizations are about working together as agile as possible,” which is achieved by the Intranet in the domain of knowledge management. Third, the **distance between teams is reduced.** In particular, I4 mentions “theme-based communication, i.e., one no longer needs to know which person to address, but rather communicate on a certain topic and opens a certain channel for it [...] and that is how one brings together people who would otherwise never know about each other.” Fourth, **physical distance is reduced.** As I2 puts it, “ideally, [...] everyone would be sitting in the same room and shouting things to each other. If employees are looking for documents, then everything is available in one room. [...] But of course, this ideal world does not exist in the company. That means, teams are distributed, there are several teams. [...] Why do we need all the tools? [...] to come close to this ideal.” In the Communication Tool case, this means “the integration of external contractors, working remotely. This is an additional challenge which the tool solves for us” (I3). **Technical integration in existing systems** usually requires alignment with the IT organization. Hence, we observe with Intranet that “[I2] am extremely grateful, that [I1 and further developers] accepted this platform and did not want to do their own thing. Which then would have led to difficulties in the exchange with the other systems. However, [...] our existing platform, G Sites, was accepted by the team” (I2). Due to the fact, that Communication Tool is implemented as a within-unit system only, the identified benefits are only realized for within-unit knowledge sharing. In contrast, benefits are realized for the whole enterprise when it comes to Intranet as it is a cross-unit KMS.

<table>
<thead>
<tr>
<th>Subcategories</th>
<th>Codes</th>
<th>InTRANET</th>
<th>Communication tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central, open gateway for knowledge sharing</td>
<td>Knowledge storage in one place/ knowledge aggregation</td>
<td>I1, I2</td>
<td>I3</td>
</tr>
<tr>
<td></td>
<td>Knowledge accessibility for everyone</td>
<td>I1</td>
<td>I3</td>
</tr>
<tr>
<td>Streamlined process of knowledge sharing</td>
<td>Transparent knowledge sharing process</td>
<td>I1, I2</td>
<td>I3, I4</td>
</tr>
<tr>
<td></td>
<td>Simple administration</td>
<td>I1</td>
<td>I3, I4, I5</td>
</tr>
<tr>
<td></td>
<td>Knowledge sharing automation/ efficiency increase</td>
<td>I1</td>
<td>I3, I4</td>
</tr>
<tr>
<td>Mitigated barriers of knowledge sharing</td>
<td>Ease of use/user acceptance</td>
<td>I1, I2</td>
<td>I3, I4</td>
</tr>
<tr>
<td></td>
<td>Temporal distance reduction</td>
<td>I1, I2</td>
<td>I3, I4</td>
</tr>
<tr>
<td></td>
<td>Team distance reduction</td>
<td>I2</td>
<td>I3, I4</td>
</tr>
<tr>
<td></td>
<td>Physical distance reduction</td>
<td>I2</td>
<td>I3, I4</td>
</tr>
<tr>
<td></td>
<td>Technical integration in existing systems</td>
<td>I1, I2</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3. Benefits of Business-managed or Shadow IT KMS**
**Challenges of within-unit KMSs for cross-unit knowledge sharing**

Table 4 illustrates the known challenges of within-unit KMSs. In the Business-managed IT Intranet case, an outdated cross-unit KMS existed which in turn led to various within-unit KMSs. Within-unit KMS lead to specific challenges for cross-unit knowledge sharing in enterprises. Naturally, a high number of KMS and thus scattered knowledge evolves due to within-unit KMSs as different units might implement different systems. Therefore, “it was not easy to find anything because you had so many different platforms to find [knowledge]” (I1). In the Communication Tool case, I6 recalls an example in which “the employee, who is involved in [a certain project], is required to communicate with five tools” Evidently, within-unit KMSs are restricted to within-unit knowledge sharing, by definition. Hence, I3 finds “I believe Slack has prevailed within the department, the other [knowledge management systems] are only used when you communicate across departments” and I5 confirms “[Slack’s] is being used limited to [business unit]; it is not used outside this business unit”. As a result, barriers increase for a consolidation of KMS. As I1 notices during the system implementation “Since so many people already got used to these local folders and local solutions I am afraid that it just is difficult to pull people back onto such a common platform.” However, eventually, a consolidation effort for KMSs is started. In the Intranet case, “shutting down the systems that exist parallel to this intranet and Team Drive” is planned, “for example, the old Confluence Intranet still exists. However, we want to switch it off now” (I1). Also, in the Communication Tool case, I4 states: “Yes, I will try to have fewer tools [...] it’s time to muck it out,” and I5 confirms “we have to reconcile it. We will choose a tool and introduce it for the whole company”.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Intranet</th>
<th>Communication tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>High number of knowledge management systems/scattered knowledge</td>
<td>I1, I2</td>
<td>I1, I3, I4, I5, I6</td>
</tr>
<tr>
<td>Restricted to within-unit knowledge sharing</td>
<td>I1</td>
<td>I1, I3, I4, I5</td>
</tr>
<tr>
<td>Increased barriers for consolidation of KMS</td>
<td>I1</td>
<td>I1, I3, I4, I5</td>
</tr>
<tr>
<td>Consolidation effort for KMS</td>
<td>I1</td>
<td>I1, I3, I4, I5</td>
</tr>
</tbody>
</table>

Table 4. Challenges of within-unit KMSs for cross-unit knowledge sharing motivating consolidation of KMSs

**Discussion and Theoretical Integration**

Our study extends and details the research in the field of Shadow IT KMS (i.e., Mallmann et al. (2016) and Mallmann et al. (2018)) which analyzes Shadow IT instant messaging tools, cloud storage tools, and usage of personal hardware for knowledge sharing. We confirm the benefits of Shadow IT KMSs in prior literature and find that Business-managed IT and Shadow IT KMSs can reduce temporal and physical barriers of knowledge sharing. Furthermore, we also identify potential drawbacks of Shadow IT KMS, such as redundancy and reduced efficiency (Mallmann et al. 2018), which do not occur for the Business-managed IT KMSs. These drawbacks motivate standardization/consolidation efforts, particularly for existing Shadow IT KMSs.

On a general note, the knowledge management research stream traditionally focusses on the development and implementation of KMS, e.g., the adaption of business processes, implementation stages, or knowledge architectures, as well as “soft” aspects of knowledge sharing, e.g., culture or training (Diedrich and Guzman 2015). Thus, the findings at hand extend the knowledge management research stream with a new research perspective, i.e., by analyzing KMS deployed and managed by BUs.

Our key contribution to the IS field is the description and theorization of how and why Business-managed IT and Shadow IT transform knowledge sharing in enterprises. Therefore, we use the findings of our case studies and the meta-theoretical lens of the KBV to develop a mid-range theory with a set of propositions, see Figure 1. In developing our theory, we differentiate within-unit and cross-unit knowledge sharing. We define within-unit knowledge sharing as the act of making knowledge available to others within the same BU. Accordingly, cross-unit knowledge sharing is the act of making knowledge available to others across BUs, i.e., throughout the enterprise. The introduction of Business-managed IT or Shadow IT KMS relates
to our case observation that, as specific motivators exist, employees escalate their needs and establish Business-managed IT or Shadow IT KMSs (Table 2). This is in line with the findings in Business-managed and Shadow IT literature (Klotz et al. 2019). Thus, we propose:

**Proposition 1:** The existing organizational and technological environment causes the introduction of a Business-managed IT or Shadow IT KMS.

As shown in the two cases, Business-managed IT and Shadow IT KMSs can positively influence knowledge sharing in enterprises, for example through mitigated barriers for knowledge sharing (Table 3). This is in line with the general benefits of Business-managed IT and Shadow IT described in the literature, e.g., collaboration enhancement (Klotz et al. 2019; Silic and Back 2014). In the case of Shadow IT, the benefits are limited to the involved BUs as Shadow IT can hardly span across a whole enterprise. Consequently, Shadow IT KMSs are beneficial for within-unit knowledge sharing, but Shadow IT negatively affects cross-unit knowledge sharing (Table 4). Based on these findings, we propose:

**Proposition 2a:** The introduction of a Business-managed IT KMS or Shadow IT KMS advances knowledge sharing in the BUs using it.

**Proposition 2b:** The introduction of a within-unit Shadow IT KMS hinders knowledge sharing across BUs.

The increase of complexity of KM with the number of scattered (within-unit) KMSs, is an unintended consequence of the introduction of new (Business-managed IT or Shadow IT) KMSs (Haag and Eckhardt 2014; Schultze and Leidner 2002). Eventually, the increased complexity motivates a consolidation and standardization in our cases (Table 4). Hence, we propose:

**Proposition 3:** A plethora of KMSs leads to a standardization of KMSs across BUs.

Business-managed IT systems are overtly integrated in the organizational IT management, i.e., activities regarding system development and management are practiced openly (Kopper et al. 2018). Therefore, relevant stakeholders are aware of the systems, the systems are aligned with the stakeholders, and specific governance measures for the instances are enabled (Klotz et al. 2019; Kopper et al. 2018). The observations in the Intranet case illustrate that Business-managed IT KMSs can lead to a standardization of KMSs across BUs. Based on these findings, we propose:

**Proposition 4:** A Business-managed IT KMS leads to standardization of cross-unit knowledge sharing due to the alignment with relevant stakeholders across BUs

![Figure 1. Transformed knowledge sharing through Business-managed IT and Shadow IT](image)

**Conclusion, Implications, and Further Research**

In this paper, we analyze why and how knowledge sharing in enterprises is influenced by Business-managed IT and Shadow IT systems based on two cases and the theoretical lens of the KBV. We find that shortcomings of existing systems and further motivators lead to the autonomous implementation of KMS. Several benefits occurred due to these systems, such as, a reduction of knowledge sharing barriers for the BUs which use them. However, Shadow IT KMSs lead to challenges for cross-unit knowledge sharing due to the focus on within-unit knowledge sharing. Based on existing research and our findings, we develop a mid-range theory to explain the transformation of knowledge sharing in enterprises caused by Business-managed IT and Shadow IT.
Hence, this study contributes to the existing research in the field of Business-managed IT and Shadow IT by identifying clear differences of outcomes. In fact, this study is one of the first which compared Business-managed IT and Shadow IT case examples as the concept of Business-managed IT was only recently introduced (Kopper 2017; Kopper et al. 2018). Moreover, the developed mid-range theory explains the transformation of knowledge sharing by Business-managed IT and Shadow IT and provides scholars with a starting point for theory testing.

Our work suggests that practitioners can benefit especially from Business-managed IT KMSs due to potential benefits of these systems compared to existing KMSs in enterprises. BU KMS implementation as described in the two cases can be understood as lightweight KMS implementation approaches opposed to the rather heavyweight KMS-based company-wide organizational change programs (see the Siemens ShareNet example in Heier and Strahrringer (2006)) many businesses indulged in around the beginning of this millennium. However, our findings point at a drawback when it comes to cross-unit knowledge sharing and calls for standardization of KMSs across BUs. This is in-line with Tanriverdi’s (2005) observations, i.e., a universal IT strategy across the enterprise might hinder the performance of individual BUs, while unique IT strategies for BUs might constraint overarching IT initiatives. Hence, a potential solution might be the IT relatedness, i.e., “the use of common IT infrastructures and common IT management processes across business units” with universal strategy-making process, standardized IT infrastructure, shared management of IT talent, and relatedness of IT vendor management (Tanriverdi 2005, p. 317–318).

This study can be considered as a basic exploratory case study because the outcomes are based on only two cases (Benbasat et al. 1987). Thus, one limitation of our study is the small number of cases. Accordingly, future research could gather additional empirical data and test our mid-range theory, for example, in a longitudinal study. Furthermore, we did not study the motivation of employees for knowledge sharing as proposed by Hendriks (1999), which could be extended in a future study. An additional limitation is our choice of the KBV. Adopting competing theoretical lenses, for example, social learning, in future studies may lead to new additional insights concerning the transformation of knowledge sharing through Business-managed IT and Shadow IT.

REFERENCES


