Communications of the Association for Information Systems

Volume 47 Article 60

12-21-2020

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Research Article DOI: 10.17705/1CAIS.04729 ISSN: 1529-3181

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Abstract:

In this study, we investigate the relationship between the occupational culture of information technology (IT) personnel and knowledge sharing in organizations. We suggest that some elements of IT occupational culture affect knowledge sharing among IT personnel and business end users. Drawing on cultural psychology, we present one possible approach through which IT occupational culture manifests through six elements of organizational structure (i.e., stories, symbols, power structures, control systems, and rituals and routines) and affects the knowledge-sharing process. In doing so, we better understand behaviors related to knowledge sharing and IT diffusion in organizations beyond the limitations of previous IT-diffusion studies.

Keywords: Knowledge Sharing, IT Occupational Culture, IT Diffusion, IT and Non-IT Personnel.

This manuscript underwent peer review. It was received 01/18/2019 and was with the authors for 15 months for four revisions. Damien Joseph served as Associate Editor.

1 Introduction

When organizations implement a new information technology (IT), conflicts often occur between IT personnel and non-IT personnel. In examining empirical research to date, we found that classical IT-diffusion variables by themselves have a limited ability to predict whether efforts to adopt complex technologies will succeed (Wang & Wang, 2016) and that we need more research to examine diverse organizational and environmental factors in organizational innovation diffusion (Anderson, Potočnik, & Zhou, 2014). Based on a meta-analysis, Hameed, Counsell, and Swift (2012) found that studies that have examined IT diffusion in organizations have produced inconsistent and contradictory outcomes. Researchers should include additional factors to better explain IT-adoption behavior in organizations given that a high knowledge gap can exist among IT personnel and non-IT personnel (Kohli & Melville, 2019).

Researchers have recognized that culture plays an important role in new technology diffusion (Leidner & Kayworth, 2006). Differences in cultural perspectives, such as cultural beliefs, often cause conflicts between interacting groups (Rao & Ramachandran, 2011). Intergroup conflicts can affect organizational technology diffusion (Cavusoglu, Hu, Li, & Ma, 2010). A systematic review noted that researchers have not sufficiently studied opposing forces to diffusion, such as a misaligned culture, as a source of new insights (Kohli & Melville, 2019). As organizations increasingly rely on technology, IT personnel who help business functions operate play an essential role in organizational technology diffusion (Kakabadse & Korac-Kakabadse, 2000). From a general perspective, IT personnel refer to individuals who make IT work; with respect to technology, non-IT personnel refer to individuals who use IT to deal with everyday business in organizations (Nord, Nord, Cormack, & Cater-Steel, 2007).

While researchers have conducted most cultural studies at the national level (e.g., Hofstede, 1983), we investigate IT occupational culture. According to Schein (2015), “the most important driver of behavior derives neither from country nor organization, but from occupation” (p. 110). IT personnel have established a distinct occupational culture (Guzman, Stam, & Stanton, 2008; Jacks, Palvia, Iyer, Sarala, & Daynes, 2018). We define IT occupational culture as certain values, beliefs, and behaviors that commonly appear across all IT workers regardless of where they work (Jacks et al., 2018). We conceptualize IT occupational culture according to how organizations develop such culture in organizations, so some dimensions of IT occupational culture that we examine in this paper relate to the role that IT and IT personnel play in organizations. Schein (2010) defined organizational culture as the basic assumptions and beliefs that members in an organization share, that operate unconsciously, and that define in a basic taken-for-granted fashion the way in which an organization views itself and its environment. IT occupational culture differs from organizational culture in that organizational culture comprises patterned ways of thinking that both IT and non-IT employees in an organization share (Straub, Loch, Evaristo, Karahanna, & Srite, 2002). While IT personnel and non-IT personnel both work in organizations, they understand IT occupational culture and behave differently. IT maintains its separate culture from non-IT employees (Prager, 1999). According to Straub et al. (2002, p. 19):

> *Culture must be measured at an individual level even though it is assumed that it is a group-level phenomenon. Once the individual level data is aggregated, it will also be possible to assert that certain cultural characteristics do or do not belong to certain cultures.*

Thus, we measure IT occupational culture at individual level and then aggregate data at the group level.

In this study, we focus on knowledge sharing (or lack thereof) between business and IT personnel as one aspect of the diffusion process. Knowledge sharing refers to providing task information and knowledge to people so that they can collaborate with others to solve problems, develop new ideas, or implement policies or procedures (Santos, Goldman, & Souza, 2015). We further develop this definition after explaining and reviewing classical diffusion theories. Previous studies have examined the factors that impact IT diffusion but scarcely studied the effect that cultural conflicts have on knowledge sharing in the technology diffusion context (Kohli & Melville, 2019). After reviewing the extant literature on knowledge-sharing drivers, Ghobadi (2015) noted that future studies should focus on different cultures. To the best of our knowledge, little research has examines how IT occupational culture influences intergroup knowledge sharing. Although one cannot easily precisely measure culture (Jacks et al., 2018), we need to open the black box and see how IT occupational culture impacts knowledge sharing among IT personnel and business end users. Accordingly, we address the following research question (RQ):

> **RQ**: How does IT occupational culture affect knowledge sharing among IT personnel and business end users in the IT-diffusion context?

We propose that IT occupational culture impacts the knowledge sharing between IT personnel and non-IT personnel in the IT-diffusion context. We contribute to the technology-diffusion and knowledge-sharing literatures by proposing a model that investigates the influence that IT occupational culture has on the knowledge sharing among IT personnel and business end users. We present the model we propose in Figure 1.

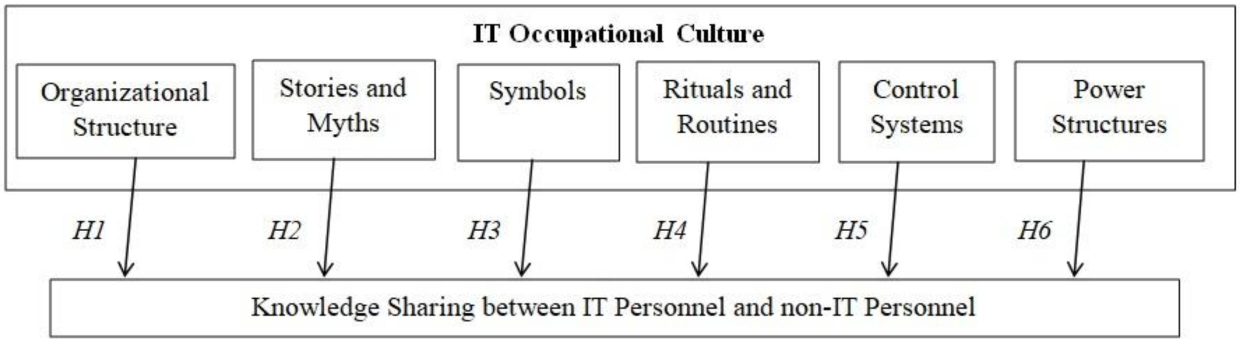

Figure 1. Research Model

This paper proceeds as follows: in Section 2, we examine the extant research on IT diffusion and knowledge sharing and review the IT occupational culture (where we specify IT occupational culture as comprising six elements). We also look at how IT occupational culture affects knowledge sharing and develop several hypotheses. In Section 3, we present the research methodology we followed to test our hypotheses. In Section 4, we present and analyze our results. In Section 5, we discuss our findings and present their implications for research and practice. In Section 6, we discuss our study's limitations and future research directions. Finally, in Section 7, we conclude the paper.

2 Theory and Hypotheses

2.1 IT Diffusion and Knowledge Sharing in Organizations

Research has found that two forces influence efforts to measure the technology adoption rate over time: 1) a user's intrinsic tendency to adopt the technology and 2) social interaction (Cavusoglu et al., 2010). Accordingly, research has established that environmental factors influences individual adoption.

Classical diffusion theory assumes that adopters make their decision based on their own usage rather than as part of a larger community of interdependent users. It also does not consider the fact that organizations mandate and make many technology decisions. Beyond classical diffusion theory, new variables come into play in the IT-diffusion process. When an organization decides to adopt a new technology, how cooperatively individual adopters embrace it could highly impact the IT-diffusion process (Fichman, 2004). A dysfunctional relationship between business and IT personnel hinders the IT-diffusion process in an organization. Previous research has already recognized the frustrations regarding repeated project failures and project delays that result from insufficient understanding between IT personnel and end users (Nord et al., 2007). Further, researchers have acknowledged that the skills and knowledge that adopters gain and share information to operate technology help determine adopter innovativeness for organizations (Navimipour & Charband, 2016). In all, the research suggests that understanding and knowledge sharing between IT personnel (who support IT diffusion) and non-IT personnel (who adopt IT) affect the entire organizational technology-adoption process.

Previous research that has examined barriers to achieving business/IT alignment has found that knowledge sharing between business and IT personnel constitutes a vital factor in whether they achieve alignment (Alaceva & Rusu, 2015). In her conceptual model, Ipe (2003) divided motivational factors that significantly impacted knowledge sharing between individuals in organizations into internal and external factors. Internal factors included the power of knowledge and the reciprocity that comes from knowledge sharing. External factors included the relationship with recipients, which trust, recipients' power and status, and rewards from sharing knowledge determined. Culture in the work environment influenced all the motivational factors (Ipe, 2003). From an integrative point of view, Bock, Zmud, Kim, and Lee (2005) demonstrated that attitudes toward, and subjective norms about, knowledge sharing and the organizational climate affected individuals' intentions to share knowledge. Lin (2007) integrated a motivational perspective on employee knowledge-sharing intentions and found that motivational factors such as reciprocal benefits, knowledge self-efficacy, and enjoyment in helping others were significantly associated with employee knowledge-sharing attitudes and intentions. Teo (2012) examined knowledge management in client-vendor partnerships and found that the factors that affected knowledge sharing included knowledge characteristics, client characteristics, vendor characteristics, and the relationship between client and vendor.

Kim and Lee (2006) examined the impact that organizational context and information technology have on employee knowledge-sharing capabilities and found that social networks, centralization, performance-based reward systems, how employees use IT applications, and user-friendly IT systems significantly affected employees' knowledge-sharing capabilities in organizations in South Korea. Tsai (2002) found that a formal hierarchical structure in the form of centralization had a significant negative effect on knowledge sharing and that informal lateral relations in the form of social interactions had a significant positive effect on knowledge sharing among units that competed for market share but not among units that competed for internal resources. Van Den Hooff and De Ridder (2004) investigated the influence that organizational commitment, organizational communication, and computer-mediated communication use had on knowledge sharing and found that commitment to the organization positively influenced knowledge donating and that, in turn, computer-mediated communication positively influenced commitment to the organization (Van Den Hooff & De Ridder, 2004).

Individuals in teams and communities need to share knowledge among themselves, especially to foster a virtual community. Social capital's facets, which include social interaction ties, trust, norms of reciprocity, identification, shared vision, and shared language, influence the degree to which individuals share knowledge in virtual communities (Chiu, Hsu, & Wang, 2006). Research has indicated that knowledge flows easily when employees view knowledge as a public good that belongs to the whole organization (Ardichvili, Page, & Wentling, 2003). However, various barriers hinder individuals from contributing knowledge.

Several barriers, which researchers have classified into three main domains, make it difficult for people to share knowledge: individual/personal, organizational, and technological barriers (Riege, 2005). Each domain has more than a dozen barriers. For example, potential individual barriers include lack of time, concerns about job security, low awareness about knowledge sharing's value, and lack of trust. Potential organizational barriers include contextual differences (Zahedi, Shahin, & Babar, 2016), a lack of integrating knowledge-management strategy and sharing initiatives into the company's goals and not having a strategic approach, a lack of leadership and managerial direction in terms of knowledge sharing's benefits (Lee, Shiue, & Chen, 2016), and a lack of an existing organizational culture that supports knowledge sharing (Teo, Nishant, Goh, & Agarwal, 2011). Potential technology barriers include a lack of integration between IT systems and processes (which impedes the way people operate), a lack of technical support and immediate maintenance of integrated IT systems (which obstructs work routines and communication methods), a lack of training, and a lack of communication.

Attewell (1992) argued that decreasing knowledge barriers, communication, and social influence drive the complex IT diffusion process. IT personnel, who support business through implementing IT in various functions, are closely linked to end users. IT group characteristics play a role in the modified IT-diffusion framework (Fichman, 2004). Effective cooperation between IT personnel and non-IT personnel can quickly bridge end users' knowledge gap related to IT usage. In this way, an organization can more easily implement technology. In Section 2.2, we review the IT occupational culture, which might be visible through IT personnel's characteristics.

2.2 IT Occupational Culture

The term culture originally comes from anthropology and refers to the rituals and customs that societies developed over time (Schein, 2010). Research has observed that not only societies but also organizations, groups, communities, and occupations develop their own culture (e.g., Schein, 2010; Nord et al., 2007; Guzman & Stanton, 2009; Jacks et al., 2018). In general, culture refers to a generally shared understanding that results from commonly held assumptions and ways to view the world among organizational, group, and occupational members (Guzman et al., 2008).

In analyzing culture at the group or organizational level, Schein (1990) found that culture manifests itself through three fundamental levels: observable artifacts, values, and basic underlying assumptions.

According to Schein (2010), basic underlying assumptions form a culture's core, espoused values reflect what individuals think as ideal (i.e., the underlying assumptions) and appropriate to present publicly, and observable artifacts manifest culture through everyday behavior that the complicated compromise among the espoused values, the core assumptions, and specific situations determine. Observable artifacts include visible and audible behavior patterns, myths and stories, languages, rituals, and symbols.

Information systems research has already noted the essential role that culture plays in organizations and called for researchers to further examine the social and cultural factors at play in employees' workplace interactions with each other and with technology (Jacks et al., 2018). IT personnel have established a distinct occupational culture that includes shared characteristics such as technical jargon use, an emphasis on technical knowledge, feelings of superiority, and a general lack of formal rules (Guzman et al., 2008). When implementing a new IT in an organization, the cultural contexts of the individuals who work with IT inevitably affect the dynamic IT-diffusion process.

Increased knowledge fragmentation results from the various ways that researchers have conceptualized culture, although one cannot easily capture the complexity and interplay across culture, the IT-diffusion process, and IT itself (Kappos & Rivard, 2008). After reviewing previous IS literature related to culture, Kappos and Rivard (2008) conceptualized culture through three perspectives: integration, differentiation, and fragmentation. The integration perspective defines culture as a shared set of basic assumptions, value symbols, and meanings among members in a collective. The fragmentation perspective presents that some manifestations may have multiple meanings that do not depend on organizational subcultures in the collective.

Based on this multi-faceted perspective, Gallivan and Srite (2005) regarded culture as a richly layered set of forces that shape personal beliefs and behaviors. In a multicultural team, members have multiple identities, such as national identity, organizational identity, group identity, and individual identity. Multiple-level conflicts occur where different identity boundaries meet.

Researchers have already paid much attention to culture from organizational and geographical perspectives but paid less attention to groups of employees through the "occupational culture" perspective. Guzman et al. (2008) identified common characteristics of IT personnel based on Trice's framework (Trice, 1993). They found that IT personnel have established a distinct occupational culture. Trice (1993) classified occupational culture as having two dimensions: group and grid. The group dimension refers to the extent to which members constrain other members' behavior due to their membership in a group, while the grid dimension refers to an occupational culture's tangible structural features through which members try to order the relations. The grid dimension has three parts (Sonnenstuhl & Trice, 1991): 1) rankings and hierarchy in the culture, 2) members' autonomy over their work and their control over other workers, 3) and the imposed formal and tangible structure that execute these arrangements. More recently, Jacks et al. (2018) merged the way that Trice conceptualized culture with the way that Schein (2010) conceptualized it and developed another theoretical framework of IT occupational culture with a cohesive set of cultural values: autonomy in decision making, structure in environment, precision in communication, innovation in technology, reverence for technical knowledge, and enjoyment at the workplace. Their findings confirmed a distinct IT occupational culture, and they called for further research to examine the effect that IT occupational culture has on firms.

Researchers have used another model that Johnson, Whittington, Scholes, Angwin, and Regnér (2017) developed to assess IT occupational culture as well (e.g., Nord et al., 2007). The model presents culture as a web that comprises central values and outer symbols. Nord et al. (2007, p. 6) describe it as:

> *The center circle, the paradigm, represents a core set of values, beliefs, and assumptions common to the organization. These values, beliefs, and assumptions are reflected through the outer circles, which represent the cultural elements of stories, symbols, power structures, control systems, and rituals and routines*.

However, to the best of our knowledge, researchers have not yet applied this model in any quantitative study to investigate IT occupational culture.

To bridge the gap, we investigate IT occupational culture by applying the model that Johnson et al. (2017) developed. In this study, we conceptualize occupational culture in a way that concurs with how Trice (1993) formulated occupational subculture. In an organization, IT personnel can have a distinct occupational subculture that the organization's culture influences. As Guzman et al. (2008) have indicated, "When referring to the occupational subcultures independently from the organizations where they are embedded, they are referred just as occupational cultures" (p. 36). Since we examine multiple organizations in this study, we conceptualize our focal construct as IT occupational culture. We illustrate the relationship between organizational and occupational culture in organizations in Figure 2. Moreover, based on Schein's (2010) classic cultural model of artifacts, values, and assumptions, we present the existing models of IT occupational culture into Table 1.

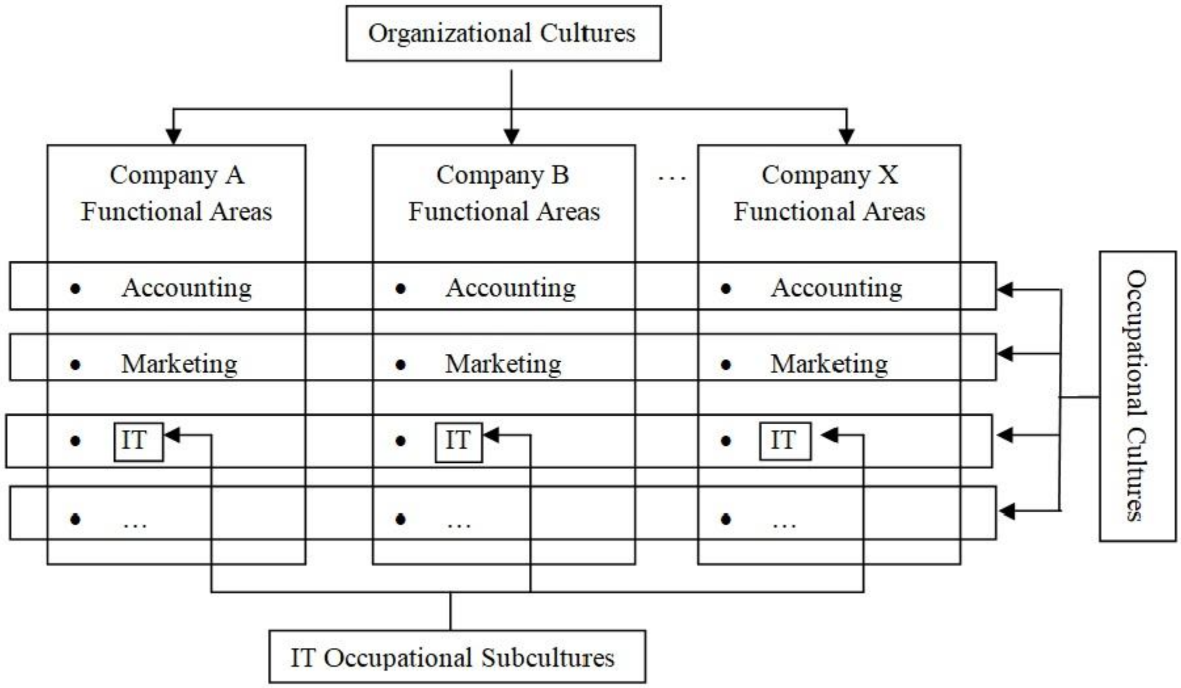

Figure 2. Organizational Cultures, Occupational Cultures, and Occupational Subcultures (or Occupational Subculture in a Single Organization)

Table 1. Summary of Models for Assessing IT occupational Culture

Artifacts		Values		Assumptions	
Elements of culture	**Source**	**Elements of culture**	**Source**	**Elements of culture**	**Source**
• Stories and myths • Rituals and routines • Organizational structure • Control systems • Symbols • Power structures	Johnson et al. (2017)	• Autonomy in decision making • Structure in the environment • Precision in communication • Innovation in technology • Reverence for technical knowledge • Enjoyment at the workplace	Jacks et al. (2018)	**Group dimensions** • Esoteric knowledge • Extreme or unusual demands • Consciousness of kind • Primary reference group • Social image of occupation • Abundance of cultural forms • Pervasiveness **Grid dimensions** • Division of labor • Hierarchy • Relationship to end-user (customer)	Rao & Ramachandran (2011)

Table 1. Summary of Models for Assessing IT occupational Culture

• Esoteric knowledge and expertise • Extreme and unusual demands • Consciousness of kind • IT pervasiveness • Favorable self-image, pride • Abundance of cultural forms (language, shared stories)	Guzman & Stanton (2009)			• Structural social capital • Relational social capital • Cognitive social capital	Van Den Hooff, & De Winter (2011)

2.3 The Effect that IT Occupational Culture has on Knowledge Sharing

Culture impacts knowledge sharing in that it shapes assumptions about knowledge's importance and creates the context for social interaction (De Long & Fahey, 2000). McDermott and O'Dell (2001) found that companies overcome cultural barriers to share knowledge by linking sharing knowledge to solving practical business problems, tying sharing knowledge to a preexisting core value, introducing knowledge management in a way that matches the organization's style, building on existing networks, and/or encouraging peers and supervisors to exert pressure to share. Moreover, norms and practices that advocate knowledge sharing facilitate this process (Ipe, 2003). Additionally, Al-Alawi, Al-Marzooqi, and Mohammed (2007) investigated the role that organizational culture plays in knowledge sharing and found that trust, communication among staff, information systems, rewards, and organization structure played a positive role in knowledge sharing in organizations.

Six elements represent IT occupational culture: organizational structure, stories and myths, symbols, rituals and routines, control systems, and power structures (Johnson et al., 2017). We describe these elements in Table 2. To develop hypotheses about effect of IT occupational culture on knowledge sharing, we applied various theories.

Table 2. Elements of IT Occupational Culture

Elements of IT occupational culture	Description
Organizational structure	Refers to the way in which an organization works. It is specified under two themes: IT's role and IT's position.
Stories and myths	Refers to IT personnel's reputation.
Symbols	Refers to the type of language that IT personnel use.
Rituals and routines	Refers to the way individuals conduct work and manifests through systems development process.
Control systems	Refers to the way IT and business control the strategic direction and IT projects.
Power structures	Refers to the level of expert power that the IT group has.

The first element, organizational structure specified in two themes: IT's role and IT's position. Nord et al. (2007) found that the strategic role that IT personnel played positively affected shared knowledge among IT and business professionals and that an organizational structure that lacked an IT director as a senior executive negatively affected such knowledge. When IT people play a strategic role in an organization, it will more likely have the capability to deploy IT innovations (Zhang, Zhao, & Kumar, 2016). Powerful senior IT executives can often serve as a driving force in maintaining a strategic role for IT and ensure that an organization continuously renews its organizational IT capabilities (Lim, Stratopoulos, & Wirjanto, 2012). Thus, knowledge sharing between IT and non-IT personnel will more likely occur if IT people play a strategic role in an organization.

We use the model of acceptance with peer support (MAPS) to hypothesize the relationship between organizational structure and knowledge sharing. Drawing from social network theory and previous individual-level technology adoption research, the MAPS proposes that an individual's embeddedness in an organizational unit's social network impacts new technology implementation in the organization (Sykes, Venkatesh, & Gosain, 2009). As key predictors of system use, valued network density and valued network centrality together influence the organizational technology-diffusion process. Valued network density describes a focal employee's connectedness to others weighted by the perceived strength of the tie and the adjacent node's control of system-related information, knowledge, and other tangible resources that effective knowledge sharing requires. Valued network centrality refers to the way in which peers perceive the level of system-related resources that a focal employee controls. These two predictors suggest that IT personnel's and business end users' network density and centrality determine the extent to which they share knowledge with each other. If IT people play a strategic role in the organization, they would have high network density and centrality. Therefore, they would have more opportunities to share knowledge. Thus, we hypothesize:

> **H1:** An IT occupational culture in which IT people play a strategic role in an organization positively affects knowledge sharing among IT personnel and business end users.

As a "soft" issue under culture, organizational members tell stories and myths. Nord et al. (2007) indicated that success stories and myths about IT were positively related to trust between IT personnel and other employees in the organization. Thus, we use trust and trust theory to explain the relationship between stories and myths and knowledge sharing. If employees told good stories about IT personnel in an organization, business end users had a higher likelihood to trust IT personnel's capability, gain mutual benefits with them, and believe in the integrity of what they did and will do. Hashim and Tan (2015) found trust to be positively related to knowledge sharing. With trust, knowledge sharing might be easier between IT and non-IT personnel.

According to trust theory, trusting beliefs come in three kinds: competence, benevolence, and integrity (McKnight, Choudhury, & Kacmar 2002). Competence beliefs refer to a truster's perceiving that a trustee can do what the truster needs. Benevolence beliefs refer to a truster's perceiving that a trustee cares about and is motivated to act in the truster's interests. Finally, integrity beliefs refer to a truster's perceiving that a trustee maintains honesty and keeps promises. IT personnel who have a good reputation in an organization receive trust. Trust facilitated knowledge sharing among IT personnel and other employees in an organization. Researchers have linked a culture that emphasizes trust with individual knowledge sharing and firms' capability to share knowledge (Wang & Noe, 2010). Thus, we hypothesize:

> **H2:** An IT occupational culture in which organizational members hear myths and success stories about IT personnel positively affects knowledge sharing among IT personnel and business end users.

Since symbols contain a broad range of artifacts, we limit its meaning to the IT occupational culture context. Previous studies on IT occupational culture have indicated that IT personnel commonly use IT jargon (Guzman et al., 2008; Guzman & Stanton, 2009; Rao & Ramachandran, 2011). In this study, we limit IT occupational culture symbols to the type of language that IT personnel use to communicate. We use richness theory to hypothesize the relationship between the language IT personnel use to communicate and knowledge sharing. Media richness theory suggests that organizations process information to reduce uncertainty and equivocality (Daft & Lengel, 1986). Uncertainty refers to the lack of information, while equivocality refers to the ambiguity of information (Robert & Dennis, 2005). We propose that the way in which organizational personnel communicate determines both the amount and richness of knowledge sharing. Previous research has found that IT personnel and non-IT personnel differ in that IT personnel have a technology orientation and cannot communicate properly (Willcoxson & Chatham, 2006). However, other research found no evidence that IT people have poor general communication skills (Jacks et al., 2018). IT jargon represents the most common barriers to effective communication among IT personnel and business end users (Rao & Ramachandran, 2011). Non-technical people can find IT jargon, an artifact of IT occupational culture, difficult to understand, which can lead to miscommunication (Jacks et al., 2018). While effective communication increases the level of knowledge sharing and understanding among IT personnel and business end users (Manfreda & Štemberger, 2018), miscommunication can negatively impact their knowledge sharing. Thus, we hypothesize:

> **H3:** An IT occupational culture in which IT personnel adopt IT jargon negatively affects knowledge sharing among IT personnel and business end users.

Rituals and routines characterize the way employees conduct work and normally manifest through the system-development process. Generally, the system-development process comprises eight phases: 1) determine long-term organizational requirements, 2) identify projects and user requirements, 3) gather system requirements, 4) analyze and design the system, 5) program the system, 6) install the system and train employees, 7) operate and maintain the system, and 8) review and change the system (Carayannis & Sagi, 2001). Systems development requires profound technology and business domain knowledge combined with effective teamwork, processes, methods, and tools (Ebert & Man, 2008). Shared understanding requires actual collaboration between business and IT (Van Den Hooff & De Winter, 2011). When both business and IT adhere to a collaborative approach to system development, their knowledge regimes can meet (Howard-Grenville & Carlile, 2006). Nord et al. (2007) found that, when both business and IT do not adhere to a collaborative approach to the system-development process, they negatively affect the IT-business relationship. An impaired IT-business relationship leads to less knowledge sharing (Manfreda & Štemberger, 2018). Thus, IT personnel should cooperate with business end users to understand organizational and user requirements first and then analyze how to employ IT to achieve business goals. After that, IT personnel might gather feedback from business end users and then, based on such feedback, review and/or change a system. In doing so, they would facilitate the knowledge-sharing process. Thus, we hypothesize:

> **H4:** An IT occupational culture in which both business and IT adhere to a collaborative approach to the system-development process as a ritual and routine positively affects knowledge sharing among IT personnel and business end users.

Control systems deal with whether IT and non-IT personnel cooperate in controlling projects and strategic direction in an organization. Control systems influence the organizational knowledge-sharing process by affecting the way in which individuals who cooperate and exchange information organize it (Turner & Makhija, 2006). IT diffusion is a knowledge-intensive activity that requires IT and non-IT personnel to simultaneously consider complex issues and share highly diverse knowledge. Information systems have evolved from being a process-oriented support function to a strategic information-oriented function (Manfreda & Štemberger, 2018). Business and IT groups must cooperate, create joint information systems strategies, and implement joint projects to build better communication and knowledge sharing between them and to enhance the probability that IT will succeed (Nord et al., 2007).

This culture theme (i.e., control systems) relates to IT governance, which concerns IT projects and strategic decisions and how business and IT people share authority for resources and the responsibility for IT (Wu, Straub, & Liang, 2015). Thus, we apply IT governance as theoretical justification for our hypothesis about control systems. When both IT and business control the strategic direction in an organization and IT people co-manage projects with non-IT personnel, IT governance provides the contextual setting for business and IT people to participate in IT decision making and knowledge sharing. Moreover, from an IT governance point of view, multidisciplinary experience, different stakeholders' experience, and shared understanding and collaborative relationships between business and IT stakeholder constituencies can address uncertainties and ambiguities through knowledge sharing (Peterson, Parker, & Ribbers, 2002). Thus, we hypothesize:

> **H5:** An IT occupational culture in which both IT and business control the organization's strategic direction and IT personnel co-manage projects with non-IT personnel positively affects knowledge sharing among IT personnel and business end users.

Power structures can represent the influence that the managerial group in an organization has. Power structures, which expert power reflects, shed light on how a powerful IT group can control business units. Expert power refers to possessing knowledge or expertise (Jasperson et al., 2002). Knowledge is an asset (Wang & Wang, 2016). To develop our hypothesis about the relationship between expert power and knowledge sharing, we use an exchange theory perspective. From an exchange theory perspective, when IT personnel have a high level of expert power, they find it hard to share knowledge without enough motivation, such as reciprocal benefits. While dependence on the partner is positively related to knowledge sharing (Park & Lee, 2014), a high level of dependence and expert power could be negatively associated with it. Considering knowledge as a source of power and superiority can inhibit individuals from sharing knowledge because they may fear losing it (Wang & Noe, 2010). Both Guzman et al. (2008) and Jacks et al. (2018) found that IT personnel have an occupational culture that involves superiority and an emphasis on technical knowledge. Nord et al. (2007) found that, if the business group has little control over the IT group's expert power, the IT-business relationship will feature less knowledge sharing. Thus, we hypothesize:

> **H6:** An IT occupational culture in which the IT group has a high level of expert power negatively affects knowledge sharing among IT personnel and business end users.

3 Research Methodology

After reviewing existing studies on IT occupational culture, we investigated artifacts of IT occupational culture based on the web of culture model that Johnson et al. (2017) developed. We adapted a survey instrument from the qualitative exploration that Nord et al. (2007) completed. We show the items in Appendix A. Although we measured some constructs with only one or two variables, they highly correlated with each other (> 0.70) and did not correlate with other variables and, thus, displayed good reliability (Yong & Pearce, 2013). In fact, for some narrowly defined constructs, recent evidence suggests that single-item measures may be adequate (Bergkvist & Rossiter, 2007; Klein & Rai, 2009). One can justify one-item and two-item measures when adding other items introduces wasteful redundancy (Rossiter, 2002) in the presence of concrete measures (Bergkvist & Rossiter, 2007) and when one uses clear and focused constructs (Sackett & Larson, 1990). Both conditions applied to our measurements with one or two variables, which justified our using these measures.

We collected responses from individuals who use organizational information systems through an online survey. However, we first conducted a pilot study in which we used MBA and master of IT management students as subjects. For the pilot study, we received 94 completed responses. The results indicated that the developed questionnaire demonstrated good reliability and validity. Next, we conducted the main study at a university in the Southern United States and received 314 completed responses. Respondents (139 non-IT personnel and 175 IT personnel) either worked in IT related roles or had interactions with IT personnel in their jobs. We present the respondents' demographic characteristics in Table 3. We established the constructs' reliability (measured by composite reliability) and validity (both convergent and discriminant validity). We used partial least squares (PLS) analysis to test the research model and the scales' psychometric properties.

Table 3. Demographic Characteristics of Survey Respondents

Respondents	Category	Frequency	Percentage (%)
Gender	Male	162	52%
	Female	149	47%
	Not answered	3	1%
Age	Under 21	3	1%
	21-34	148	47%
	35-44	89	28%
	45-54	44	14%
	55-64	23	7%
	65 and above	5	2%
	Not answered	2	1%
Years of total work experience	Less than 1 year	12	4%
	Less than 2 years	29	9%
	Less than 3 years	18	6%
	Less than 5 years	43	14%
	Less than 10 years	57	18%
	More than 10 years	155	49%
Years of work experience in the current company	Less than 1 year	52	17%
	Less than 2 years	58	18%
	Less than 3 years	22	7%
	Less than 5 years	51	16%
	Less than 10 years	57	18%
	More than 10 years	74	24%
Job position	IT position	175	56%
	non-IT position	139	44%

Researchers often choose a survey design to investigate organizational behavior. Previous researchers have already conducted several qualitative studies (i.e., semi-structured interviews) to understand IT personnel's occupational culture (e.g., Nord et al., 2007; Guzman et al., 2008; Jacks et al., 2018). Grounded by that research, we adopted a quantitative approach to explain researchers' previous observations and how IT occupational culture impacts the knowledge-sharing process based on the belief that such an approach would provide results that would better generalize to a greater organizational population.

4 Data Analysis

We used structural equation modeling with partial least squares (PLS-SEM) to analyze our data. The PLS-SEM approach, like other SEM techniques such as LISREL and AMOS, allows researchers to simultaneously assess the measurement model parameters and structural path coefficients. Component-based PLS uses a least squares estimation procedure and focuses on explaining endogenous constructs. Because we use a relatively exploratory model and focus on explaining endogenous constructs, we found PLS-SEM path modeling suitable for our study. Additionally, PLS avoids many restrictive assumptions in covariance-based SEM techniques. It is a powerful method to analyze complex models using smaller samples (Hair, Ringle, & Sarstedt, 2011). Moreover, "because the constructs' measurement properties are less restrictive with PLS-SEM, constructs with fewer items (e.g., one or two) can be used than those that CB-SEM requires" (Hair et al., 2011, p.140).

According to the often-citied 10 times rule (Barclay, Higgins, & Thompson 1995), the sample size should be equal to the larger of 1) 10 times the largest number of formative indicators used to measure a single construct or 2) 10 times the largest number of structural paths directed at a particular construct in the structural model. In our model, we modeled all items as reflective indicators because we viewed them as effects (not causes) of latent variables. The largest number of independent variables that we estimated for a dependent variable was six. Thus, we judged our sample of 314 responses as more than adequate for the PLS estimation procedures. We used the SmartPLS software package to evaluate the measurement properties and to test the model. We estimated the measurement models and the structural model..

4.1 Measurement Model

We assessed the measurement model in SmartPLS by examining reliability, convergent validity, and discriminant validity (Hair, Hult, Ringle, & Sarstedt 2014). We assessed reliability via 1) internal consistencies reliability (ICR) and 2) indicator reliability. First, composite reliability should be higher than of 0.708. Researchers consider ICR more robust than Cronbach's alpha because it weights items differently depending on factor loading considerations. Second, the indicator's outer loadings should be higher than 0.708. One should consider indicators with outer loadings between 0.4 and 0.7 for removal only if the deletion leads to an increase in composite reliability and average variance extracted (AVE), which measures whether convergent validity (i.e., the degree to which a latent construct explains the variance of its indicators) exceeds the suggested threshold value. Table 4 shows that all composite reliabilities exceeded the suggested value 0.708, which indicates good internal consistency reliability; and all AVE values exceeded the suggested value .50, which indicates good convergent validity (Chin, 2010). Because all composite reliabilities and AVE exceeded than the suggested threshold values, we opted to keep the only item below the threshold (the item OS1's loading was 0.6863).

We assessed convergent and discriminant validity by applying two criteria: 1) the square root of the average variance extracted (AVE) by a construct from its indicators should be at least 0.707 (i.e., AVE > 0.50) and greater than that construct's correlation with other constructs (Straub, Boudreau, & Gefen, 2004) and 2) items loadings on the intended construct should be higher than their loadings on other constructs (Hair et al., 2011). Table 5 exhibits that each square root of the construct's AVE exceeded its highest correlation with any other construct, which supports discriminant validity. Table 6 shows that items loaded much more highly on their own constructs than on any other constructs (cross-loadings). Thus, the results met all criteria that we used to assess the construct measures' reliability and validity.

To assess the common method bias, we conducted Harman's single-factor test. We loaded all variables into an exploratory factor analysis (EFA) and examined the unrotated factor solution. According to Podsakoff, MacKenzie, Lee, and Podsakoff (2003), if a detrimental level of common method bias exists, "(a) a single factor will emerge from exploratory factor analysis (unrotated) or (b) one general factor will account for the majority of the covariance among the measures" (p. 889). In this study, more than one factor emerged to explain the variance, and no single factor accounted for more than half of covariance among the measures.

One can also assess common method bias by assessing constructs' variance inflation factor (VIF). If the highest VIF equals or does not reach 3.3, one can consider the model free from common method bias (Kock, 2015). In this study, the highest VIF was 2.566, well below the threshold value 3.3, which indicates that common method bias or multicollinearity problems did not affect the model. Table 4 lists each construct's VIF value, composite reliability, and AVE. Table 5 shows the inter-construct correlations, while Table 6 focuses on the loadings and cross-loadings. Collectively, the constructs had excellent psychometric properties.

Table 4. AVE, Composite Reliability, and VIF

Construct	AVE	Composite reliability	VIF
Control systems (CS)	0.8127	0.8966	2.142
Knowledge sharing (KS)	0.6416	0.9148	1.694
Organizational structure (OS)	0.5541	0.8608	1.714
Power structures (PS)	0.7585	0.8623	1.840
Rituals and routines (RR)	0.6343	0.8738	2.566
Stories and myths (SM)	0.7361	0.933	2.026
Symbols (SY)	1	1	1.117

Table 5. Inter-construct Correlations

	CS	KS	OS	PS	RR	SM	SY
CS	**0.9015**						
KS	0.5115	**0.801**					
OS	0.5593	0.5171	**0.7444**				
PS	0.571	0.4281	0.4686	**0.8709**			
RR	0.623	0.5248	0.4111	0.5817	**0.7964**		
SM	0.5058	0.4664	0.3703	0.5218	0.6879	**0.8580**	
SY	0.2096	0.2223	0.2767	0.2382	0.1203	0.12	**1**

Note: CS: control systems, KS: knowledge sharing, OS: organizational structure, PS: power structures, RR: rituals and routines, SM: stories and mythics, SY: symbols.

Table 6. Loadings and Cross-loadings

	CS	KS	OS	PS	RR	SM	SY
CS1	0.8734	0.3929	0.4081	0.4983	0.5649	0.4477	0.1781
CS2	0.9287	0.516	0.5807	0.5306	0.5628	0.4652	0.1984
KS1	0.3653	0.7745	0.4401	0.4247	0.4067	0.3346	0.198
KS2	0.4029	0.7815	0.4662	0.3391	0.3916	0.4058	0.1777
KS3	0.3753	0.8103	0.3698	0.3317	0.3648	0.2787	0.2261
KS4	0.4073	0.8139	0.3744	0.2343	0.4525	0.4312	0.1267
KS5	0.4409	0.8109	0.4237	0.4173	0.4144	0.3351	0.2639
KS6	0.4579	0.8139	0.404	0.3098	0.4825	0.4402	0.0848
OS1	0.3749	0.3103	0.6863	0.4099	0.3029	0.2985	0.2743
OS2	0.3458	0.3949	0.7151	0.3906	0.2956	0.2995	0.1914
OS3	0.4081	0.3524	0.7693	0.2886	0.2309	0.1581	0.2042
OS4	0.5199	0.4245	0.8311	0.3622	0.3542	0.2472	0.1991

Table 6. Loadings and Cross-loadings

OS5	0.4184	0.4204	0.7111	0.3036	0.3345	0.3655	0.1791
PS1	0.5793	0.4334	0.4473	0.9214	0.6132	0.564	0.225
PS2	0.3879	0.2923	0.36	0.8173	0.361	0.3031	0.1864
RR1	0.4965	0.4676	0.3935	0.3879	0.7717	0.4538	0.1817
RR2	0.4149	0.3649	0.2588	0.4679	0.821	0.6327	0.05
RR3	0.4546	0.4055	0.2874	0.5394	0.8371	0.6372	0.0671
RR4	0.6016	0.4157	0.3483	0.4639	0.753	0.4849	0.0663
SM1	0.4004	0.4305	0.35	0.4405	0.5608	0.8325	0.1329
SM2	0.4844	0.4218	0.353	0.4522	0.5832	0.8829	0.108
SM3	0.4183	0.3878	0.2773	0.3849	0.5472	0.8479	0.0609
SM4	0.4249	0.3839	0.2878	0.502	0.6229	0.8142	0.1257
SM5	0.4378	0.3669	0.3109	0.4568	0.639	0.9088	0.0819
SY1	0.2096	0.2223	0.2767	0.2382	0.1203	0.12	1

4.2 Structural Model

We assessed the structural model and hypotheses by examining the significance of the path coefficients and the variance that the antecedent constructs accounted for. We measured the coefficients of determination (R^2), and f^2 effect sizes as well. Figure 3 provides our results from testing the hypotheses. We conducted bootstrapping (with 314 cases and 5,000 samples) to test the statistical significance of each path coefficient using t-tests. The R^2 value refers to the amount of explained variance of the endogenous latent variable. An R^2 value higher than 0.2 indicates that the endogenous model variables have good explanatory power (Chin, 2010). In this study, we used constructs from IT occupational culture as the exogenous latent variables and knowledge sharing as the endogenous latent variable. The model explained about 41 percent of the variance in the endogenous latent variable, knowledge sharing (R^2 = 0.4096). Overall, our empirical results support H1 and H4 well. Specifically, we found that organizational structure and rituals and routines positively influenced knowledge sharing between IT personnel and non-IT personnel. Contrary to our expectations, control systems, stories and myths, symbols, and power structures had no significant relationship with knowledge sharing; thus, we did not find support for H2, H3, H5, and H6.

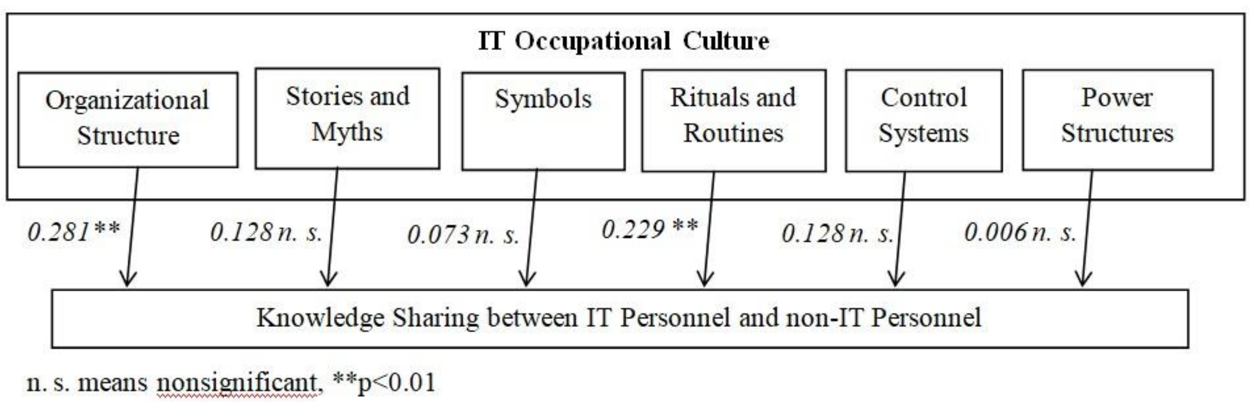

Figure 3. PLS Results of Research Model

The effect size f^2 specifies constructs' relevance in explaining the endogenous latent construct, where the threshold values 0.02, 0.15, and 0.35 represent that the exogenous latent variable had a small, medium, and large effect, respectively, (Cohen, 1988). We calculated effect size (f^2) with the formula:

$$(R^2 included – R^2 excluded) / (1 – R^2 included), \qquad (1)$$

where R²included and R²excluded constitute the R² values of the endogenous latent variable when one includes or excludes the exogenous latent variable from the model (Hair et al., 2014). Organizational structure had an effect size of 0.084, which represents a small to medium effect. Rituals and routines had an effect size of 0.035, which represents a small effect.

Because we collected data from both IT and business professionals, we split the sample and ran separate models for each one. We had enough responses for both professionals (175 for IT personnel and 139 for non-IT personnel) for the PLS estimation procedures according to the often-cited 10 times rule (Barclay et al., 1995). We found that the model for IT personnel explained 0.275 of the variance (R^2) in knowledge sharing, while the model for non-IT personnel explained 0.517 of the variance. Comparing the path coefficients for both models, the results differed. Figure 4 shows results for IT personnel, and Figure 5 shows the results for non-IT personnel.

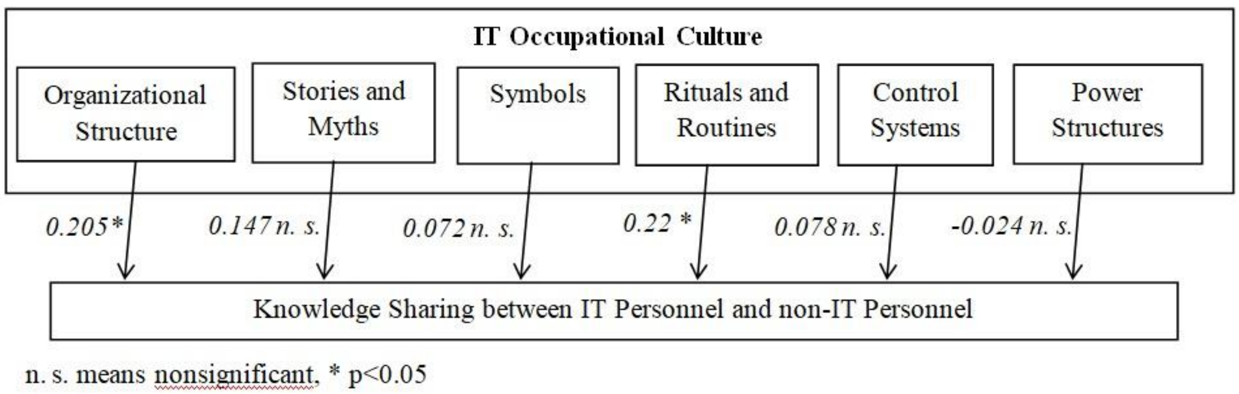

Figure 4. PLS Results of Research Model for IT Personnel

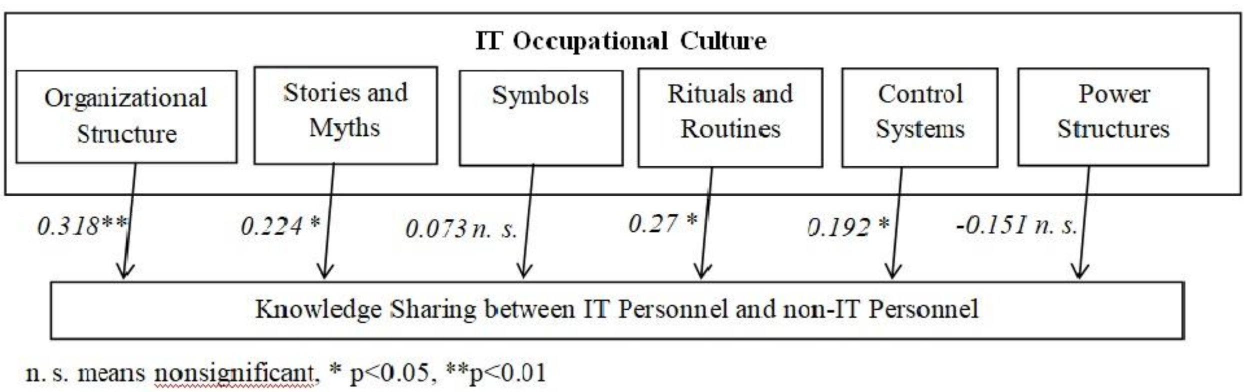

Figure 5. PLS Results of Research Model for non-IT Personnel

For the IT personnel, only organizational structure and rituals and routines positively influenced knowledge sharing between IT personnel and non-IT personnel, which supports H1 and H44. As Figure 4 shows, we found no significant influence from control systems, stories and myths, symbols, and power structures on knowledge sharing for the IT personnel. Thus, we did not find support for H2, H3, H5, and H6.

For the non-IT personnel, organizational structure, rituals and routines, control systems, and stories and myths positively influenced knowledge sharing between IT personnel and non-IT personnel, which supports H1, H2, H4, and H5. While we found no significant relationship for the IT personnel from control systems and stories and myths on knowledge sharing (i.e., we did not find support for H3 and H6), they were significant for the non-IT personnel. This result hints at the conclusion that control systems and stories and myths significantly influence the way that non-IT personnel perceive knowledge sharing between IT personnel and non-IT personnel, whereas control systems and stories and myths do not influence the way in which IT personnel perceive knowledge sharing between IT personnel and non-IT personnel. Figure 5 also shows no significant influence from symbol and power structures on knowledge sharing for non-IT personnel, which concurs with the results from IT personnel. Thus, we did not find support for H3 and H6.

5 Discussion and Conclusions

5.1 Implications for Research

Although some researchers have already explored IT personnel characteristics that uniquely differ from other employees (e.g., Guzman et al., 2008; Cui, 2017; Jacks et al., 2018), we need more research on the impact of IT occupational culture in organizations (Jacks et al., 2018). With this study, we contribute to the literature on IT diffusion and knowledge sharing research by investigating the relationship between IT occupational culture and knowledge sharing in the IT-diffusion context. Also, we considered knowledge sharing (among IT personnel who support IT implementation and non-IT personnel who use IT) as an important determinant of IT diffusion in organizations to better understand the IT-diffusion process in organizations.

Classical IT-diffusion theory cannot adequately explain organizational IT diffusion if all employees must adopt a complex IT (Nord et al., 2007). Knowledge sharing among IT personnel and non-IT personnel can bridge the knowledge gap between groups and facilitate the diffusion process. Thus, IT personnel’s occupational culture plays an important role when both groups cooperate in IT diffusion, particularly in mandated adoption decisions.

To our knowledge, our study provides the first empirical investigation into the impact that IT occupational culture has on knowledge sharing. We contribute to the literature by introducing a scale to measure artifacts of IT occupational culture and comprehensively examine the effect that these elements have on knowledge sharing. We developed several hypotheses about how IT occupational culture influences knowledge sharing among IT personnel and non-IT personnel. We found that for, both IT personnel and non-IT personnel, organizational structure and rituals and routines positively affected their knowledge sharing.

Stories and myths and control systems were only positively significant for non-IT personnel. When an organization has IT-related success stories and myths, non-IT personnel perceive that knowledge sharing exists. However, such stories and myths do not alter the way in which IT personnel perceive knowledge sharing. Perhaps non-IT personnel are motivated to share knowledge with IT personnel when they trust them, but that motivation does not exist among IT personnel. Moreover, when both IT and business control the strategic direction and co-manage IT-implementation projects, non-IT personnel perceive greater knowledge sharing. However, for IT personnel, control systems have no significant influence on knowledge sharing possibly because, when IT personnel and non-IT personnel both control the strategic direction and co-manage IT-implementation projects, they have more opportunities to share knowledge. For IT personnel, it does not matter if they co-control the strategic direction and co-manage the IT-implementation projects with non-IT personnel—people have to share knowledge. To further explain the differences, we require further investigations into these factors.

Unlike in our pilot study, we did not find a significant relationship between symbols and knowledge sharing in our main study. According to Table 3, almost half our respondents in our main study had more than 10 years’ work experience. Thus, IT jargon may not have bothered them. Besides symbols, we also did not find a significant relationship between power structure and knowledge sharing. Power structure measures the extent to which business depends on IT and IT personnel’s expert power. The non-significant relationships may depend on other factors. For example, they may depend on the IT personnel’s role and whether they work directly with end users or not.

5.2 Implications for Practice

For practitioners, promoting knowledge sharing between departments remains a challenge despite much research on the topic. To promote knowledge sharing, practitioners need to understand the influence that divergent occupational cultures have on people as culture shapes their minds and behavior. Business leaders cannot successfully manage occupational cultures with different artifacts if they do not know exactly what these artifacts are. While previous studies have highlighted the need to pay attention to cultural issues, they have not suggested how occupational culture can impact knowledge sharing. We propose various elements of IT occupational culture that one can consider to facilitate the knowledge-sharing process in organizations. For example, given that we found that IT personnel’s playing a strategic role and rituals and routines positively affected knowledge sharing, management may need to develop strategies to ensure both business and IT collaboratively adhere to the system-development process and that IT people play a strategic role in the organization. Besides, both IT and business should cooperate in controlling the strategic direction and managerial activities associated with IT-implementation projects. As such, the IT-diffusion process in the organization may be accelerated.

Our findings also suggest that organizations should provide more opportunities for various departments to communicate with one another, such as by promoting the cooperation between business and IT in the system-development process and inviting IT to play a strategic role in organizations. A culture that emphasizes cooperation and communication is conducive to knowledge sharing. However, a positive culture alone may be insufficient to facilitate knowledge sharing. In our study, we found organizational structure, stories and myths, rituals and routines, and control systems to be positively associated with non-IT personnel perceiving knowledge sharing between IT and non-IT personnel. Thus, organizations need to design knowledge-sharing initiatives that promote more interdepartmental communication and cooperation and link knowledge sharing to company goals and values. Knowledge sharing is essential to the IT-diffusion process in organizations. Because the organizational IT-diffusion process requires managers and employees to adopt new attitudes and behaviors related to knowledge sharing, they may need to consider a change-management strategy. When IT people understand organizational and user requirements and know how to employ IT to achieve business goals and when business end users understand the importance of sharing control and cooperation, these individuals will facilitate the knowledge-sharing process.

6 Limitations and Future Directions

6.1 Limitations

This study has several limitations. First, we collected online survey data from the same respondents on all variables at one time period. Thus, we could have collected richer data if we had conducted a longitudinal study. If we could capture data from the same individuals at different time periods, we could investigate the influence that knowledge sharing has on different IT-diffusion phases.

The second limitation concerns the information providers. In this study, we asked both IT personnel and non-IT personnel to take the survey and to measure knowledge sharing among IT personnel and non-IT personnel. However, we measured the construct knowledge sharing based on our respondents' perceptions. It would have been preferable to ask both IT personnel's and non-IT personnel's opinions and make matched pairs to assess the two-way knowledge-sharing process between IT personnel and non-IT personnel in the same organization. Unfortunately, such situations typically have a low response rate, and we deemed a trade-off between the data richness and response rate a necessity in this study.

Third, we found two significant relationships among all six hypotheses when we analyzed the sample with both IT and non-IT personnel in the data set. Additionally, some dimensions of IT occupational culture that we examined in this paper can also be dimensions of organizational culture. Although we established the constructs' reliability and validity, we see a need to further refine our instrument that measured artifacts of IT occupational culture as "researchers never have enough resources to go through every single step of instrument creation and validation" (Jacks et al., 2018, p. 110).

6.2 Future Directions

We collected survey data from 314 IT and non-IT personnel. To better understand IT occupational culture, future research could collect data from the same individuals at different time periods. Additionally, future research could measure the cultural distance between IT and non-IT personnel and investigate its impact on knowledge sharing. We found some contingencies and non-significant findings in our study. Other researchers could replicate our study with different technologies and/or across various geographic areas. Future research could test the model in other regions/countries and at multiple time points or further granularize IT personnel based on management/non-management related positions as the management culture may blur other occupational cultures.

More importantly, a future study may continue to explore a greater range of contextualized variables associated with elements of IT occupational culture and refine our measurement items. For example, in this study, we contextualized symbols of IT occupational culture as the type of language IT personnel used to communicate. But one can measure symbols in many ways as they "are objects, events, acts or people that convey, maintain or create meaning over and above their functional purpose" (Johnson et al., 2017, p. 176). Future studies may examine other ways to measure symbols, such as offices and office layout, cars and job titles, a service level-agreement document, and so on. In addition, IT departments perform rituals and routines other than the system-development process, such as incident management and change management, which future studies could further investigate.

Furthermore, future research could examine the interplay between multiple levels of culture and develop hypotheses that link the different levels together. For example, the interaction between national and occupational culture might be a new interesting research area given that IT offshoring/outsourcing represents a prevalent business model and organizations commonly cooperate internationally. Moreover, future research may investigate the effect of the interaction between organizational factors and cultural factors. Additionally, such research could consider the type of shared knowledge, such as tacit knowledge and explicit knowledge.

Finally, we could not measure the IT-diffusion phase. Thus, researchers could examine the relationship among IT occupational culture, knowledge sharing, and IT-diffusion phase if they can reach more corporate participants. Additionally, future research may expand our research model to investigate the phase in which the cultural impact occurs. We call for more explorations into IT occupational culture.

7 Conclusion

We empirically investigated the relationship between IT personnel's occupational culture and knowledge sharing between IT personnel and business end-users. We found that organizational structure and rituals and routines were significant antecedents of knowledge sharing. Stories and myths and control systems were positively significant only for non-IT personnel. Our research results highlight that IT people should play a strategic role in their organizations, that both IT personnel and non-IT personnel should adhere to a collaborative approach to the system-development process, and both IT and business should control the strategic direction and IT-implementation projects.

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Appendix A: Measurements for the Variables in This Study

Knowledge sharing for IT personnel

1) KS1: You share your success and failure stories with colleagues of other divisions in the organization.
2) KS2: Your colleagues from other divisions in the organization share success and failure stories with you.
3) KS3: You share your experience or know-how from work with colleagues of other divisions in the organization.
4) KS4: Your colleagues from other divisions in the organization share know-how from work with you.
5) KS5: You share your expertise from your education or training with colleagues of other divisions in the organization.
6) KS6: Your colleagues from other divisions in the organization share their expertise from their education or training with you.

Knowledge sharing for non-IT personnel

1) KS1: You share your success and failure stories with colleagues of IT divisions in the organization.
2) KS2: Your colleagues from IT divisions in the organization share success and failure stories with you.
3) KS3: You share your experience or know-how from work with colleagues of IT divisions in the organization.
4) KS4: Your colleagues from IT divisions in the organization share know-how from work with you.
5) KS5: You share your expertise from your education or training with colleagues of IT divisions in the organization.
6) KS6: Your colleagues from IT divisions in the organization share their expertise from their education or training with you.

Organizational structure

1) OS1: IT plays a strategic role in your organization.
2) OS2: IT employees play a strategic role in your organization.
3) OS3: The IT director is a senior executive in the organization.
4) OS4: The IT director participates in making strategic decisions on the organization.
5) OS5: System-related resources are controlled by the IT director.

Stories and myths

1) SM1: Good stories are told about the IT personnel in the organization by non-IT employees.
2) SM2: IT personnel are admired by other departments in the organization.
3) SM3: IT personnel are trusted by other departments in the organization.
4) SM4: IT personnel are a competent group in the organization.
5) SM5: IT personnel have a good reputation in the organization.

Symbols

1) SY1: IT professionals use IT jargon when talking with their business colleagues in the organization.

Rituals and routines

1) RR1: The system development process is adhered to by both business and IT.
2) RR2: IT professionals understand organizational and user requirements.
3) RR3: IT professionals know how to employ IT to achieve business goals.

4) RR4: Business colleagues participate in the system development process.

Control systems

1) CS1: IT people co-manage IT-implementation projects with business people in the organization.
2) CS2: Both IT and business control the strategic direction in the organization.

Power structures

1) PS1: The IT group has a high level of expert power that benefited the business.
2) PS2: Business in the organization is highly dependent on IT.

About the Authors

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