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Actions Lead to Results: How the Behaviors of Information Systems Professionals Influence the Success of Information Systems Departments

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Abstract:

The growing complexity of systems, the increasing intensity of their use, and the greater prominence of technology in supporting organizational activities has meant that information systems (IS) professionals in organizations have to go beyond offering routine task-related support when working with their non-IS colleagues. For organizations to see IS professionals as effective, they have to carry out empathic behaviors such as sharing their IT knowledge with their non-IS colleagues and taking the initiative to minimize inconveniences during IS projects. Drawing from the organizational citizenship behavior concept, we develop a multilevel research model to examine how behaviors that IS professionals perform influence IS departments' effectiveness. Using data from more than 1,000 respondents working in the global finance industry, we conducted both cross-level and unit-level analyses and found results that support our arguments. Our results deepen the extent to which we understand the role that IS professionals play in supporting post-adoption IS use and digitally empowering business units while also performing their traditional roles.

Keywords: IS-specific Behaviors, Organizational Citizenship Behavior, IS Unit Effectiveness, Multilevel Analysis.

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1 Introduction

Information technology's (IT) increasing pervasiveness in organizations has had at least two incidental consequences. First, information systems (IS) users often experience stress due to the ongoing pressure to adopt new technologies (Ayyagari, Grover, & Purvis, 2011; Karimikia, Singh, & Joseph, 2020; Tarafdar, Qiang, Ragu-Nathan, & Ragu-Nathan, 2011). IS professionals also struggle to keep up with how quickly IT changes (Haffke, Kalgovas, & Benlian, 2017). Second, IS users and IS professionals interact with each other more often than before when IS staff mainly handled back-end systems and databases (Deng & Wang, 2014; Deng, Wang, & Galliers, 2015). Nowadays, IS professionals in organizations have to go beyond offering routine task-related support to their non-IS colleagues due to the growing complexity of information systems, the increasing intensity of their use, and the more prominent role of external service vendors (Joseph, Ang, Chang, & Slaughter, 2010; Karimikia, Safari, & Singh, 2020; Kettinger, Zhang, & Chang, 2013). IS staff also have to exceed the standard practices that their roles and responsibilities define because one cannot easily predict the rate at which IS users require assistance and the type of assistance they require, especially when users face uncooperative, unclear, or otherwise difficult-to-use technologies.

As a result, IS staff today have to be altruistic, conscientious and courteous for organizations to see their departments as effective (Yen, Hu, Hsu, & Li, 2015). The management literature refers to such behaviors as organizational citizenship behaviors (OCBs) (Organ, 1988, 1989, 1997). In this study, we focus on more deeply understanding the social context in which IS departments function by examining the impact that OCBs that IS professionals display have on IS departments' effectiveness. Research on the social aspects of the work that IS professionals conduct has focused on formalized, structured behaviors, which includes how IS and non-IS employees interact to build a shared understanding (Chan & Reich, 2007; Reich, & Benbasat, 1996, 2000). However, relationships based on formalized behaviors often reflect a "deep trench" between IS and business units and, thus, little day-to-day interaction and collaboration between IS and non-IS employees (Schlosser, Beimborn, Weitzel, & Wagner, 2015). This absence of informal contact reduces the mutual understanding required for creating IT-business value, which can potentially lead to unwanted products and services (Ghobadi & Mathiassen, 2017; Schlosser et al., 2015).

In this study, we focus on better understanding social IS-business alignment by surfacing IS-specific OCBs. OCBs can stimulate informal interaction between IS and business units and, thereby, bridge the knowledge gap and help IS departments realize better outcomes (Deng & Wang, 2014; Deng et al., 2015). An example IS-specific OCB includes the voluntary assistance that IS professionals provide to their IS and non-IS colleagues. In non-IS contexts, research has found such assistance to improve employee performance, free resources, enhance coordination, and support a refreshing work environment (Podsakoff, MacKenzie, Paine, & Bachrach, 2000).

In particular, we examine the following research question (RQ):

> **RQ**: What impact does IS-specific organizational citizenship behaviors have on an IS department's effectiveness?

Research has shown that, in the non-IS context, unit performance increases when employees carry out OCBs to help their colleagues perform their duties (Van Dyne, Graham, & Dienesch, 1994; Van Dyne & LePine, 1998). However, in the IS field, researchers have examined only whether OCBs predict system use (Deng & Wang, 2014; Yen et al., 2015) and not whether they predict IS department effectiveness even though their impact on the latter may manifest more clearly and less distally.

This paper proceeds as follows: in Section 2, we provide an overview of social IS-business alignment and a set of IS-specific OCBs outlined from a careful review of IS literature to date. Then, we show how these behaviors are related to the effectiveness of IS functions. In Section 3, we propose a multi-level research model to measure the effect that individual- and unit-level IS-specific OCBs have on IS functions' effectiveness according to system quality, service quality, and information quality. In Section 4, we assess the model using data from a global survey of IS professionals working in the financial sector. In Section 5, we elaborate on our findings. In Section 6, we summarize and discuss the study's theoretical and practical contributions. Finally, in Section 7, we conclude the paper.

2 Literature Review

2.1 Formal and Informal Interaction between IS and Business Units

Social IS-business alignment concentrates on developing mutual understanding through formal communications and partnerships between the IS and business units in an organization (Bassellier, Reich, & Benbasat, 2001; Johnson & Lederer, 2005; Preston & Karahanna, 2009a, 2009b; Reich & Benbasat, 2000). The level at which IS and business executives share knowledge influences the IS-business alignment's social dimension (Chan & Reich, 2007; Reich & Benbasat, 1996, 2000; Sledgianowski & Luftman, 2005) (Reich & Benbasat, 2000). This shared knowledge significantly affects the services that an IS department provides to its organization—from helpdesk support to enterprise system implementations (Ko, Kirsch, & King, 2005; Tarafdar & Qrunfleh, 2009).

Substantial research has examined how formal communications and shared knowledge between IS and business units influence IS project success and effectiveness (Ewusi-Mensah, 1997; Powell & Yager, 2004; Roberts, Cheney, Sweeney, & Hightower, 2004). However, this research stream has captured only part of the IS-business alignment's social dimension, and we require research that captures the deeper mechanisms underlying this concept (Wagner, Beimborn, & Weitzel, 2014). One avenue to capture these mechanisms would involve examining the informal interactions between IS and business units. Such relationships have greater impact than formal interactions on IS professionals' business understanding and, thus, IS and business performance (Schlosser et al. 2015). Informal interactions between IS and business units provide IS professionals with opportunities to perform proactive actions, such as voluntarily leading and scheduling IS project meetings (Curtis, Krasner, & Iscoe, 1988; Walz, Elam, & Curtis,1993), spontaneously and voluntarily handholding colleagues (Jasperson, Carter, & Zmud, 2005), and sharing workarounds with their peers (Haffke et al., 2017; Tarafdar, Qiang, Ragu-Nathan, & Ragu-Nathan, 2011; Vithayathil, 2018). IS researchers have only anecdotally studied the impact of such proactive behaviors that fall outside the formal IS job descriptions (e.g., Hsu, Tsaih, & Yen, 2018; Messersmith, 2007; Rafaeli, Ziklik, & Doucet, 2008; Walz et al., 1993), which we find surprising because such behaviors improve relationships between IS and business professionals (de Haes & van Grembergen, 2009; Reich, & Benbasat, 2000), a key determinant for whether an IS department will succeed (Gerow, Grover, Thatcher, & Roth, 2014).

We also find the limited amount of research on this topic notable for three other reasons. First, such behaviors play an increasingly important role in organizations that struggle with their digital transformation (Hsu et al., 2018). Firms often find digital transformation a challenge because they have to balance effort and resources between maintaining their legacy technologies and supporting their business units' emerging digital needs (Haffke et al., 2017; Vithayathil, 2018). One way to address this challenge involves encouraging proactive behaviors among IS professionals (Haffke et al., 2017; Johnson & Lederer, 2005; Karimikia, Singh, & Donnellan, 2021), such as by further customizing standard cloud computing services for business units. Second, proactive behaviors can complement current formal knowledge-sharing practices. As such, we need to consider proactive behaviors because, despite being well defined and widely deployed, formal practices have had little impact on increasing how often organizations complete software projects satisfactorily (Ghobadi & Mathiassen, 2017). Third, researchers have studied the role that soft skills that IS professionals should possess, such as business functional knowledge, interpersonal relationships or project management skills, in contributing to IS project success or whether IS departments function effectively (Gallagher, Kaiser, Simon, Beath, & Goles, 2010; Kaiser, Goles, Hawk, Simon, & Frampton, 2011). Although we do not address soft skills' determinants or importance in this study, proactive behaviors, which we conceptualize as OCBs here, likely have an auxiliary positive effect on behavioral or business-domain aspects of IS professionals' soft skills. (Gallagher, Gallagher, & Kaiser, 2013). For example, IS professionals act in an appropriate or sincere manner when interacting with business employees in order to explain how systems will work after their implementation.

In this study, we identify the examples of proactive behaviors that IS professionals perform and the effect that these behaviors have on IS departments' outcomes. In Section 2.2, we describe the OCB concept and explain how one can apply it to characterize IS professionals' proactive behaviors.

2.2 IS-specific OCBs

OCBs refer to either discretionary and nondiscretionary individual behaviors that supervisors and co-workers can explicitly recognize, that formal reward systems promote, that contribute to one's job

performance socially and psychologically, and that improve organizational effectiveness (Organ, 1997). Example OCBs include altruism, courtesy, civic virtue, conscientiousness, and sportsmanship (Organ, 1988). Altruism refers to behaviors that directly focus on helping others, such as assisting employees with a large workload or orienting new employees. Courtesy refers to gestures that demonstrate an interest in preventing problems that could otherwise happen to employees. Civic virtue refers to responsible, constructive participation in an organization, such as attending organizational meetings. Conscientiousness refers to behaviors that go beyond what is expected from employees, such as saving organizational resources. Sportsmanship means tolerating inconveniences without complaining. Such behaviors make organizations more effective (Podsakoff & MacKenzie, 1997). For example, encouraging co-workers to share best practices enhances productivity and eases managers' work (Podsakoff, Ahearne, & MacKenzie, 1997).

Following the above conceptualization, we term the positive, proactive behaviors that IS professionals display when assisting their IS and non-IS colleagues as IS-specific OCBs[1]. Such behaviors occur, for example, when IS professionals help non-IS colleagues use newly adopted or existing systems in the pre- and post-implementation stages (Deng & Wang, 2014; Deng et al., 2015). Non-IS employees often seek out their IS professional colleagues to learn about the various features of the systems they use (Santhanam, Seligman, & Kang, 2007). IS helping and knowledge-sharing behaviors can also occur between IS employees (Hsu, Shih, Hung, & Lowry, 2015; Karimikia et al., 2021; Yen et al., 2015). For example, IS professionals learn from their peers about how to troubleshoot for business users and train them informally (Yen et al., 2015). Another example includes when IS professionals help their IS colleagues remain informed about IS security policies, which improves their department's IS security effectiveness (Hsu et al., 2015).

Prior IS researchers have used a "top-down" perspective to list how OCBs can manifest in an IS context (Appendix A). We supplement this approach by examining the IS literature to locate example IS-specific OCBs that IS professionals have conducted. In reviewing the literature, we identified three general instances of IS-specific OCBs: helping, knowledge sharing, and initiative taking.

2.2.1 Helping

Researchers have established that IS professionals sometimes voluntarily help their peers with work-related issues or prevent work-related problems from occurring (Yen, Li, & Niehoff, 2008). Helping behaviors reduce technology complexity, facilitate IT adoption (Karimikia et al., 2020; Tarafdar et al., 2011), and complement efforts to manage externally provided applications (Stople, Steinsund, Iden, & Bygstad, 2017). In recent years, helping behaviors have increased in prevalence as IS professionals struggle to cope with the IS department's complexity (Singh & Hess, 2017). Researchers have termed IS helping behaviors "customer-oriented organizational citizenship behaviors" (COCBs) (Deng & Wang, 2014) and "service-oriented organizational citizenship behaviors" (SOCBs) (Yen et al., 2015). Both terms consider business employees as customers that IS professionals serve.

2.2.2 Knowledge Sharing

IS professionals often share their know-how and know-why about system-related problems with users (Santhanam et al., 2007). For example, they support business units by sharing good technology-use practices (Pawlowski & Robey, 2004), solutions (e.g., help files), and knowledge about problems arising from insufficient information and data (Deng & Wang, 2014). They may also organize workshops, training programs, and informal mentoring sessions to inform their IS and non-IS colleagues and managers about current digital initiatives, IT-enabled work systems, and appropriate technical practices (Deng et al., 2015, Jasperson et al., 2005). By sharing their knowledge, IS professionals help employees learn how to better use systems or applications (Karimikia et al., 2020; Messersmith, 2007; Stople et al., 2017). IS professionals share their knowledge partly because less expert non-IS and IS colleagues often search out informal sources when dissatisfied with formal sources, such as "how-to-use" manuals (Rice, Collins-Jarvis, & Zydney-Walker, 1999).

[1] While researchers from various disciplines, such as marketing (Brown, Mowen, Donavan, & Licata, 2002), customer service (Bienstock, DeMoranville, & Smith, 2003), and manufacturing (Podsakoff et al., 1997), have studied OCBs, IS researchers have studied them less frequently, although we identified some recent interest (Deng & Wang, 2013, 2014; Deng et al., 2015).

As organizations have increasingly adopted emerging technologies (e.g., cloud computing and artificial intelligence), IS professionals' knowledge-sharing activities have also expanded in scope. They now share knowledge with individuals in newer roles such as business analysts, business intelligence analysts, and digital transformation specialists (Choudhary & Vithayathil, 2013; Singh & Hess, 2017; Vithayathil, 2018). Doing so allows IS departments to: 1) acquire and share best practices and business-critical information, 2) conduct pilot projects and implement IT-enabled business processes and applications more successfully, and 3) contribute towards a more effective digital strategy through cross-functional collaborations.

2.2.3 Initiative Taking

As organizations adopt more and more IT systems, IS professionals need to be creative to help their users complete their work with the new systems. For example, Ghosh (2011) studied IT technicians whose clients asked about information that a new system did not store and found that these requests led the technicians to learn the process for making new records even though their job description did not list this task. This example illustrates taking the initiative, a well-known OCB (Podsakoff et al., 2000). We can also find OCB among software developers who pay attention to the broader scope of software projects when discussing project requirements so that they can better understand what users truly want, which leads to more satisfied users (Walz et al. 1993). Further still, we can find this OCB in Dekas, Bauer, Welle, Kurkoski, and Sulivan's (2013a) study on knowledge workers who took on extra responsibilities to make source code easier to understand, maintain, and modify and, thus, exceeded general expectations about cleaning up code and datasets (Dekas, Bauer, Welle, Kurkoski, & Sulivan, 2013).

One can find initiative-taking behaviors when business employees lack knowledge (low user efficiency) and technical malfunctions occur (low system efficiency) (Deng et al., 2015). In such situations, IS professionals can take the initiative by anticipating the need for additional information, providing personalized information and hands-on walkthroughs on technical features (e.g., workarounds), and offering extra explanations on about problems' origins. Initiative-taking behaviors also play an important role in IS implementation projects where IS professionals have to tolerate inconveniences and work turmoil without complaining and maintain a positive attitude even when conflicts emerge (Yen et al., 2008).

Business units have increasingly begun to appreciate these behaviors. Many organizations encourage their IS professionals to substantially engage with business employees to help the latter better understand the business environment and issues (Schlosser et al., 2015). Doing so would help IS professionals initiate the best ways to exploit external services (e.g., cloud services) to improve business functions, processes, operations, and, thus, business outcomes (Vithayathil, 2018). IS departments can take the initiative to mediate business units' relationships with external parties, such as cloud or analytics vendors, to help business units with evaluating, metering, billing, monitoring, and maintaining such services. They can also interact with senior managers to change their mindset about upcoming technologies and, thus, contribute to digital strategies' effectiveness (Singh & Hess, 2017).

In Sections 2.2.1 to 2.2.3, we explored IS-specific OCBs that IS professionals direct towards their peers and business employees. Mapped to Organ's (1988) five OCB dimensions, IS helping and knowledge-sharing behaviors exemplify helping behaviors (e.g., altruism, courtesy, peacekeeping, and cheerleading), while initiative-taking behaviors resemble the OCB's civic virtue and sportsmanship aspects. When IS professionals conduct such behaviors, business employees will have a better experience with the systems that they use, the services that they receive, and the information that IS professionals produce and share, which will reflect a more effective IS function. In Section 2.3 and 2.4, we explain different dimensions of an IS function's effectiveness and how IS-specific behaviors affect these dimensions.

2.3 The IS Function's Effectiveness

The IS function's effectiveness refers to the quality of the information, systems, and services that an IS department provides to its users, which influences user satisfaction and individual and organizational performance (Chang & King, 2005). An effective IS function maintains information systems well, produces information at the required time and quality, and sufficiently and promptly delivers services to work groups. As such, effective IS functions can improve business employees' job performance (Petter, DeLone, & McLean, 2013) or motivate them to more deeply use an IS system to complete their assigned tasks (Yen et al., 2015).

The features of an information system that produces information characterizes system quality. Such features include ease of use (Gable, Sedera, & Taizan, 2008), ease of learning (Sedera & Gable, 2004), response time (Iivari, 2005), and system accessibility (McKinney, Kanghyun, & Zahedi, 2002). Information quality refers to the extent to which the information that an information system produces possess desirable characteristics such as accuracy (Iivari, 2005), precision (Bailey & Pearson, 1983), completeness (Iivari, 2005), understandability (McKinney et al., 2002), and relevance (Gable et al., 2008). Service quality refers to the quality of the support that users receive from IS departments, IS teams, and IS professionals (Petter, DeLone, & McLean, 2008). Example characteristics that comprise service quality include: tangible services (e.g., IS has up-to-date hardware and software) (Pitt, Watson, & Kavan, 1995), reliability (e.g., IS is dependable) (Laumber, Maier, & Weitzel, 2017; Pitt et al., 1995), responsiveness (e.g., IS professionals give prompt service to users) (Chang & King, 2005; Laumber et al., 2017), assurance (e.g., IS professionals possess the knowledge to do their job well) (Pitt et al., 1995), and empathy (e.g., IS professionals have users' best interests at heart) (Petter & McLean, 2009; Pitt et al., 1995).

DeLone and McLean's (2003) IS success model comprises six dimensions. Specifically, it proposes system quality, information quality, and service quality (i.e., the quality of what IS departments output) as the key antecedents for use, user satisfaction, and net benefits (i.e., individual and organizational outcomes). In this study, we draw on these three predictors to reflect an entire IS function's effectiveness. DeLone and McLean's (2003) IS success model suggests that, while IS departments initially design and develop IS systems with certain features, the services that IS professionals provide affects how employees perceive information systems and the information that they produce. This change in perceptions prompts business employees to view their information systems as being easy to use or useful and to assess the information that they produce as being accurate or consistent. The increasing virtualization of work processes (Overby, Slaughter, & Konsynski, 2010) has accelerated the need for IS professionals to play this supportive role. As organizations use information systems more intensely and as these systems become more complex and embedded in organizational activities, IS professionals need to go beyond offering routine task-related support by carrying out IS-specific OCBs. Doing so implies supplementing their organizationally mandated responsibilities, which will make IS departments more effective.

2.4 IS-specific OCBs and the Effectiveness of the IS Function

The voluntary behaviors that IS professionals exhibit, which we term "IS-specific OCBs", influence system quality, information quality, and service quality (Yen et al., 2015). Researchers have found IS-specific OCBs, such as voluntarily leading and scheduling IS project meetings (Curtis et al., 1988, Walz et al., 1993), spontaneous handholding, and information sharing (Jasperson et al., 2005), to lead to greater technology use among IS users. However, researchers have largely overlooked the effect that such behaviors have on the effectiveness of IS departments as a whole.

Previously, researchers have found OCBs to influence how users perceive the quality of the information that ERP systems produce (Yoon, 2009), the quality of project management in an ERP implementation (Yen et al., 2008), and the overall success of an online tax filing system (Carter, McFadden-Wade, & Wells, 2016). Yen et al. (2008) pointed out that IS professionals in implementation teams actively and voluntarily help users with work-related problems, assist them to prevent issues associated with the new system from occurring, and communicate and coordinate with users to effectively adapt the new system during the implementation process.

We can see that previous studies have focused on the impact that OCBs have on how users evaluate systems and the information that they produce, which means they have largely unexplored the effect that these behaviors have on the services that IS professionals provide. With IT underpinning more and more organizational processes and new innovations appearing rapidly, IS professionals have to support business users more frequently, which means an IS department's service aspect today plays an increasingly important role in measuring its effectiveness. Even if organizations possess high-quality systems and information, they will not obtain the full value of their investments in technology if they receive poor quality services from their IS department.

IS-specific OCBs can occur between IS professionals and their IS and non-IS colleagues (Hsu et al., 2015; Yen et al., 2015). When IS professionals consistently display IS-specific OCBs with their IS peers, they will be able to gather and interpret essential cues through observing and working with each other. If similar behaviors occur between IS professionals and their non-IS colleagues, then they both become

exposed to similar cues and their perceptions about systems' and information's quality converge. Thus, non-IS colleagues who interact with IS professionals will develop shared perceptions and expectations about their own service behaviors and outcomes. Indeed, they model IS-specific OCBs vicariously and adopt and sustain such behaviors if they meet their expectations regarding valuable outcomes (Yen et al., 2015). Consequently, when these behaviors become pervasive, non-IS employees learn how to use various features and to extract the information that they require their systems (Compeau & Higgins, 1995).

A similar learning process takes place in IS departments when IS professionals interact with their IS peers. IS staff members who work with individuals who carry out OCBs will begin adopting the latter's cues and perceptions, which will result in their delivering high-quality IS services to business work units. For example, IS professionals improve the overall level of security in their IS departments when they make innovative suggestions, train other IS peers about the need to avoid leaking information (such as can occur when they fail to log out after accessing their email accounts on public computers), or help other employees in the work group learn about security policies (Hsu et al., 2015).

In this section, we explain how the IS-specific OCBs that IS professionals display influence how well IS departments perform. We formalize this discussion as a model in Section 3.

3 Research Model

In this study, we focus on the IS-specific OCBs that IS professionals in IS departments and across organizations perform and the impact that these behaviors on IS departments' effectiveness. As we argue in Section 2, such behaviors include helping, knowledge sharing, and initiative taking. Taken together, these behaviors influence the quality of the IS services and IS systems in an organization and the quality of the information that those systems produce and that employees obtain from them. In this way, they reflect an IS department's overall effectiveness.

This study differs from prior IS research in this domain in two key ways. First, previous research has paid more attention to exploring whether OCBs exist in the IS context and focused little on such behaviors' potential outcomes. Among the studies that have focused on their potential outcomes, while some (Yen et al., 2008) examined the IS function's effectiveness, others have studied outcomes such as IS security effectiveness (Hsu et al., 2015), IS professionals' task efficiency (Deng & Wang, 2014), and employee IS use (Yen et al., 2015). We note that researchers who have examined IS effectiveness have not focused on the quality of the services that IS employees provide. Instead, they have stressed the quality of the systems and information and the impact that systems have on individuals. The limited literature in this space indicates that the impact that such behaviors have on IS departments' overall effectiveness needs further investigation. Thus, in this study, unlike previous ones in this domain, we include service quality as an important aspect of the IS function's effectiveness following Chang and King (2005).

Second, we use a multi-level model. We propose that both individual- and unit-level IS-specific OCBs affect an IS department's effectiveness. Research has previously discussed the effect that OCBs have on individual and organizational outcomes, such as employee absenteeism, turnover, productivity and effectiveness (Kidwell, Mossholder, & Bennett, 1997; Podsakoff et al., 2000; Podsakoff, Whiting, Podsakoff, & Blume, 2009; Van Dyne & LePine, 1998). Research has also established that OCBs positively influence group-level outcomes, such as group performance and effectiveness (Chen, Lam, Naumann, & Schaubroeck, 2005; Ehrhart, Bliese, & Thomas, 2006; Nielsen, Hrivnak, & Shaw, 2009). In summary, Figure 1 shows the impact that individual- and unit-level IS-specific OCBs have on system quality, service quality, and information quality.

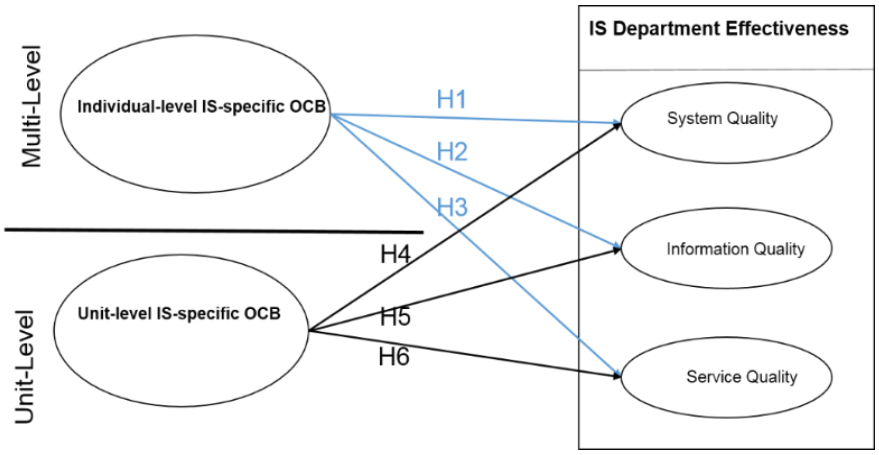


Figure 1. Research Model

Chang and King (2005) divided IS function effectiveness into three dimensions: system quality, service quality, and information quality. Thus, following Klein and Kozlowski's (2000) arguments on the effect that individual-level behaviors have on unit-level outcomes, we hypothesize that IS-specific OCBs that IS professionals carry out in an IS department in aggregate have cross-level effects on how non-IS employees perceive the quality of systems, information, and services. Researchers have proposed many research models through which social interaction influences how users use information systems and, thus, adopt behavioral intentions (Venkatesh & Bala 2008; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003). Such social interaction may occur through informal interaction in an IS department and with business groups when less expert or new IS and non-IS employees rely on more expert IS professionals to help them with IT knowledge or to update their IT expertise (Rice et al., 1999; Schlosser et al., 2015). Hsu et al. (2015) elaborated on security behaviors, as a form of OCBs, that occur within IS departments and between business departments. They found that when IS professionals additionally share security-related concerns with their IS and non-IS peers or help them learn about security policies, this improves the overall level of security within departments.

Therefore, IS professionals who voluntarily help and share knowledge inside and outside an IS department enhance recipients' technical and social skills, which leads to more effective IS implementation (Yen et al., 2008, 2015). Several IS scholars argue that changes in users' beliefs about systems' characteristics, such as the perceived usefulness or ease of use, help users understand such systems' benefits (e.g., increased task performance or enhanced decision making), which motivates them to use the systems (Bhattacherjee & Premkumar, 2004; Yen et al., 2015). Thus, we argue that IS-specific OCBs that IS professionals exhibit lead to IS users to perceive information systems as operating more efficiently and provide a clear, compelling cue in terms of system reliability, functionalities, and ease of use. Therefore, we hypothesize:

H1: Individual-level IS-specific OCBs that IS professionals exhibit positively affect users' perceptions about the quality of the systems that IS departments provide.

Likewise, OCBs carried out by IS professionals indicate to users a system's ability to provide accurate, secure, accessible, and adequate information (Karimikia et al., 2021; Yoon, 2009). When IS professionals display such behaviors, new non-IS employees or non-IS employees inexperienced in creating systems' data apprehend how to use the data that certain systems (, e.g., an ERP system) produce in accomplishing their daily business tasks. Therefore, we hypothesize:

H2: Individual-level IS-specific OCBs that IS professionals exhibit positively affect users' perceptions about the quality of the information that IS departments provide.

Similarly, users' beliefs about the benefits that using an information system and its produced information will provide them may escalate if users receive IS services from IS professionals via IS-specific OCBs (Yen et al., 2015). We argue that users perceive IS services as high in quality when IS professionals voluntarily assist and cooperate with their IS and non-IS peers to provide cost-effective and useful training programs, timely emergency services, and valuable, helpful services. Consequently, the following hypothesis can be established:

H3: Individual-level IS-specific OCBs that IS professionals exhibit positively affect users' perceptions about the quality of the services that IS departments provide.

Podsakoff et al. (2000) and Podsakoff and Mackenzie (1997) theoretically and empirically discussed the influence that unit-level OCBs have on unit- and organizational-level effectiveness. Unit-level OCBs, such as helping and knowledge-sharing behaviors with employees from other departments, enhance departments' effectiveness by reducing intergroup conflict and facilitating group effort coordination. Yen et al. (2015) postulated that IS departments provide an essential contextual influence through which IS professionals, as an IS unit, engage in OCBs to encourage business employees to perceive their ERP system as beneficial. They also mentioned that, when IS departments display such behaviors, business employees use their ERP system at an extended level without incurring unfavorable job outcomes such as increased workloads. In this study, we argue that IS-specific OCBs that IS professionals direct towards business units make IS departments more effective as the IS-specific OCBs make it more likely that business employees perceive the systems as high in quality. Therefore, we hypothesize:

H4: Unit-level IS-specific OCBs that IS professionals in IS departments exhibit positively affect users' perceptions about the quality of the systems that IS departments provide.

Yen et al. (2008) discussed that OCBs that an IS unit exhibits increase the socio-emotional support in an organization through encouraging an integration climate and improving project management during IS implementation. An IS unit that exhibits directing behaviors such as helping, sportsmanship, and civic virtue behaviors shapes a positive, helpful, and cooperative milieu through which non-IS employees gain domain-specific knowledge and technical expertise. We argue that unit-level IS-specific OCBs that an IS unit exhibits enable users to adopt expected behaviors towards using their systems and information that they produce to support work tasks and facilitate decision-making processes. The unit-level information signifies a system's ability to provide timely, useful, accurate, and interpretable information, and unit-level IS-specific OCBs include any act that improves users' capabilities to take advantage of information that the system produces. Skills and capabilities they can achieve through relationships with IS people would prompt users to view their IS unit's outcomes in a positive manner. Therefore, we establish the following hypothesis:

H5: Unit-level IS-specific OCBs that IS professionals in IS departments exhibit positively affect users' perceptions about the quality of the information that IS departments provide.

When IS professionals as a group engage in OCBs, users who receive extraordinary support (e.g., additional workshops) from their IS unit become more familiar with their system's various features and its applicability in reducing workloads and enhancing task performance. We argue that IS-specific OCBs at the unit level create a social-technical context through which users perceive the services that their IS unit provides to be valuable, timely, and/or useful. Therefore, we hypothesize:

H6: Unit-level IS-specific OCBs that IS professionals in IS departments exhibit positively affect users' perceptions about the quality of the services that IS departments provide.

4 Research Methodology

We conducted a survey to assess the research model. Researchers in the IS field have often used this method to conduct confirmatory studies, such as theory testing (Venkatesh, Brown, & Bala, 2013). Surveys can bring breadth to a study by helping IS researchers collect data about a phenomenon's different aspects from many participants (Venkatesh et al., 2013). Therefore, the research model that we present in Figure 1 required data from IS professionals for the individual-level hypotheses and data from business (i.e., non-IS) employees for the unit-level hypotheses. Thus, we used a matched sample of business and IS professionals to collect responses: we asked the IS professionals about individual-level IS-specific OCBs, while we asked the business employees about unit-level IS-specific OCBs and IS department effectiveness (see Appendix C). We asked the IS professionals to rate 24 actions they carry out in assisting their IS and non-IS peers based on Podsakoff, MacKenzie, Moorman, and Fetter's (1990) five-dimensional OCB measure (altruism, courtesy, civic virtue, sportsmanship, and conscientiousness). We asked the business employees to respond to 123 items pertaining to unit-level OCB behaviors (e.g., helping behaviors, civic virtue, and sportsmanship) and the three IS effectiveness aspects (i.e., system, information, and service quality). This dyadic structure differs from previous OCB studies that have used the same respondent, normally a supervisor, to rate OCBs. Podsakoff, MacKenzie, Lee, and Podsakoff, (2003) suggest that capturing assessments from different resources allows data triangulation, diminishes

the potential for common method bias, and yields greater reliability and validity. In this study, both business employees (peer-rating) as IS service recipients and IS professionals (self-rating) as internal IS service providers reflected different perspectives on the five-dimension and three-dimension OCB that Organ (1988) conceptualized and Podsakoff et al. (1990) and Podsakoff et al. (1997) operationalized. Furthermore, to ensure that: 1) subjects could understand the items in each scale, 2) the items used valid wording, 3) the results would increase reliability, and 4) that we allowed sufficient time for subjects to complete each session, we conducted both a pre-test and a pilot test. Based on the pre-test assessment, we fine-tuned the initially drawn-up items.

4.1 Data Collection

We used both online and pen-and-paper surveys to gather data from IS and non-IS employees working in large banks and insurance companies located in different countries, such as New Zealand, Malaysia, Pakistan, and Iran. We chose banks and insurance companies as sample sites since the financial sector has proven to be an appropriate context to investigate today's IS departments (Schlosser et al., 2015). Firms in this sector employ many IS professionals, and their IS and non-IS staff interact frequently and intensively. Following Hsieh and Wang's (2007) guideline that researchers need to adopt a two-year post-implementation period to capture OCBs in an IS context since individuals display these behaviors more often at that stage, we asked respondents whether their organizations had implemented IS systems at least two years before they received our survey and whether they had interacted with their internal IS staff for at least two years. We checked this criterion early on when collecting both data sets and when analyzing the data. Thus, we removed data that showed less than two-year interaction from the datasets to ensure the respondents had interacted for more than two years on the existing systems. We provide more details on data collection in Appendix B.

Of the 230 banks and insurance companies that we approached via email or face to face, 32 announced their willingness to participate. In particular, 27 organizations, including 25 insurance companies and two banks, used pen-and-paper surveys, and only five banks used the online survey. Thus, we sent a survey packet that comprised the survey for the IS and non-IS employees to 1,740 business (non-IS) employees and 840 IS professionals in total. To boost the likelihood that the respondents would respond to the survey, we promised that we would enter them in a draw to win one of two US$100 gift cards that we would hold after we had finished collecting data. In addition, to help ensure that participants understood IS-specific behaviors and their impacts, the first author explained OCB behaviors and their potential outcomes to the organizations' bank chief executive officers (CEOs) or chief information officers (CIOs) before we began collecting data.

The response rate for the paper surveys was 50.34 percent for IS professionals (432 completed responses) and 51.43 percent for the business (non-IS) employees (876 completed responses). After deleting unusable responses, such as responses that included extreme univariate and multivariate outliers, we removed five IS responses and 21 business (non-IS) responses from the data sets, which reduced the response rates to 49.37 percent and 51.07 percent, respectively. In addition, 257 business (non-IS) employees and 102 IS professionals from Malaysian and Pakistani banks responded online to the survey. In total, we obtained 1,112 responses from business employees and 529 responses from IS employees. We provide and discuss the demographic information for the two sample in Appendix B. We grouped the completed IS and business questionnaires from the same organization to make a matched sample across different organizations. In all, we found that the responses came from 32 organizations. According to Maas and Hox's (2005) guidelines, this sample size should be sufficient to accurately estimate the regression coefficients and standard errors. In Section 4.2, we discuss the measurements we adapted to measure the individual- and unit-level constructs.

4.2 Measures

We provide all constructs and their items at the individual and unit level in Appendix C. To show whether the model with multi-dimensional or unidimensional constructs better fit the data, we conducted a confirmatory factor analysis (CFA) twice for each construct. First, we tested the model while we loaded all construct items as indicators on the unidimensional construct. Second, we tested the model while we loaded all items on the respective dimensions and then loaded all dimensions on the higher construct to serve as first-order indicators for the second-order factor. The resulting fit indexes demonstrated a perfect fit and indicated no significant difference between the two models for each construct ($\Delta CFI < 0.05$ and

ΔCFI < 0.01) (Cheung & Rensvold, 2002; Little, 1997). All paths from the first-order factors to the higher-order factors were significant and greater than the 0.70 cut-off.

4.2.1 Individual-level Organizational Citizenship Behavior (OCB)

We assessed the IS-specific OCBs using Podsakoff's et al. (1990) 24-item scale, which measures Organ's (1988) five-dimensional OCB. The instrument comprises five subscales for each dimension (altruism, courtesy, civic virtue, conscientiousness, and sportsmanship). We used a seven-point Likert scale that ranged from "strongly disagree" (1) to "strongly agree" (7) to evaluate the individual-level OCBs. The behavioral literature has found satisfactory reliability levels for the OCB measurement (Podsakoff et al., 1990). We found the following coefficient alphas for the five OCB dimensions: 0.90 (altruism), 0.88 (courtesy), 0.89 (civic virtue), 0.90 (sportsmanship), and 0.91 (conscientiousness).

4.2.2 Unit-level Organizational Citizenship Behavior (OCB)

We measured the IS-specific unit-level OCBs using Podsakoff's et al. (1997) 13-item scale for unit-level OCB, which has three subscales for helping behaviors (e.g., altruism, courtesy, peacekeeping, and cheerleading), civic virtue, and sportsmanship. We used a referent-shift consensus approach to modify the measurement for the business respondents. Accordingly, we shifted the referents in the items from an individual (i.e., "I/this employee/my team member") to a more collective assessment or unit referent (i.e., peers/IS department). We used a seven-point Likert scale that ranged from "strongly disagree" (1) to "strongly agree" (7) to evaluate the unit-level OCBs. We found the following coefficient alphas for the unit-level OCB dimensions: 0.88 (helping behavior), 0.80 (civic virtue), and 0.78 (sportsmanship).

4.2.3 IS Department Effectiveness

We adapted a functional scorecard from Chang and King (2005) to assess the IS function's effectiveness by measuring business employees' perceptions about the quality of the systems, information, and services that their IS departments delivered. We captured their perceptions with a six-point Likert-type scale that ranged "hardly at all" (1) to "to a great extent" (5) with "not applicable" as the sixth point.

We assessed IS system quality using Chang and King's (2005) 42-item scale that measures six system quality dimensions (see Appendix C). We found the following coefficient alphas for the system quality dimensions: 0.91 (impact on job), 0.87 (impact on external constituencies), 0.87 (impact on internal processes), 0.90 (impact on knowledge and learning), 0.89 (systems usage characteristics), and 0.85 (intrinsic systems quality). We used the 36-item IS information quality scale (Chang & King, 2005) to evaluate seven information quality dimensions (see Appendix C). We found the following coefficient alphas for the information quality dimensions: 0.85 (intrinsic quality of information), 0.81 (reliability of information), 0.73 (contextual quality of information), 0.70 (presentational quality of information), 0.83 (accessibility of information), 0.89 (flexibility of information), and 0.91 (usefulness of information). Finally, we evaluated IS service quality using Chang and King's (2005) 32-item scale that measures five service quality dimensions (see Appendix C). We found the following coefficient alphas for the service quality dimensions: 0.85 (responsiveness of services), 0.93 (intrinsic quality of service providers), 0.84 (interpersonal quality of service providers), 0.97 (IS training), and 0.87 (flexibility of services).

5 Data Analysis and Results

5.1 Reliability and Validity Analysis of Individual- and Unit-level Variables

We evaluated the unit-level measurement model for internal consistency and convergent and discriminant validity. We show the results of the constructs' means, standard deviations, number of items, factor loadings, and reliabilities (Cronbach' alpha, α) in Table 1. All items that loaded on respective factors exhibited values around 0.70 or greater. However, some items had lower loadings (i.e., between 0.50 and 0.70). As a guideline, Chin (1998) stated that standardized loadings should be greater than 0.707 but also noted that this rule of thumb should not be as rigid as at early scale-development stages. Loadings around 0.5 or 0.6 may be acceptable if additional indicators in the block could serve as a basis for comparison. For all constructs (second-order factors), internal consistency reliabilities (Cronbach' alpha (α)) exceeded than the recommended cut-off 0.70 (Nunnally & Bernstein, 1994).

Table 1. Factor Loadings and Reliabilities of Individual- and Unit-level Constructs

Construct (second-order latent factors)	Mean	Standard deviation	No. of items (observed variables)	Confirmatory factor loadings range between observed variables and first-order latent factors	Reliability (alpha) α
Individual-level OCB	4.69	0.76	24	0.67 - 0.86	0.94
Unit-level OCB	4.53	0.99	13	0.54 - 0.82	0.88
System quality	3.65	0.70	42	0.62 - 0.80	0.97
Information quality	3.21	0.99	36	0.60 - 0.77	0.97
Service quality	2.93	1.30	32	0.68 - 0.82	0.96

All constructs exhibited satisfactory reliability and convergent and discriminant validity (see Table 2). For all constructs, CR ranged from 0.87 to 0.97 and, thus, demonstrated the accuracy of composite reliabilities that avoid the assumption of equal weighting of items. AVEs exceeded 0.50, which means the observed variables accounted 50 percent or more for variance of their own latent variables (Chin, 1998; Fornell & Larker, 1981). To claim discriminant validity among the constructs, the square root of the AVE should exceed the square of the correlations (see Table 3) among the latent variables or AVE should be greater than MSV (see Table 2), which would mean that the latent variables shared more variance with the block of observed variables than with different observed variables of other latent variables (Chin, 1998).

Table 2. Convergent and Discriminant Validity of Unit-level Constructs

Construct	Composite reliability (CR)	Average variance extracted (AVE)	Maximum shared squared variance (MSV)
Unit-level OCB	0.87	0.764	0.230
System quality	0.97	0.813	0.449
Information quality	0.97	0.818	0.449
Service quality	0.95	0.772	0.230

Table 3. Correlation among Unit-level Constructs

Group-level construct	Unit-level OCB	System quality	Information quality	Service quality
Unit-level OCB	0.874			
System quality	0.480**	0.879		
Information quality	0.327**	0.261**	0.904	
Service quality	0.331**	0.267**	0.670**	0.902

Note: We show the square roots of the construct's AVE value on the diagonal. Significance of correlations: **p < 0.01; *p < 0.05 (n = 1112)

We conducted multiple analyses to assess the threat of multicollinearity. The highest correlation was 0.670 between information quality and service quality (less than 0.70; see Table 3), the highest score of variance inflation factor (VIF) was 1, and the highest conditioning index was 9.237 (less than 30). These statistics fall within an acceptable range (Tabachnick & Fidell, 2001), which indicates that multicollinearity did not threaten the results. We applied different tests to assess common method bias and found that it did not pose a serious threat to this study (see Appendix E).

In Section 5.2, we describe how we applied multilevel modeling techniques to measure the effect that individual-level IS-specific OCBs had on unit-level outcomes, such as the system quality, service quality, and information quality (Podsakoff, Podsakoff, MacKenzie, Maynes, & Spoelma, 2014). We employed Mplus version 7 to run a multilevel SEM to analyze within-group (individual level) and between-group (group level) variances and covariances and to evaluate the effect that we hypothesized the individual-level IS-specific OCBs to have on the unit-level outcomes.

5.2 Multi-level Analysis

In a multilevel SEM, all observed variables exist at both the individual and the group level. The observed variables at the individual level become latent variables at the group level, which represent the group-level

variation in the random intercepts as second-level latent variables that capture the variation in the means of the observed individual level variables (Hox, 2013). The multilevel model we adopted in this study contained "within" and "between" parts: we modeled unit-level IS-specific OCB as a second-order latent factor and its dimensions as first-order latent factors in the within part, while we modeled unit-level system, service, and information quality as latent factors in the between part. We used unit-level IS-specific OCB and its dimensions as the independent variables in the within part, while we used system quality, service quality, and information quality latent factors (as business employees rated them) as dependent variables in the between part. To obtain unit-level IS-specific OCBs, we aggregated the individual responses to estimate the respective scores for each participating organization (Klein & Kozlowski, 2000). Specially, we computed the score of the aggregate-level IS-specific OCBs in each organization by averaging the sum of responses from business employees and IS professionals.

To examine whether responses from IS employees could create unit-level constructs through aggregation, we computed three group reliability indexes: the within-group agreement index (r_{wg}) and the interclass correlations, ICC1 and ICC2 (see Appendix G) (Podsakoff et al., 2014). Building on James, Demaree, and Wolf's (1984) assumptions about within-group inter-rater reliability, within-group agreement index (r_{wg}) indicates the degree to which responses to a measurement scale by group members in the same organizations converge and the extent to which judges agree on a set of judgments. The ICCs of the variables determine how much of a measure's variance is within classes versus between classes and represent the ratio of between-group (group level in the multilevel model) to within-group (individual level in the multilevel model) variance (Nezlek, 2011). We obtained average r_{wg} values for altruism, courtesy, civic virtue, sportsmanship, and conscientiousness. In particular, they ranged from 0.90 to 0.92 and, thus, exceeded the acceptable cut-off 0.70 (Bliese, 2000). From analyzing the between-group variance and group-level mean reliability, we found ICC1 values that ranged from 0.07 to 0.11. These values imply that that seven to 11 percent of the variance in the within group-variables accounted for the between-group variables. The ICC2 values all exceeded the minimum values that researchers have suggested (i.e., 0.50 (Muthén & Muthén, 1998-2012) and 0.60 (Bliese, 2000)). Although we found an acceptable ICC2 value for all OCB dimensions based on Klein and Kozlowski's (2000) suggested cut-off, we found slightly lower ICC2 values for some OCB dimensions compared to Bliese's (2000) recommended cut-off 0.60. The relatively lower ICC2 values reflect the difficulty in detecting emergent relationships using group means (Bliese, 2000; Hox, 2013). However, we considered these values acceptable mainly because we could theoretically justify the underlying aggregation with OCB theories and the average r_{wg} was sufficiently high (Liao & Chuang, 2007; Yen et al., 2015). Given we found considerable between-group variances, we had good reason to investigate the between structure and justification to aggregate the between-group part (Bliese, 2000).

5.2.1 Fit Indices

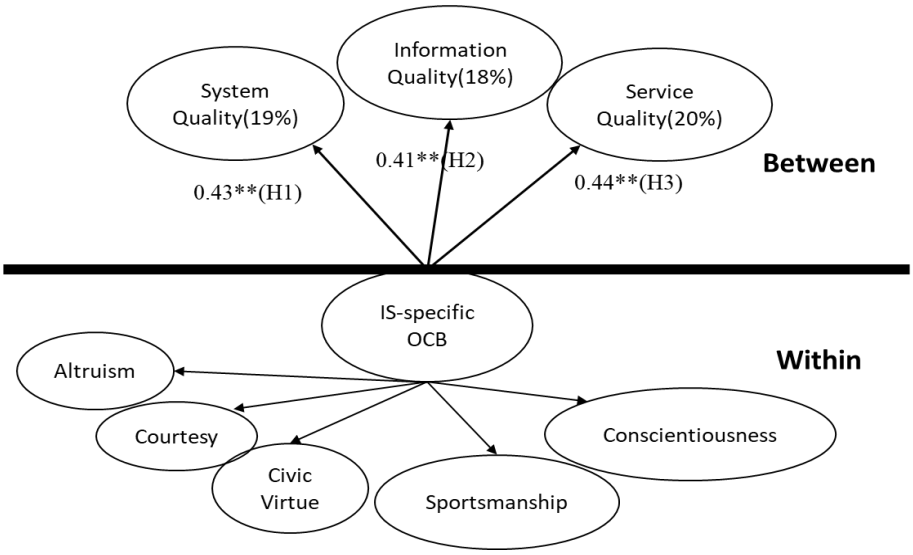
We tested a five first-order-factor CFA with 24 categorical observed variables using Mplus version 7 (Muthén & Muthén, 1998-2012). We examined alternative fit indices to determine whether the fit was adequate. The chi-square value was significant (X2 = 767.354, p-value= 0.000). The results indicated that /df was 1.363, which falls between 1 and 2 (see Table 4). The value of Akaike's Information Criterion (AIC) was 30619.499, showing the correct number of components in finite mixture models, while the value of Bayesian Information Criterion (BIC) was 31331.475 as a good indicator for class enumeration over the rest that picked the correct model most consistently in the finite mixture structure equation model (Nylund, Asparouhov, & Muthén, 2007). We also found other fit indices in Mplus. Comparing the measurement model fit indexes in Table 4 to the cut-offs recommended for the perfect-fitting models in Appendix D, the model perfectly fit the data. SRMR yielded a value of 0.040 for the within part—less than 0.08, and it obtained 0.11 for the between part—slightly more than 0.08. The values for TLI and CFI were 0.975 and 0.977, respectively—greater than 0.95. The value for RMSEA was 0.018—less than 0.05.

Table 4. Fit Statistics

Model	Chi-square	SRMR	NNFI(TLI)	CFI	RMSEA
Multilevel model	767.354 with 563 df (/df = 1.363)	0.040 (within part) 0.11 (between Part)	0.975	0.977	0.018

5.2.2 Hypotheses Testing Results

We used the path coefficient results that we show in Figure 2 to test our hypotheses. For each hypothesis, we also report the standardized estimates (β), the significance levels, and the squared multiple correlations.



Significance levels: ** P < 0.01; *P < 0.05

Figure 2. Cross-level Model Results

We conducted a multilevel analysis to measure the effect that cross-level IS-specific OCBs have on IS system quality, information quality, and service quality. Table 5 summarizes the results we obtained from testing the hypotheses.

Table 5. Summary of the Proposed Cross-level Hypotheses

Hypotheses	Supported?
H1: Individual-level IS-specific OCBs that IS professionals exhibit positively affect users' perceptions about the quality of the systems that IS departments provide (β = 0.43, P = 0.005).	Yes
H2: Individual-level IS-specific OCBs that IS professionals exhibit positively affect users' perceptions about the quality of the information that IS departments provide (β = 0.41, P = 0.010).	Yes
H3: Individual-level IS-specific OCBs that IS professionals exhibit positively affect users' perceptions about the quality of the services that IS departments provide (β = 0.44, P = 0.006).	Yes

5.2.3 Within-level Predictors of Unit-level IS System Quality, Service Quality, and Information Quality

We assessed the IS-specific OCBs in the IS department as determinants of IS system quality, service quality, and information quality. First, individual-level IS-specific OCBs had a significant and moderately positive relationship with IS system quality ($p < 0.01$, $\beta = 0.43$). Individual-level IS-specific OCBs explained 19 percent of the explained variance in IS system quality, which supports H1. Second, individual-level IS-specific OCBs had a significant and positive relationship with information quality ($p < 0.01$, $\beta = 0.41$). Individual-level IS-specific OCBs explained 18 percent of the explained variance in information quality, which supports H2. Third, individual-level IS-specific OCBs had a significant and moderately positive relationship with IS service quality ($\beta = 0.44$, $P < 0.01$). Individual-level IS-specific OCBs explained 20 percent of the variance in IS service quality, which supports H3. In Section 5.3, we report on a CFA we performed for the unit-level part in the research model to test the hypotheses that relationships between observed variables and their underlying latent constructs (factors) exist. We used Amos (Arbuckle, 2014) to perform CFA through structural equation modeling (SEM) to deal with modeling covariances among factors and variances between factors in the unit-level measurement and structural models.

5.3 Unit-level Measurement and Structural Models

The unit-level measurement model contains an exogenous construct, a three-dimension OCB, and the endogenous constructs, which included information quality with seven dimensions, system quality with six dimensions, and service quality with five dimensions. All endogenous constructs correlated with the exogenous construct and observed variables linked to their own constructs. In the structural model, we replaced all correlations between constructs with paths from the exogenous variable to the endogenous ones (see Figure 3).

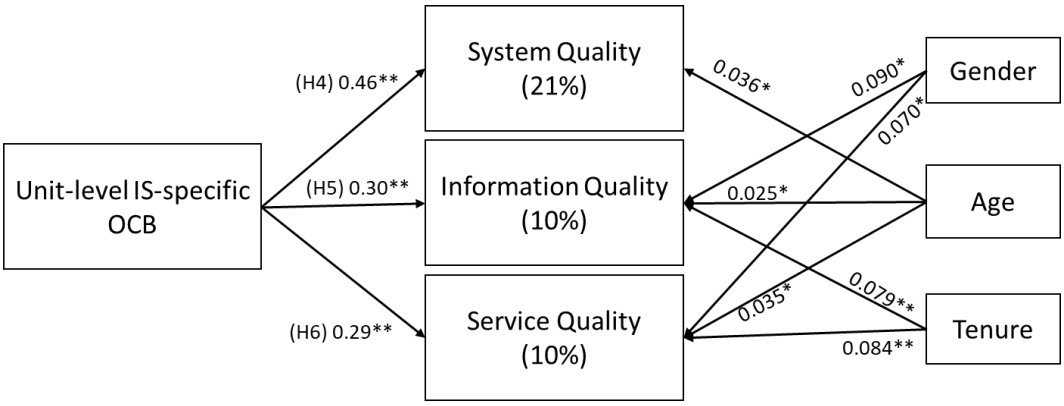
We report the resulting fit indices in Table 6. Comparing the measurement model fit indices in Table 6 to the cut-offs recommended for the perfect-fitting models in Appendix D, we can see that the model fit the data reasonably well. The results indicate that /df was2.256, which falls between 1 and 3; SRMR was 0.041, less than 0.08; IFI, TLI and CFI were 0.912, 0.909, and 0.912, respectively, greater than 0.90; and the obtained value for RMSEA was 0.034, less than 0.05. We also show the fit indices that we obtained from the structural model in Table 6 and indicate a reasonable-fitting model based on a comparison with acceptable values from different fit indexes that we report in Appendix D. The results gained from the structural model reflect that /df was 2.304; SRMR was 0.053; IFI, TLI, and CFI were 0.908, 0.905, and 0.908, respectively; and RMSEA was 0.034. In addition to how we interpreted fit indices previously, the value of RMSEA is as good as what is required, indicating correct specified factor loadings in the exploratory factor analysis (EFA) and an assumption of the appropriate number of variables in this research (Kenny & McCoach, 2003).

Table 6. Fit Statistics

Model	Chi-square	SRMR	IFI	NNFI(TLI)	CFI	RMSEA
Measurement model	11270.740 with 4996 df (/df = 2.256)	0.041	0.912	0.909	0.912	0.034
Structural model	11525.909 with 5003 df (/df = 2.304)	0.053	0.908	0.905	0.908	0.034

5.3.1 Results of Hypotheses Testing of the Unit-level Part of the Research Model

We used the path coefficient results that we show in Figure 3 to test our hypotheses. For each hypothesis, we report the standardized estimates (β), the significance levels, and the squared multiple correlations in Figure 3.



Significance levels: ** p < 0.01; *p < 0.05
We indicate only significant correlations.
The latent common method variance factor remained with observable variables.
Rectangular shapes indicate the latent factors.
We interpret gender, age, and tenure as control variables in Appendix F.

Figure 3. Unit-level Results

The overall results indicate that unit-level IS-specific OCBs that an IS department exhibits influence the quality of information systems, the quality of the IS services that it delivers, and the quality of the information shared across an organization. In addition, IS groups assist business groups by solving technical problems on existing IS systems, providing access to emergency IS services, and increasing users' IT-related knowledge, which leads to IS departments that function effectively. IS groups act as a focal source of technical knowledge dissemination to enhance business employees performance by promoting such behaviors between IS and non-IS departments so that users comprehend their information systems' abilities. Further, these behaviors likely affect business employees' perception of their information systems, IS services, and information. Table 7 summarizes the results of the hypotheses testing.

Table 7. Summary of the Proposed Unit-level Hypotheses

Hypotheses	Supported?
H4: Unit-level IS-specific OCBs that IS professionals in IS departments exhibit positively affect users' perceptions about the quality of the systems that IS departments provide (β = 0.46, P = 0.002).	Yes
H5: Unit-level IS-specific OCBs that IS professionals in IS departments exhibit positively affect users' perceptions about the quality of the information that IS departments provide (β = 0.30, P = 0.000).	Yes
H6: Unit-level IS-specific OCBs that IS professionals in IS departments exhibit positively affect user perceptions about the quality of the services that IS departments provide (β = 0.29, P = 0.000).	Yes

5.3.2 Predictors of IS Department Effectiveness

First, unit-level IS-specific OCBs had an extremely significant and positive relationship with IS system quality ($p < 0.01$, $\beta = 0.46$). Unit-level IS-specific OCBs explained 21 percent of the variance in IS system quality, which supports H4. Second, unit-level IS-specific OCBs had a significant and positive relationship with information quality ($p < 0.01$, $\beta = 0.30$). Unit-level IS-specific OCBs explained 10 percent of the explained variance in the information quality, which supports H5. Third, unit-level IS-specific OCBs had a significant and positive relationship with IS service quality ($\beta = 0.29$, $P < 0.01$). Unit-level IS-specific OCBs explained 10 percent of the variance in the IS service quality, which supports H6. Among the relationships between unit-level IS-specific OCBs and the IS department effectiveness dimensions, system quality showed the stronger relationship with IS-specific OCBs.

In this section, we statistically report on the support we found for our hypotheses, which we use to answer our research questions. The research findings provide empirical evidence that IS-specific OCBs that occur across departments strongly predict an IS department's effectiveness. This study employed a multilevel approach to evaluate the cross-level effects of IS-specific OCBs on effective functioning of the IS departments. To shed light into this study's benefits, we discuss our findings in more detail.

6 Discussion and Implications

6.1 Discussion on the Consequences of IS-specific OCBs

We drew on the IS literature to conceptually identify OCB examples in IS departments and across organizations. IS helping, knowledge-sharing and initiative-taking behaviors constitute IS-specific OCBs that IS professionals perform to assist and share technical knowledge with their IS and non-IS colleagues and to take the initiative to anticipate additional requirements. The way in which IS-specific OCBs manifest across an organization alludes to an informal communication setting with these behaviors' recipients that helps them with IT updates and issues, share "know-how" and "know-why" knowledge, and provide valuable and innovative suggestions and feedback. In reviewing the literature on IS-specific OCBs, we found that few studies have analyzed these behaviors' consequences. Therefore, we empirically examined the effect that IS-specific OCBs have on IS department effectiveness. In doing so, we assessed the effect that IS-specific OCBs at the individual and unit levels have on unit-level IS system quality, service quality, and information quality.

Our findings demonstrate that IS professionals who direct IS-specific OCBs towards their IS and non-IS colleagues improve how effective their colleagues perceive the IS department in terms of the quality of its

systems, services, and information. They also demonstrate that unit-level IS-specific OCBs have a slightly greater impact on perceived information systems quality than IS-specific OCBs have on perceived IS service and information quality at both the individual and unit levels. These findings imply that IS departments should direct IS-specific OCBs towards distinct business departments so that business employees will likely perceive that the designed and developed IS systems streamline their task accomplishment, improve their communication and knowledge sharing with external constituencies, improve business operations efficiency, facilitate knowledge assimilation and dissemination, and contribute to innovation and collective group learning.

In addition to these perceived IS system characteristics, we also found that IS-specific OCBs that IS departments exhibit helps business employees perceive their IS systems as reliable, accessible, easy to use and learn, well integrated, and responsive to changing needs. In contrast, we found that business employees perceive IS-specific OCBs at the individual level to have a stronger impact on the service quality and information quality than unit-level IS-specific OCBs. Thus, we found that IS professionals who individually engage in different IS-specific OCBs make business employees perceive the IS services they deliver as responsive and flexible and that the IS professionals possess sufficient soft and hard skills to deliver services (e.g., conducting effective informal and formal training). Furthermore, we found that business employees perceive the shared information to become accessible, flexible, useful, reliable, presentational, and understandable if their IS professionals perform such IS-specific OCBs.

6.2 Implications for Theory

This study has three main theoretical contributions. First, we offer evidence that informal communication and knowledge-sharing mechanisms forge effective social linkages between IS departments and business units. We expand existing knowledge by demonstrating that the additional assistance and support that IS professionals provide improves the extent to which business employees perceive systems, information, and services as the essential elements that influence IS units' effectiveness. IS-specific OCBs assist IS departments facing myriad complexities to make the best use of today's digital technologies (Hsu et al., 2018; Vithayathil, 2018). For example, cloud vendors and organizations often have asymmetric objectives, which results in low-quality and unreliable cloud services (Choudhary & Vithayathil, 2013). Even though cloud vendors provide organizations with application programming interfaces (APIs) for further in-house customization, organizations still face being locked-in, incurring high switching costs to shift to other vendors, and having insufficient APIs for advanced business analytics or other value-added services (Choudhary & Vithayathil, 2013). These complexities arise from insufficient communication and knowledge sharing between IS and business units, which detract from IS departments' effectiveness and imposes increasing costs to enhance quality (Vithayathil, 2018). IS-specific OCBs that IS departments exhibit at individual or unit levels can be, however, seen as solutions to address these problems. IS-specific OCBs broaden IS professionals' current roles, such as 1) when IS units acquire business-specific needs and feature value-added services in more proactive ways and 2) when IS professionals effectively familiarize themselves with their organizations' competitive environment, market and product positioning, and strategies, which can lead to more effective IS department outputs.

Second, many studies have explored the effect that OCBs have on unit or organizational-level outcomes (e.g., organizational effectiveness, customer satisfaction, or unit-level turnover) in marketing or financial contexts (Podsakoff et al., 2009). However, few researchers have examined this effect in the IS field (Hsu et al., 2015; Yen et al., 2015, Yoon, 2009). We developed and evaluated a multilevel research model to more broadly understand the effect that individual and unit-level OCBs have on unit-level organizational outcomes in the IS context. Our findings contribute to the literature on the impact that OCBs have on subjective overall group/team/department effectiveness by measuring OCBs in distinct IS groups/teams/departments. Consequently, the results that we derived from the framework provide support for the theory that IS-specific OCBs significantly determine IS department effectiveness. Indeed, this research portrays social influence processes as informal activities that IS professionals carry out to assist their IS and non-IS colleagues, which results in business employees perceiving that they receive good quality technical and non-technical services, shared information, and IS systems. The findings highlight the value that multilevel approaches offer in demonstrating how IS-specific OCBs at individual and unit levels expand informal interaction from in IS departments to between departments, which jointly provide a deep insight into how IS departments function effectively.

Several IS scholars have used the distinct dimensions in Delone and McLean's IS success model to measure IS functions' effective outputs and individual and organizational impacts (Chang & King, 2005;

Laumber et al., 2017; Nelson, Todd, & Wixom, 2005). Chang and King's (2005) IS functional scorecard, which draws on the predictors of Delone and McLean's IS success model, is a comprehensive instrument for evaluating IS departments' activities. Although Chang and King (2005) used a fairly large sample size in their study and their sample exhibited relatively acceptable validity and reliability, some subconstructs in their instrument, such as IS training and flexibility, exhibited marginal reliability and validity. Despite that, we retained all items for this study to maintain theoretical consistency. While our study provides further empirical support for researchers who intend to use the IS functional scorecard for measuring IS departments' performance, we would encourage future scholars to review it to incorporate aspects of IS department effectiveness that have arisen more recently (i.e., after 2005), especially since IS departments today often have advisory and facilitation roles in addition to a service role.

Third, IS-specific OCBs can be distinguished from OCBs in at least two specific ways: 1) IS professionals are referents of IS-specific OCBs; and 2) non-IS and IS colleagues are recipients of IS-specific OCBs. IS professionals disseminate IT-related knowledge, hands-on training, and personalized information beyond the call of their duty to their business and IS peers. IS professionals span various business departments and enhance both their IS and non-IS colleagues' IT competence. With this study, we strengthen our knowledge about IS professionals' OCBs as enabling IT-business alignment: IS professionals display IS-specific OCBs to perform their roles in making technical and non-technical knowledge flow more effectively around and across organizations. In doing so, they increase cross-domain knowledge, which, in turn, influences IS department effectiveness because they externalize knowledge around how crucial IS activities should occur (Zolper, Beimborn, & Weitzel, 2013).

Also, after exploring the different types of OCBs that IS professionals perform, we defined IS-specific OCBs and drew on the IS literature to conceptually describe OCB examples that occurred in IS departments and across organizations. For instance, IS helping and knowledge-sharing behaviors exemplify helping behaviors (e.g., altruism, courtesy, peacekeeping, and cheerleading), while initiative-taking behaviors resemble the OCB's civic virtue and sportsmanship aspects. Organ (1997) stressed that one should consider OCBs across jobs, not the roles that leaders discuss with their subordinates. In the IS field, these behaviors can be in-role or extra-role behaviors depending on the IS professionals' job description (Cui, 2017). For example, the extra time and effort that software developers expend on redocumenting legacy systems, refactoring their architecture, or translating programs to a modern programming language can be either in-role or extra-role behaviors depending on whether or not one's enforceable job contract includes these activities.

6.3 Implications for Practice

Whether the IS function succeeds depends on the alignment between IS and business employees in terms of IS impact on the business' strategic direction, operations, and its relationships with business units. Our results point to the need to create scenarios to encourage IS-specific OCBs to frequently occur between IS professionals and business employees, which will reduce miscommunication; increase shared knowledge; and provide more effective systems, IS services, and information for business units. Broadly, the goal should shift away from conceptualizing "IT-business alignment" as a rigid, structured activity (Bassellier & Benbasat, 2004) toward a more organic, free-flowing process throughout the organization.

The IS-specific OCB model that we propose provides new ways to express Bassellier and Benbasat's (2004) recommendation for IS professionals to enhance their organization-specific knowledge, expand their network with business users, and improve their interpersonal communication, leadership, and other soft skills. When IS-specific OCBs occur, IS professionals have the opportunity to develop essential soft skills by communicating with their non-IS colleagues when gathering relevant knowledge about the company, the industry, and associated functional business processes (Gallagher et al., 2010; Joseph et al., 2010; Teo & Ang, 2001). Through these behaviors, IS professionals expand their knowledge about how business processes operate and how they can be improved using IT-related solutions and delivering appropriate systems (Gallagher et al., 2010; Sawyer, 2004). IS professionals who display IS-specific OCBs are likely to boost their IS department's reputation, where trust and confidence is built between business units and IS departments (Nelson & Cooprider, 1996; Sledgianowski & Luftman, 2005), which will streamline coordinating, negotiating and managing activities and expectations regarding system requirements, project deadlines and delivery dates (Gallagher et al., 2010). The presence of IS-specific OCBs across organizations improves our understanding of what social aspects of IS-business alignment mean at the individual and unit levels and how they can affect the contributions of IS professionals to a business, such as sustaining a competitive advantage (Bassellier et al., 2001; Bassellier & Benbasat,

2004), improving the quality of knowledge brokering and IT boundary spanning activities (Pawlowski & Robey, 2004), enhancing the likelihood of IS project implementation success (Bassellier et al., 2001; Curtis et al., 1988; Keil, Lee, & Deng, 2013; Skulmoski & Hartman, 2010; Walz et al., 1993) and enhancing knowledge sharing in the use of IT-enabled work systems (Jasperson et al., 2005).

IS-specific OCBs lead to more effective and flexible social linkages between IS units and their business units. Also, exhibiting these behaviors prevents firms from falling in a rigidity trap due to overbearing formal alignment processes, which results in more effective IS units. IS-specific OCBs are supplementary activities that complement task-related behaviors. Engaging in IS-specific OCBs means spending additional effort and time beyond their normal role to understand issues so as to offer innovative solutions to business users. Based on our results, IS units should proactively understand business employees' needs, look through sources for business solutions (albeit subtly and proactively), and foresee possible features. Furthermore, we demonstrate that IS professionals should proactively assist business units in running more effective service level agreements (SLA)-related activities with external parties, such as advising business units about better ways to deploy IT resources, planning disaster recovery and backups, and negotiating high-quality services.

By studying the role that IS professionals play in IS function effectiveness, we highlight the need to consider the actions that the various actors in the social context surrounding information systems and their value take. As IS professionals analyze, plan, deploy, maintain or retire systems, their activities can influence the perceptions that business employees have about individual systems and the overall portfolio. Business employees make decisions to invest further time and effort in using outcomes from their IS departments based on whether their organization can provide support beyond encouragement from their managers. Studies that have examined IT value have focused on incorporating such possibilities by using real options analysis (Jasperson et al., 2005). However, this approach, while complex and robust, often incorporates only managers' and business employees' decisions and, thus, ignores the role that IS professionals play. In this paper, we provide evidence that the actions that IS employees take in helping business employees learn strongly influence the long-term value that organizations receive from their IT investment decisions.

6.4 Limitations and Future Research

The present study includes several noteworthy features, consisting of multi-source, multilevel analysis based on international data. As with any research study, this one has several limitations. First, we used a cross-sectional design. Thus, we may have obtained less certain conclusions compared to a longitudinal design that can better demonstrate causality in the relationships between predictor and outcome variables. Second, due to the large sample size we used, our results may inadvertently show statistical significance for meaningfully non-significant means[2]. Finally, we used a convenience sample that the matching design constrained.

Prior researchers have addressed the antecedents of OCB behaviors and how these behaviors can emerge in teams in the non-IS context (Podsakoff et al., 2000). Whether these behaviors occur to a great extent depends on team members' dispositional factors and the quality of the interaction they build with their teammates and leaders (Ilies, Nahrgang, & Morgeson, 2007; Dulebohn, Bommer, Liden, Brouer, & Ferris, 2011). However, as most IS studies have focused only on IS professionals' hard skills, which includes their technical background and competencies, future research should examine how organizations can encourage IS-specific OCBs via ensuring specific personality combinations among IS professionals and that the personalities contribute to high-quality interactions in IS departments. Future research may hypothesize that particular personalities have a higher chance to facilitate quality interactions in IS departments and that a right mix of their technical skills and personalities can possibly improve the likelihood that IS-specific OCBs will emerge (Caligiuri, 2000; Lounsbury, Moffitt, Gibson, Drost, & Stevens, 2007) and, thus, desired outcomes from IS departments.

While we investigate the positive effect of IS-specific OCBs, IS scholars should also undertake further research on the possible "dark side" of IS-specific OCBs. IS professionals may possibly perform more OCBs and overlook their own task performance (Deng & Wang, 2014). Performing the discretionary behaviors that we detail in this paper may also have detrimental effects on individuals in terms of their progress towards their work goals (Koopman, Lanaj, & Scott, 2016), their long-term career development,

[2] We thank the associate editor for this comment.

and their task performance (Rapp, Bachrach, & Rapp, 2013; Rubin, Dierdorff, & Bachrach, 2013). Future researchers could examine how IS professionals make trade–offs between benefits and costs when deciding whether or to what extent they should carry out IS-specific OCBs. To discover the differences in motivations, self-interest, and decision-making processes that IS professionals have in distinct situations, we recommend that scholars conduct qualitative studies. Also, future research should incorporate mediating and moderating mechanisms to explain the impact that OCBs have on organizational effectiveness (Podsakoff et al., 2000, 2014). As few studies have investigated these relationships, future research should pay more attention to the theoretical mechanisms that underlie how and why OCBs influence unit-level organizational outcomes.

Technology has transformed employees' traditional workplaces into virtual workplaces where employees interact with each other through information and communication technology. We do not know whether IS professionals can provide the support that the IS function needs to function effectively. IS researchers have suggested online IT helping behaviors as part of IS-specific OCB (Lee & Lee, 2010), and future researchers could examine how the location (local/distant) and type (online/face-to-face) of IS-specific OCB affect IS function effectiveness or other relevant outcomes.

The shift towards IT outsourcing and the growth in cloud-based system use represent other relevant environmental changes in this context. These changes indicate that organizations rely more on vendors for supporting their internal IT systems, which has led to fewer IS professionals working in organizations in roles such as infrastructure management, technology deployment, application development, and maintenance (Bailey & Becker, 2014). This shift toward external rather than internal sources has ramifications for the model we propose in this paper because most of the interaction between internal users and IS professionals that vendors employ occurs in formal channels (Sultan, 2010), which limits the scope discretionary behaviors to occur. Moreover, as vendor-employed IS professionals have limited incentives to engage in IS-specific OCB, they would likely not have enough commitment to target organizations. Therefore, they would probably know less about target organizations' organizational strategy, structure, and culture to maximize the value of their IT investments. Therefore, future researchers could consider whether our model applies to contexts where external IT support for users has a more dominant role. For example, researchers could examine what other knowledge and skill sources users rely on in such situations and whether they would attempt to build deeper bonds with vendor-employed IS staff to establish a channel they could rely on when faced with uncertain situations. Furthermore, we do not know whether externally sourced IS professionals affect internal IS staff members' morale, commitment, and satisfaction. The IS professionals who remain in an organization after it has shifted to a cloud computing environment or outsourced the majority of its IS functions may have little motivation to display IS-specific OCBs towards their users. As such, a negative spiral may occur in that poor IS-business relationships would reduce the perceived usefulness of IS investments, which would further engender a move towards using IS vendors. Researchers should study how IS-specific OCB occurs among the IS professionals who remain in such organizations and whether the newly appointed external IS professionals view such discretionary behaviors as part of the service they provide.

7 Conclusion

In this study (among the few to focus on OCBs in the IS context), we examine IS-specific OCBs that underlie the factors that contribute to an effective IS department. We took a multilevel approach to analyze the effect that individual-level and unit-level IS-specific OCBs have on IS departments' effectiveness. We adopted a methodologically robust approach by collecting responses from both business and IS employees and creating a matched sample from each participating organization to use in multilevel SEM, which offers greater understandability than regression-basis analysis methods. We comprehensively reviewed the IS literature and theories from management literature to develop a multilevel conceptual research model along with six research hypotheses. We found support for all six hypotheses at the unit-level and cross-level. The research model tested the consequences of IS-specific OCBs and the findings reflect that IS-specific OCBs enhance IS departments' effectiveness (i.e., the quality of the systems, information, and services that they provide).

Importantly, the findings indicate that unit-level IS-specific OCBs have a slightly greater impact on perceived information systems quality than IS-specific OCBs have on perceived IS service and information quality at both the individual and unit levels. In contrast, the findings reveal that individual-level IS-specific OCBs have a greater impact on perceived quality of services and information quality than unit-level IS-specific OCBs have on perceived IS service and information quality. For years, IS and business

managers have been interested in finding out solutions to enhance social interactions between IS professionals and business employees to help IS professionals acquire business-related knowledge and business employees expand their technical capacity. By translating generic OCBs into IS-specific OCBs, this study provides detailed guidance to organizational human resource and IS managers to provide more concrete content to training for enhanced OCB behavior generation, which will lead to delivering effective outcomes for IS departments and enhancing business employees' learning.

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Appendix A: OCBs in the IS Context

Table A1. OCBs in the IS Context

OCB categories	Definitions and consequences	Explanations and examples
Customer-oriented OCB (Deng et al., 2015)	Discretionary behaviors that IS personnel perform in serving business users' interests and needs that the latter do not explicitly requested, which results in an ERP system success.	• Provide business users with extra hands-on training on technical features (e.g., how to process a purchase order in the SAP system). • Offer additional system-related information that can be useful later (e.g., updating payment rates and the consequences of doing this for payroll). • Offer explanations and additional information on why problems arise or on the status of problem resolutions (e.g., receiving recurring error messages and how to fix them). • Provide personalized information and solutions tailored to business users' business processes and data (e.g., assisting business users with data discrepancies between their ERP system and the business intelligence application). • Develop workaround solutions tailored to the technical features that users employ (e.g., finding out features that the HR/payroll system does not contain).
Customer-oriented OCB (Deng & Wang, 2014)	Supportive activities that do not constitute an explicit part of IS workers' job description, not something that an organization trains its IS workers to do, and not of behaviors formally and explicitly rewarded when exhibited or punished when not. These activities provide an insight into managing IT support and IT workforce during the post-implementation stage.	Help business employees with information requests (e.g., helping them to use the system to check the status of a purchasing order) and with diagnosing problems/causes and creating solutions (e.g., helping business users resolve their system usage problems, troubleshooting the problematic incidents, developing solutions, and communicating the results to business users). Taking initiative involves a sequence of activities to ensure that business users fully understand how to use the embedded functions in a system to accomplish their tasks (e.g., the detailed procedures in locating and displaying payment requests in a supplier relationship management system).
Information security policy-related OCB (Hsu et al., 2015)	How well IS employees perform altruistic behaviors not specified in information security policies and how well they voice their opinions and suggestions to benefit their work group. Unit-level altruistic behaviors improve an organization's information security policy effectiveness.	Making innovative suggestions, informally training other employees on the need to avoid leaking information leakage that might happen if they fail to log out after accessing their email accounts on public computers, or helping other employees in the work group learn about security policies to improve department' overall security level.

Table A1. OCBs in the IS Context

Service-oriented OCB (Yen et al., 2015)	Behaviors that internal IS professionals direct towards business employees to describe the support and services that business employees need to use the systems in an organization. These behaviors improve the quality of systems and information that they produce through nourishing and fostering business employees to loyally use an ERP system.	• Promoting the IS department to business employees (e.g., defending the IS department when other IS or non-IS employees criticize it). • The extent to which IS employees respect organizational rules and regulations, punctually attend their job, take responsibility for organizational resources, and are aware of delivering high-quality work to business employees. • Performing specific tasks beyond the call of duty (e.g., performing job duties with unusually few errors and extra-special care). • Going well beyond minimally required attendance levels, being punctual, conserving resources, or performing related matters of internal maintenance (e.g., returns phone calls and responding to business employees' messages and requests promptly). • Responsible, constructive involvement in the organization's political process (e.g., sharing ideas and views about an ERP system with business employees). • Communicating with IS peers and business employees in the workplace to improve individual and group performance (e.g., motivating IS peers and business employees to express their ideas and opinions and frequently communicate with them on how the group can improve).
Service-oriented OCB Yen et al. (2008)	Behaviors that IS teams direct towards units to create an organization's integration climate and improve IS projects management and, thus, successful system implementations.	• Helping users to adapt a new system and assisting them with work-related problems during the system implementation process • Voluntarily communicating and coordinating with users during system implementation process • Bringing up valuable and innovative suggestions about the system • Keeping up with any environmental changes that might affect the information system's progress • willingly tolerating inconveniences and work turmoil during system implementations without complaints • Maintaining a positive attitude even when things related to the information system do not seem to meet the IS team's interests • Willing to sacrifice the team's own benefit to ensure the system implementation succeeds.
Service-oriented OCB (Yoon, 2009)	IS professionals display certain behaviors, such as altruism, conscientiousness, courtesy, civic virtue, and sportsmanship to promote ERP system success.	• Supporting business employees who are not familiar with an ERP system. • Completing ERP system-related work even though after business hours. • Being cautious to avoid problems with my IS peers in developing an ERP system • Keeping up with the policy and business strategy of the organization. • Not complaining about business processes that seem unfair to me.

Table A1. OCBs in the IS Context

OCB-knowledge workers (Dekas et al., 2013)	Behaviors that are exhibited by knowledge workers working at Google and are necessary for success in the new world of work, especially in high-technology industries.	• Employee sustainability entails knowledge workers participating in activities that maintain and improve one's own health and wellbeing, or that support others' efforts to maintain their health and wellbeing (e.g., makes others feel comfortable to be themselves at work). • Social participation includes participating in social activities during the workday that do not directly relate to core job tasks (e.g., get to know each other on a personal basis). • Civic virtue includes knowledge workers taking part in Google-sponsored knowledge-sharing opportunities, such as talks and training courses. • Voice entails behaviors encouraging the group of knowledge workers to voice their opinions regarding issues that affect the group). • Helping includes behaviors that knowledge workers exhibit to help their coworkers with work-related issues or problems or preventing work-related problems from occurring (e.g., members, for example, to write a macro). • Knowledge sharing involves behaviors that prompt knowledge workers to share knowledge or expertise with others (e.g., conversing with non-engineers to explain engineering topics or teaching software to others). • Individual initiative includes engaging in task-related behaviors beyond what minimal requirements or general expectations (e.g., cleaning up existing codes) • Administrative behaviors encompass all behaviors that pertain to planning, organizing, controlling, or supervising any aspect of the organization's operations and mission and maintaining work-related resources (e.g., taking care about "event" details that would otherwise go undone).

Appendix B: Data Collection and Sample Demographics

We used a convenience sample. We selected banks from the CIO 100 list of top IT users (see http://www.cio100.com, http://www.cio.co.nz/cio100nz/, and http://www.cio.co.uk/cio100/). We approached banks on this list to see if they would support our study by contacting their senior IT managers. We also identified and contracted several bank CEOs and CIOs through LinkedIn. We sent invitation letters to them via email to solicit their participation. We contacted around 230 bank and insurance CEOs, CIOs, and CTOs in different countries, such as the United Kingdom (UK), Canada, Australia, New Zealand, Singapore, India, Malaysia, Pakistan, Thailand, Dubai, South Korea, Vietnam, and so on. Once they had agreed to participate in an online survey (hosted on qualtrics.com), we sent a link to the survey to a senior IS representative at each bank through email so that they could inform their IS and business staff about the project and survey. Although we received 25 responses from Singaporean banking IS professionals, we excluded them from the data set as their non-IS colleagues did not send any completed responses. We also approached senior business or IT managers of New Zealand and Iranian banks and insurance companies in person, and some agreed to distribute paper surveys to their IS and business employees. We also provided them with some example OCB behaviors such as “walking your IS or non-IS peers through a system or helping your IS peers implement a function or procedure in C# or Java”, “sharing a database that you have already created with your IS peers”, or “effectively interacting with business managers and teams to fully understand their problems and putting forward the best IT solutions”. In both methods (online and pen-and-paper survey), we informed all employees that they participated in the research on a voluntary basis and that we would keep their responses confidential.

We illustrate IS sample’s demographics in Table B1. We can see that the sample had more males (59.2%) than females (40.8%). The largest age group was between 30 and 40 years old (53.7%), twice as many as the number of IS respondents (26.5%t) aged between 20 and 30 years old. The remaining IS respondents were middle-aged (15.7%) and seniors above 50 (4.2%). Around 41.8 percent of the IS employees had between five and 10 years of work experience with their current organizations. Other IS respondents had almost two years (15.9%), between two and five years (24.2%), and more than 10 years (18.1%) of work experience.

Table B1. IS Sample Demographics

Gender	Frequency	Percentage	Valid percentage
Male	313	59.2	59.2
Female	216	40.8	40.8
Total	529	100.0	100.0
Age			
20-30	140	26.5	26.5
30-40	284	53.7	53.7
40-50	83	15.7	15.7
50+	22	4.2	4.2
Total	529	100.0	100.0
Tenure			
Almost two years	84	15.9	15.9
Between two and five years	128	24.2	24.2
Between five and 10 years	221	41.8	41.8
More than 10 years	96	18.1	18.1
Total	529	100.0	100.0

We illustrate the non-IS (business) sample’s demographics in Table B2. This sample also had more males (52.7%) than females (46.7%), and around half of them were between 30 to 40 year old. Around two thirds of the non-IS employees worked for between two to five years with their organization (62.1%). Business employees who had almost two years or between five to 10 years of tenure constituted almost the same percentage. Business employees with an organizational tenure above 10 years constituted the smallest cohort (7.8%).

Table B2. Non-IS (Business) Sample Demographics

Gender	Frequency	Percentage	Valid percentage[3]
Female	519	46.7	47.0
Male	586	52.7	53.0
Total	1105	99.4	100.0
Missing	7	0.6	
Total	1112	100.0	
Age			
20-30	236	21.2	21.3
30-40	510	45.9	46.0
40-50	308	27.7	27.8
50+	54	4.9	4.9
Total	1108	99.6	100.0
Missing	4	0.4	
Updated total	1112	100.0	
Tenure			
Almost two years	170	15.3	15.3
Between two and five years	690	62.1	62.1
Between five and 10 years	165	14.8	14.8
More than 10 years	87	7.8	7.8
Total	1112	100.0	100.0

[3] The valid percentage column demonstrates percentages after we removed missing data.

Appendix C: Measurement Scales

Table C1. Measurement Scales: Independent Variables

Individual-level organizational citizenship behaviors (OCB) (based on Podsakoff et al. 1990) (scale range: 1 = strongly disagree, 7 = strongly agree)
Altruism
As an IS/IT professional, I…
Help other IS/IT peers who have been absent.
Help other IS/IT peers who have heavy work loads
Help orient new IS/IT peers even through it is not required.
Willingly help other IS/IT peers who have work related problems.
Am always ready to lend a helping hand to those around me.
Courtesy
As an IS/IT professional, I…
Take steps to try to prevent problems with other IS/IT workers.
Am mindful of how my behavior affects other people's jobs.
Do not abuse the rights of others.
Try to avoid creating problems for IS peers.
Consider the impact of my actions on IS peers.
Civic virtue
As an IS/IT professional, I…
Attend meetings that are not mandatory, but are considered important.
Attend functions that are not required, but help the company image.
Keep abreast of changes in the organization. (or, keeping up with changes)
Read and keep up with organization announcements, memos, and so on.
Sportsmanship
As an IS/IT professional, I…
Consume a lot of time complaining about trivial matters. ®
Always focus on what's wrong, rather than the positive side. ®
Tend to make "mountains out of molehills". (or, blowing problems out of proportion). ®
Always find fault with what the organization or IS department is doing. ®
Am the classic "squeaky wheel" that always needs greasing. (or, complaining about things). ®
Conscientiousness
As an IS/IT professional, I…
Attend at work, which is above the norm.
Do not take extra breaks.
Obey company rules and regulations even when no one is watching.
Am one of the most conscientious employees.
Believe in giving an honest day's work for an honest day's pay.
Unit-level organizational citizenship behaviors (OCB) (based on Podsakoff et al. 1997) (scale range: 1 = strongly disagree; 7 = strongly agree)
Helping behaviors
Information systems professionals…
Help bank employees out if they fall behind in their work.
Willingly share their expertise with bank employees from other departments.
Try to act like peacemakers when other bank employees have disagreements.

Table C1. Measurement Scales: Independent Variables

Take steps to try to prevent problems with bank employees.
Willingly give of their time to help bank employees who have work-related problems.
Touch base with bank employees before initiating actions that might affect them.
Encourage bank employees when they are down.
Civic virtue
Information systems professionals…
Provide constructive suggestions about how bank employees can improve their effectiveness.
Are willing to risk disapproval to express their beliefs about what's best for the organization.
Attend and actively participate in team meetings.
Sportsmanship
Information systems professionals…
Always focus on what is wrong with our situation, rather than the positive side. ®
Consume a lot of time complaining about trivial matters. ®
Always find fault with what bank employees are doing. ®
® Indicates reverse-coded item.

Table C1. Measurement Scales: Dependent Variables

Information quality (Chang & King, 2005) (scale range: 1 = hardly at all; 5 = to a great extent. If a statement is not applicable, circle 0.)
Intrinsic quality of information
Interpretable
Understandable
Complete
Clear
Concise
Accurate
Secure
Contextual quality of information
Important
Relevant
Usable
Presentational quality of information
Well organized
Well defined
Accessibility of information
Available
Accessible
Up-to-date
Received in a timely manner
Reliability of information
Reliable
Verifiable
Believable
Unbiased

Table C1. Measurement Scales: Dependent Variables

Flexibility of information
Can be easily compared to past information
Can be easily maintained
Can be easily changed
Can be easily integrated
Can be easily updated
Can be used for multiple purposes
Meets all your requirement
Usefulness of information
The amount of information is adequate.
It is easy to identify errors in information.
It helps you discover new opportunities to serve customers.
It is useful for defining problems.
It is useful for making decisions.
It improves your efficiency.
It improves your effectiveness.
It gives your company a competitive edge.
It is useful for identifying problems.
Service quality (Chang & King, 2005)
IS training
The training programs offered by the information systems/technology (IS/IT) department are useful.
The variety of training programs offered by the IS/IT department is sufficient.
The IS/IT department's services are cost-effective.
The training programs offered by the IS/IT department are cost-effective.
The IS/IT department's services are valuable.
The IS/IT department's services are helpful.
Responsiveness of services
Does the IS/IT department respond to your service requests in a timely manner?
Does the IS/IT department complete its services in a timely manner?
Is the IS/IT department dependable in providing services?
Does the IS/IT department have your best interest at heart?
Does the IS/IT department give you individual attention?
Flexibility of information
Does the IS/IT department have sufficient capacity to serve all its users?
Can the IS/IT department provide emergency services?
Does the IS/IT department provide a sufficient variety of services?
Does the IS/IT department have sufficient people to provide services?
Does the IS/IT department extend its systems/services to your customers/suppliers?
Intrinsic quality of service provider
Provide services for you promptly.
Are dependable.
Are efficient in performing their services.
Are effective in performing their services.

Table C1. Measurement Scales: Dependent Variables

Have the knowledge and skill to do their job well
Are reliable.
Instill confidence in you.
Are helpful to you.
Solve your problems as if they were their own.
Understand your specific needs.
Are willing to help you.
Help to make you a more knowledgeable computer user.
Interpersonal quality of service provider
Are polite.
Are sincere.
Show respect to you.
Are pleasant to work with.
System quality (Chang & King, 2005)
Impact on job
Make it easier to do your job.
Improve your job performance.
Improve your decisions.
Give you confidence to accomplish your job.
Increase your productivity.
Increase your participation in decisions.
Increase your awareness of job-related information.
Improve the quality of your work product.
Enhance your problem-solving ability.
Impact on external constituencies
Help you manage relationships with external business partners.
Improve customer satisfaction.
Improve customer service.
Enhance information sharing with your customers/suppliers.
Help retain valued customers.
Help you select and qualify desired suppliers.
Impact on internal processes
Speed product delivery.
Help you manage inbound logistics.
Improve management control.
Streamline work processes.
Reduce process costs.
Reduce cycle times.
Impact on knowledge and learning
Provide you information from other areas in the organization.
Facilitate collaborative problem solving.
Facilitate collective group decision making.
Facilitate your learning.

Table C1. Measurement Scales: Dependent Variables

Facilitate collective group learning.
Facilitate knowledge transfer.
Contribute to innovation.
Facilitate knowledge utilization.
Intrinsic systems quality
Do your organization's IS/IT systems have fast response time?
Do your organization's IS/IT systems have minimal downtime?
Are your organization's IS/IT systems well-integrated?
Are your organization's IS/IT systems reliable?
Are your organization's IS/IT systems accessible?
Systems usage characteristics
Do your organization's IS/IT systems meet your expectations?
Are your organization's IS/IT systems cost-effective?
Are your organization's IS/IT systems responsive to meet your changing needs?
Are your organization's IS/IT systems flexible?
Are your organization's IS/IT systems easy to use?
Are your organization's IS/IT systems easy to learn?
Is your company's intranet easy to navigate?
Is it easy to become skillful in using your organization's IS/IT systems?

Appendix D: Recommended Cut-offs of Goodness-of-fit Indexes

Table D1. Recommended Cut-offs of Goodness-of-fit Indexes

Goodness-of-fit Indexes	Recommended cut-offs	
	Reasonable fit	Perfect fit
Chi-square/degrees of freedom	1 ≤ /df ≤3	1≤ /df ≤2
Standardized root mean square residual (SRMR)	0 < SRMR < 0.1	SRMR ≤ 0.08
Incremental fit index (IFI)	IFI ≥ 0.9	IFI ≥ 0.95
Non-normed fit index (NNFI) or Tucker-Lewis index (TLI)	TLI ≥ 0.9	TLI ≥ 0.95
Comparative fit index (CFI)	CFI ≥ 0.9	CFI ≥ 0.95
Root mean square error of approximation (RMSEA)	RMSEA ≤ 0.08 or RMSEA ≤ 0.06	RMSEA ≤ 0.05

Appendix E: Common Method Biases

To examine the extent to which common method biases influence behavioral research results, researchers have recommended appropriate procedural remedies when designing studies and statistical remedies for different types of research settings (Podsakoff et al., 2003; Podsakoff & Organ, 1986). When designing this study, we used several techniques to avoid, for example, social desirability:

1) We psychologically separated the predictor and criterion variable measurements by using a cover story that we present in Table E1. We used remedies for factors that might decrease respondents' motivation to respond to questions accurately in the cover story. We communicated to respondents through the cover story in order to increase their motivation and psychological reactance that exert cognitive effort of information retrieval and avoid social desirability bias. They were asked to share their thoughts, and informed on how valuable their opinions are, how their feedbacks are highly required for this study, how accurate responses provide an insight into this research, and how their responses are determinant and beneficial to them.
2) We protected respondent anonymity and reduced evaluation apprehension by assuring respondents that their answers would remain anonymous and that no wrong or right answers existed. We asked respondents to answer questions as honestly as possible and solicited their participation by promising rewards rather than threatening punishment.
3) We avoided using vague concepts, "double-barreled" questions and complicated syntax in the scales. We tried to keep questions more simple, specific, and concise.

Table E1. Procedural Remedies for Unit-level Part of the Research Model

Separation statements in the questionnaire	Comments
The goal of this study is to investigate the effect of interaction between IS/IT professionals and their non-IS colleagues on the effectiveness of IS/IT departments in global banks or any universal financial institutes.	Used before questions
Completion of the questionnaire affirms your **consent and willingness** to participate in this **survey.** All information will be kept **confidential and anonymous**. Information gathered will be used only for academic purposes.	Used before questions
A drawing will be held where two respondents will win a prize of a gift card (2x$100)	Used before questions
Please read through each statement carefully and select the response that best describes you. There are no right or wrong answer.	Used before questions
Do not spend too much time on any one question. Usually your first reaction to each statement is a good guide.	Used before questions
The results of this study will be useful for IS departments in delivering the quality of IS services, system, and information to other departments. So, your accurate answers will affect the results of this study.	Used before questions
The next section focuses on the effect of being a good corporate citizen on the performance of your organization.	Used before unit-level OCB
You are halfway through the survey… Thank YOU for your patience as the results of this research are important to the future of your organization.	Used between information and system construct because the measures had similar anchor points and to motivate respondents as it was a lengthy questionnaire.
You have almost finished 90 percent of the survey… Thank you for helping in this non-profit research. Only the quality of service remains in the next questions…Thank YOU!! For helping us better understand the services that must be delivered to you!!	Used between system and service construct because the measures had similar anchor points and to motivate respondents as it was a lengthy questionnaire.

We performed statistical remedies that Podsakoff et al. (2003) recommend. Recent IS papers, such as Ayyagari et al. (2011), have also performed these remedies. Harman's single-factor test constitutes one of the most widely used statistic tests in IS research. The Harman's single-factor test in an unrotated factor

solution indicated 25.64 percent variance. Since this value did not exceed 50 percent, it reflected that no dominant single factor explained significant covariance among variables. As Harman's single-factor test is a diagnostic technique and rarely provides evidence that measures lack common method bias, we modeled an unmeasured latent method factor that Podsakoff et al. (2003) recommend to control for any systematic variance among the items (observed variables) that was independent of the variance among the constructs (latent variables). We added the latent method factor to the measurement model and drew connections between the latent method factor and each observed variable to measure common method variance bias. As the square of all measurement factor loadings on the latent common variance factor indicates the percentage of the amount of the common method variance bias (Williams, Cote, & Buckley, 1989), the result showed a value of 45 percent, which exceeds the commonly accepted percentage for common method bias variance (i.e., 25%) (Williams et al., 1989). Thus, in order to identify the effect of common method bias variance, we analyzed the difference between CFIs of the measurement model with and without the latent common factor and then retained the latent common factor in the structural model to avoid inflated or deflated coefficient estimates (β) (Podsakoff et al., 2003). To do so, we tested the measurement model twice. First, we tested the unconstrained measurement model in terms of how the model fit the data (Model A). Second, we built the constrained measurement model by adding the latent method factor (Model B). Significant method bias would have existed if the constrained model (Model B) fit the data significantly better than the unconstrained model (Model A) (Widaman, 1985; Williams et al., 1989). Thus, if introducing a latent method factor improved the model fit, common method bias would have accounted for most of the covariance observed in the variables. We present the results from these two tests in Table E2.

Table E2. Method Bias Test

Model	Chi-square	CFI	RMSEA	Comments
Model A: All Items load on respective factors	11270.740 with 4996 df	0.912	0.034	Significant method bias exists if Model B fits significantly better then Model A (Widaman, 1985). The null hypothesis of common method bias variance should not be rejected if the difference between CFIs (ΔCFI) is less than 0.05 or 0.01, which indicates the lack of method bias (Cheung & Rensvold, 2002; Little, 1997).
Model B: all items load on respective factors and also a latent method factor	11157.718 with 4999 df	0.913	0.033	

The results in Table 6 show that the ratio of chi-square difference per single degree of freedom was less than 3 and the difference in CFIswas0.00, less than the recommended values 0.05 (Little, 1997) and 0.01 (Cheung & Rensvold, 2002). These results provide support that common method bias did not pose a severe validity threat to the study.

Appendix F: Control Variables

We tested gender, age, and tenure as controls for the three outcome variables (i.e., system quality, information quality, and service quality). The results (see Figure 3) show that only gender had a positive and significant relationship with service (P = 0.016) and information quality (P = 0.010), while the correlation between gender and system quality was not significant (β = 0.026, P > 0.05). However, we found a weak relationship between gender and service (β = 0.070) and information quality (β = 0.090). Regarding gender differences, we found that females had a slightly less weak relationship than males with system quality, information quality, and service quality. Thus, we can interpret these findings as indicating that females perceived IS unit to produce higher quality outputs when they had additional support from IS professionals. Age had a positive and significant relationship with system quality (β = 0.036, P = 0.020), information quality (β = 0.025, P = 0.039), and service quality (β = 0.035, P = 0.024), although the results showed an extremely weak relationship between these variables. Further analysis on different age categories (see Appendix B, Table B1 and B2) showed that elderly business employees who received IS-specific behaviors from IS professionals were more satisfied with IS units' outputs than younger counterparts. Tenure was also positively and significantly associated with service (P = 0.004) and information quality (P = 0.008), while the correlation between tenure and system quality was negative and insignificant (β = -0.026, P = 0.351). However, the correlation between tenure and service (β = 0.084) and information quality (β = 0.079) indicated a weak relationship between these variables. Since tenure was a categorical variable (see Appendix B, Table B1 and B2), further analysis indicated that those business employees who had been with an organization for less than 10 years rated IS units for the quality of their outputs higher than those counterparts who had been with the organization for more than 10 years.

Appendix G: Group Reliability Indexes

The r_{wg} value indicates estimated inter-rater reliability for a single class. The individual-level data are IS professionals' mean scores on items that measure IS-specific OCBs for a single IS team. The ICC1 compares between-group variance against within-group variance to reveal the ratio of variance in the IS professionals' responses accounted for the between-group difference. The ICC2 reflects the reliability of the group-level means between IS teams.

Table G1. Group Reliability Indexes

Variable	r_{wg}	ICC1	ICC2
Altruism (F= 3.07, p-value = 0.000)	0.92	0.11	0.67
Courtesy (F= 2.94, p-value = 0.000)	0.91	0.11	0.66
Civic virtue (F= 2.36, p-value = 0.000)	0.90	0.08	0.58
Sportsmanship (F= 2.34, p-value = 0.000)	0.91	0.07	0.57
Conscientiousness (F= 2.94, p-value = 0.000)	0.92	0.11	0.66
Note: n = 529, within-group agreement index (r_{wg}), intra-class correlation (ICC).			

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