

# Causal Model for Predicting Knowledge Sharing via ICTs

*Research-in-Progress*

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## Abstract

Research has identified numerous constructs impacting employees' use of information and communication technologies (ICTs) for the purposes of knowledge seeking and knowledge contributing. Presently, there is a significant gap in the literature that examines factors that contribute to the most commonly accepted barriers to knowledge sharing and how these factors impact organizational knowledge management practices. This research examines three knowledge sharing barriers (lack of time, poor communications skills, and lack of trust) and proposes three shared contributing factors among them (role conflict, role ambiguity, and locus of control) and a moderator (ICT). A theoretical model is presented to explain the causal relationships between the contributors and ICT users' knowledge seeking and knowledge contributing behaviors.

## Keywords

ICT, knowledge seeking, knowledge contributing, knowledge sharing, knowledge barriers

## Introduction

Avoiding repetition of mistakes by relying on the use of previously acquired knowledge has been a key knowledge management goal of organizations (Hanisch et al. 2009). The existence of organizational procedures to share knowledge however, does not guarantee knowledge sharing. A survey of 522 professionals indicated that while 62.4% of the organizations have formal procedures for documenting experiential knowledge, 89.3% are not sharing knowledge (Williams 2008). This lack of adherence to procedures for knowledge documentation and the existence of a variety of other knowledge contribution barriers inhibit knowledge management practices in organizations. As a result, novices fail to learn from experienced professionals and repeat historical mistakes.

The work force is in the process of significant change; estimates indicate that 3.6 million "baby boomers" will leave by 2020 (Toossi 2012). With their departure, valuable knowledge that has been accumulated over many years will disappear. This issue is especially critical in the information systems area where it is common for organizations to not keep archives of accumulated experience, best practices, and valuable positive or negative work insights. For example, approximately 66% of information technology endeavors fail as a result of inexperienced staff (StandishGroup 2011).

Organizations have been taking steps to combat loss of knowledge by investing in technologies that help facilitate knowledge transfer. In 2011, US based businesses invested \$289.9 billion on ICTs, a 10.6% increase from 2010 (U.S.Census 2013). ICTs (such as content management systems, knowledge management systems, and social media platforms) provide employees with the ability to capture and share knowledge in the normal flow of their work (Kankanhalli et al. 2005; Rojko et al. 2011). According to some reports, sales of enterprise social networking ICTs had a 259% increase in the first quarter of 2013 (Perez 2013), yet in spite of such enterprise investments, organizations still fail to retain knowledge insights. While extant literature has attributed this failure to a number of organizational and individual barriers to knowledge sharing such as lack of time (Kankanhalli et al. 2005; Santos et al. 2012; Williams 2008), poor communications skills (Cleveland et al. 2013a; Lin et al. 2012; Riege 2005; Santos et al.

2012), and lack of trust (Abrams et al. 2003; He et al. 2009; Jarvenpaa et al. 2008; Offor 2013; Renzl 2008; Ridings et al. 2002; Riege 2005; Rosen et al. 2007; Sun et al. 2005), there is a significant lack of research into what contributors exist for these barriers and how they impact the individuals' willingness to seek or contribute knowledge via ICTs. For example, research shows that role conflict and role ambiguity contribute to the individual's perceived lack of time and resources (Rizzo et al. 1970), while locus of control contributes to poor communication (Flaherty et al. 1998); however, the impacts of role conflict, role ambiguity, or locus of control on promoting an individual's knowledge sharing behaviors via ICTs have not been adequately addressed.

Accordingly, the goal of this paper is to examine potential contributors of the most common barriers to knowledge sharing and to propose a model to test their impact on the individuals' knowledge seeking and knowledge contributing behaviors via ICTs. The following research questions are proposed:

- 1) What are the potential factors that contribute to the commonly accepted barriers to knowledge seeking and knowledge contributing behaviors?
- 2) How do these factors impact the employees' use of ICTs for knowledge seeking and knowledge contributing?

The rest of the paper is structured as follows. First, a literature review is performed to examine the most commonly recognized barriers to knowledge seeking and knowledge contributing in order to extract a shared set of potential factors. Next, a theoretical model is developed to explain the impact of these factors on employees' behaviors to seek and contribute knowledge via ICTs. Finally, future research is proposed.

## **Literature Review**

### ***Knowledge Seeking and Knowledge Contributing Behaviors***

Knowledge sharing is considered an act of dissemination, absorption, and utilization of information for the purposes of integrated learning (Tiwana 2002). It consists of knowledge seekers and knowledge providers who engage in active trading of information for the purpose of fulfilling specific information needs (Ardichvili et al. 2003; Xu et al. 2006b). In this study we followed the Van den Hooff et al. (2004) approach by deconstructing the knowledge sharing practice into two distinct behavioral blocks: knowledge seeking and knowledge contributing behaviors.

A theory that can be applied to explain knowledge seeking behaviors is the information foraging theory proposed by Pirolli et al. (1999). The authors anthropomorphized the valuable information as prey that is often hidden in the environment (e.g. online documentation, books, or people) and argued that the decision to hunt for it depends on whether it can "maximize the rate of gain of information relevant to their task," (Pirolli et al. 1999, p. 646). As a result, seekers will assess information value based on the amount of time and effort it takes to locate it.

To explain knowledge contributing behaviors, Bock et al. (2005) argued that personal beliefs played a key role since contributors who shared expertise with others risked losing competitive advantage, or damage to their reputation. Blau (1964) proposed the social exchange theory to explain such behaviors by arguing that individuals constantly weigh the personal costs and benefits to them). Additionally, work-related characteristics, such as in-role behavior, work and task conflict, decentralization, and work engagement also have been shown to impact knowledge contribution. For example, in a survey among 173 employees at a large US university, Flowers et al. (2010) found that affective commitment (individual's emotional attachment to the organization) and perceived in-role behavior (requirement of the job) were positively related to the extent of knowledge contribution.

Extant literature suggests that ICTs can be used for knowledge sharing by allowing contributors to codify their knowledge and seekers to gain access to that knowledge on demand (Alavi et al. 2001; Hansen et al. 1999). Furthermore, ICTs can serve as a bridge between seekers and contributors for the purpose of

transferring knowledge between communities with shared, context-related practices (Cook et al. 1999; Tsoukas et al. 2001).

### **Barriers to Knowledge Sharing**

Knowledge seeking and knowledge contributing behaviors are contingent upon an individual's ability to overcome a number of knowledge barriers (Sun et al. 2005). In this study, we propose that these barriers are merely symptoms of a set of unexplored factors that impact employees' knowledge sharing behaviors. Table 1 provides an overview of the most common knowledge barriers and outlines the common unexplored factors among them.

### **Lack of Time**

One of the biggest barriers for both contributors and seekers of knowledge in organizations is lack of time (Lin et al. 2008). According to Lin et al. (2012), the lack of time barrier is one that never changes regardless of the knowledge management maturity level of an organization. It is characterized as the employers' unwillingness to devote time and resources for knowledge sharing (Lin et al. 2008), lack of contact time and interaction between knowledge sources and recipients, and lack of time to share knowledge and time to identify colleagues in need of specific knowledge (Riege 2005). Tools available to share knowledge are very time consuming (Santos et al. 2012). For example, in a survey among 522 experienced project managers from the UK, US, and China, 67% attributed lack of employee time as the leading inhibitor to knowledge sharing in their organizations (Williams 2008). Similarly, in a study among 53 top UK civil engineering and construction companies, 68% of the respondents indicated that lack of time attributed to tight schedules and lean organizational structure was a significant barrier to engaging in knowledge sharing (Carrillo et al. 2004). Keegan et al. (2001) analyzed the knowledge management practices of nineteen project-based companies from a variety of industries and interviewed 44 of their members. They found that the key barrier to learning among all organizations operating in "turbulent product market domains" was time pressure. Employees cited lack of time to engage in knowledge sharing meetings and lessons learned reviews since they were often reassigned to new engagements immediately after the completion of their current projects.

<b>Barriers to Knowledge Sharing</b>		<b>Proposed Contributing Factors</b>	
Knowledge Barrier	Supporting Research	Factors	Supporting Research
Lack of Time	Kankanhalli et al. (2005), Santos et al. (2012), Williams (2008)	Role Conflict and Role Ambiguity	Rizzo et al. (1970), Tarafdar et al. (2007), Sales (1970), Noor (2004)
Poor Communication Skills	Santos et al. (2012), Lin et al. (2012), Riege (2005).	Locus of Control	Flaherty et al. (1998), McCroskey et al. (1976), Rubin (1993)
Lack of Trust	Abrams et al. (2003), He et al. (2009), Jarvenpaa and Majchrzak (2008), Renzl (2008), Ridings et al. (2002), Riege (2005), Rosen et al. (2007), Sun and Scott (2005)	Locus of Control	Frost et al. (1978), Carnevale et al. (1992), Butler (1991), April (2012)

**Table 1. Common Knowledge Sharing Barriers and Contributing Factors**

Information systems research suggests that role conflict and role ambiguity impact individual perceptions of time pressure. For example, in an ICT user study among 223 organizations, Tarafdar et al. (2007)

found that increase in role stress (characterized by role conflict and role ambiguity) resulted in perceived time pressure and a need for multitasking. Role conflict (e.g. role overload) is defined as over-demand on employees to complete specific tasks that they perceive as excessive on their time availability (Sales 1970). Role ambiguity is the “lack of the necessary information available to a given organizational position,” (Rizzo et al. 1970). It develops as a result of conflicting supervisory expectations, divergent job responsibilities, ambiguous definitions of tasks, and lack of clarification of duties.

### **Poor Communication Skills**

Poor communication skills (such as verbal, written, and interpersonal) is another major barrier to knowledge sharing (Riege 2005). Sun et al. (2005) studied unique knowledge transfer barriers in organizations with a Delphi group comprised of 17 members. The participants went through two stages with a total of three rounds of analysis and identified a total of 90 barriers. Of these, skills of communication and persuasion were identified as the top two barriers to transfer of knowledge from an individual to a team. Santos et al. (2012) conducted a similar study in which they interviewed 24 information technology professionals from six different countries to determine knowledge sharing barriers. They found communication to be one of the highest requirements for knowledge sharing as participants indicated that personal interactions and conversations are preferred for problem solving tasks. Lin et al. (2008) also identified poor communication skills as a contextual knowledge flow barrier in their study of 25 participants from various hospitals.

Locus of control (LOC), or the extent to which employees believe that others have control over events in their lives, is considered one of the main contributors to poor communication. Fear of interaction with others renders external LOC people (externals) feeling powerless. Rubin (1993) studied 400 undergraduate students and discovered that externals regarded communication as less satisfying, tended to avoid it, and exhibited anxiety when communicating with others. In a study among 189 elementary and secondary teachers, McCroskey et al. (1976) found a positive correlation between communication apprehension and external LOC. Compared to internals who found greater enjoyment in face-to-face and computer mediated communication with others, externals communicated for the purposes of inclusion (Flaherty et al. 1998).

### **Lack of Trust**

Trust (both in the credibility of the knowledge provider and trust that others will not misuse the shared knowledge to their advantage) has been found to significantly influence knowledge sharing behavior. Renzl (2008) found that fear of losing one’s unique value has a negative impact on knowledge sharing. She collected 201 survey responses from two companies and discovered that an employee’s fear of losing his or her unique value has a negative impact on knowledge sharing within and between teams since trust in people reduces fear in cooperating behavior. Fear of loss of control over ownership of knowledge has been shown as a high barrier to knowledge sharing between an individual and the team (Sun et al. 2005). According to Jarvenpaa et al. (2008) competition in virtual communities results in increased concern among employees that their ownership of expertise will be lost after knowledge transfer. Rosen et al. (2007) identified lack of trust among team members as the first barrier in their study on knowledge sharing barriers in virtual teams. The study consisted of interviews and three surveys with 200 responses. The results showed that minimal communication among team members limited opportunities for useful conversations, identification of common interests, and the sharing of personal information. As a result, trust was not built among members and knowledge was never shared.

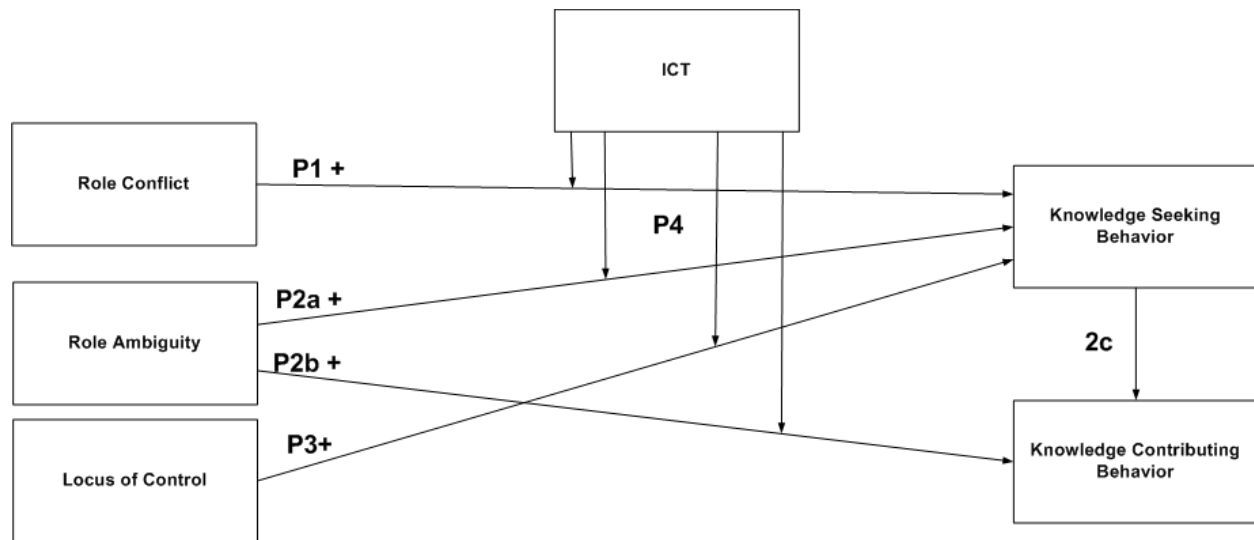
Abrams et al. (2003) conducted over 40 interviews with professionals from among 20 different organizations to determine how interpersonal trust benefited knowledge transfer. They discovered that top managerial trustworthy behaviors that promoted interpersonal trust were: 1) frequent and rich communication; and 2) engaging in collaborative communication. Ridings et al. (2002) found that sharing personal information with others in a virtual community leads to increase of trust among the team.

Some studies have proposed that there is a correlation between locus of control and levels of trust. For example, in a laboratory study on interpersonal communication among 59 undergraduate students, Frost

et al. (1978) found that individuals with internal locus of control were trusted significantly more by members of their groups than the individuals with external locus of control. In another study among 1,279 government employees, Carnevale et al. (1992) found that individuals with internal locus of control reported higher levels of organizational trust, while Butler (1991) found negative correlations between trust and external locus of control. In another study, conducted among 114 graduate students, April (2012) found that individuals with internal locus of control attributed lack of trust in others to their internal fear of losing control and having to rely on others.

## Theoretical Model

Figure 1 provides the theoretical model that presents critical predictors such as role conflict, role ambiguity, and locus of control for employees' knowledge seeking and knowledge contributing behaviors. Review of theories guiding the predictors and specific propositions are provided.



**Figure 1. Proposed Model**

### *Role Conflict*

Lack of time is often associated with the conflicting expectations and norms of the employees' roles in the enterprise (Sales 1970; Tarafdar et al. 2007). Organizational role theory (ORT) explains that individual behavior in the workplace is based on a set of rules and norms (Kahn et al. 1964). Depending on circumstances, individual behavior will be the result of a role determined by social position, social interaction, and expectations. In the workplace, ORT proposes that employees' roles are associated with specific social positions guided by normative expectations and organizational demands. As a result of the plurality of expectations, employees often experience role conflicts that require behavioral adjustments. Furthermore, the proliferation of new technology into the enterprise is frequently associated with divergence in job responsibilities as a result of change in the organizational culture (Hosono et al. 2012). For example, the traditional roles of project managers and business analysts are being integrated as a result of the combination of virtual server technology with the Infrastructure-as-a-Service (IaaS) model. The new hybrid role, known as solution architects, encompasses the responsibilities for capturing customers' needs, translating them into technical specifications, and managing the project from conception to closure (Cleveland et al. 2013b; Konstantinou et al. 2009).

Employees faced with new roles and without sufficient socialization to transition into their new responsibilities are destined to experience role conflict as a result of the varying, and in some cases, conflicting expectations (Wickham et al. 2007). Conditions leading to role conflict include lack of sufficient time to perform the new role and stress caused by the inability to meet expected requirements and behaviors (Noor 2004).

Employees seek to resolve their role conflicts by engaging in information seeking about their roles, expectations and values from internal sources (colleagues and supervisors), and external groups (sources outside their work group) (Sparrowe et al. 1997). For example, organizational ICT users engage in information sharing related to task and time coordination (Riemer et al. 2011), requests for factual knowledge from their colleagues (Seebach 2012), and specific updates relevant to daily work activities (Zhao et al. 2009). As a result, it is proposed that:

*P1. Role conflict positively impacts knowledge seeking behaviors via ICTs.*

### **Role Ambiguity**

New roles have the potential to also increase an individual's role ambiguity in conditions of changing technologies, rapid organizational growth, reorganizations, and shifts in managerial philosophies (Kahn et al. 1964). Role ambiguity is defined as the lack of sufficient information about an organizational role that results in behavioral attempts to solve the problem or "use defense mechanisms which distort the reality of the situation." (Rizzo et al. 1970). Role ambiguity, characterized by unclear tasks and conflicting management priorities, has been shown to impact employees' attitudes toward management and has been associated with decreased productivity (Cohen 1959).

Individuals faced with expectations of their new duties will tend to seek clarification and engage in information seeking behaviors (Hsieh 2009; Miller et al. 1991). They will engage in socialization practices in order to transfer tacit knowledge that can assist them in completing their new roles (Cleveland 2013; Nonaka 1994). Individuals experiencing higher levels of ambiguity will face greater number of task uncertainties that require increased effort to attain valuable information (Pirulli et al. 1999). Furthermore, it is argued that higher role ambiguity will negatively impact knowledge seeking, while low role ambiguity will result in increased knowledge seeking behaviors. As a result, it is proposed that when low ambiguity is present:

*P2a. Role ambiguity positively impacts knowledge seeking behaviors via ICTs.*

According to Zhao et al. (2009), employees use ICTs to share information usually exchanged in informal places (e.g. by the water cooler or when bumping in the hallway), while Riemer et al. (2011) discovered that ICTs are used for discussions, clarification, informal communication, and problem solving. These conversations lead to sharing of random ideas, noteworthy items, or other personal experiences that can clarify ambiguities. At the same time, social exchange theory posits that individuals assess the benefit and costs before engaging in interactions with others (Blau 1964). When high role ambiguity exists, costs to contribute knowledge will be greater than the benefits due to perceived time pressure. In contrast, when low role ambiguity is present, individuals will focus on seeking task-specific knowledge to achieve higher benefits at lower costs. Therefore it is proposed that when low ambiguity is present:

*P2b. Role ambiguity positively impacts knowledge contributing behaviors via ICTs.*

According Xu et al. (2006a) individuals engage in trading of knowledge for the purpose of fulfilling specific information needs. When low ambiguity is present, individuals who seek knowledge will also reciprocate by in the social exchange by contributing knowledge (Blau 1964). Therefore it is argued that the relationship between low role ambiguity and knowledge contributing will be mediated by knowledge seeking. As a result, it is proposed that:

*P2c. Knowledge seeking will mediate the relationship between role ambiguity and knowledge contributing behaviors via ICTs.*

## ***Locus of Control***

Individuals exhibit different behaviors when experiencing conflict and ambiguity. For example, Kahn et al. (1964) found a positive relationship between role conflict and job tensions in introverts and flexible individuals, while role ambiguity and job-related tension were significantly related in individuals with a high need for cognition, where cognition is defined as the need to organize related events in an integrated matter (Cohen et al. 1955).

According to the social learning theory (SLT), people's motivations to engage in a specific behavior are impacted by the results of previous behaviors (Rotter 1954). Since individuals strive to minimize negative consequences while maximizing positive results, they will engage in behaviors that are expected to have a high probability of resulting in positive outcomes. Positive results will either reinforce or weaken repetitions of that behavior, depending on whether the individual believes that the reinforcement resulted from his personal behavior or from an outside entity (Rotter 1966).

According to Lam et al. (2005), individuals with high internal locus of control believe that their behaviors determine what occurs to them. At work, they tend to engage in increased levels of information seeking and sharing in order to remain in control of their environment. They also tend to pay more attention to sources of useful information detrimental to their future behavior and occupations, tend to have higher motivation to learn, engage in deeper information processing, have higher retention of information, possess higher levels of generalized self-efficacy, and engage in greater risk taking behavior on tasks (Cohen et al. 1979; Judge et al. 2002; Klein et al. 1999; Peters 1969; Valecha 1972).

Individuals with high external locus of control believe that factors such as luck, fate, or powerful others determine what happens to them (Rotter 1966). They tend to be more withdrawn, less likely to take risks and rely more on information from their inner circle since this makes them feel safe (Lam et al. 2005). Flaherty et al. (1998) found that high externals used face-to-face communication to fulfill the need for social interaction while they used computer mediated communication to engage others primarily to fulfill the need for inclusion, control, and affection. Healthcare studies found that internals were more inquisitive about their conditions and more actively engaged in information-seeking behavior than externals (Seeman et al. 1962; Wallston et al. 1976). Therefore it is proposed that:

*P3. Internal locus of control positively impacts knowledge seeking behaviors via ICTs;*

## ***ICT***

ICTs have been shown to impact individual motivation to share knowledge (Hendriks 1999). In this study, it is proposed that ICTs will complement knowledge users' needs and will influence the strength of relationships between the proposed variables. As a result, ICT is added to the model as a categorical moderating variable, and it is proposed that:

*P4. ICT will moderate the relationships between role conflict, role ambiguity, locus of control, knowledge seeking, and knowledge contributing behaviors.*

## **Future Research**

This research doesn't exhaust all possible variables associated with knowledge seeking and contributing behaviors. It attempted to derive answers to two research questions:

- 1) What are the potential factors that contribute to the commonly accepted barriers to knowledge seeking and knowledge contributing behaviors?
- 2) How do these factors impact the employees' use of ICTs for knowledge seeking and knowledge contributing?

To answer these questions, several potential shared contributors to the most common barriers to knowledge sharing were explored, and a model to test the impacts of these factors on employees' willingness to use ICTs for knowledge seeking and knowledge contributing purposes was proposed. The study suggested association among perceived lack of time, role conflict, and ambiguity. It also suggested that those factors might influence knowledge seeking and contributing behaviors. Moreover, it was proposed that poor communication skills and lack of trust barriers were associated with employees' locus of control. A theoretical model was developed to explain how employees' knowledge seeking and knowledge contributing behaviors via ICTs might be impacted by these proposed factors. Future research will focus on comprehensive review of knowledge sharing barriers and corresponding contributors in order to enhance understanding on additional constructs impacting knowledge seeking and knowledge contributing behaviors of ICT users. A content analysis study on articles from the knowledge sharing literature will be used to extract potential contributing factors to the identified barriers. Concepts that percolate from the content analysis will be used to validate the first research question of this study. Depending on the results, a causal-modeling study using a survey for data collection and structured equation modeling for the data analysis will be conducted to test the impact of any emerged concepts.

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