RESEARCH ARTICLE

The Role of Basic Human Values in Knowledge Sharing: How Values Shape the Postadoptive Use of Electronic Knowledge Repositories

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Abstract

A growing body of literature examines how to elicit knowledge contributions to electronic knowledge repositories (EKRs) with the goal of helping organizations increase implementation benefits. While this literature has explained in detail the initial EKR adoption by knowledge contributors, it has not yet examined the drivers of postadoptive EKR usage for contributing knowledge. Postadoptive EKR usage, such as innovative feature use, can potentially result in richer contributions to EKRs. To aid understanding of how to unlock the benefits of EKRs for organizations, this study examines the impact of basic human values on one type of postadoptive behavior that goes well beyond basic usage: trying to innovate with EKR features. We develop a research model that integrates human values and trying to innovate with EKRs, suggesting that human values indicate modes of independent thought and action and can lead to attempts to innovate in EKR use by increasing the frequency of EKR usage. Data collected from 233 knowledge workers support the model. Our findings shed light on how to encourage innovative EKR usage and underscore the importance of human values for the success of knowledge management initiatives.

Keywords: Knowledge Management, Knowledge Sharing, Electronic Knowledge Repository, Human Values, Theory of Basic Human Values, Postadoptive Use, Trying to Innovate.

1 Introduction

As a committed chief knowledge officer, Frank S. Smith has implemented an electronic knowledge repository (EKR) as part of his recent knowledge management initiative. While some of his workers use the EKR in innovative ways to make their knowledge available to their co-workers in a richer fashion, the majority do not try to go beyond basic usage. Frank believes that a more innovative kind of usage would help his employees make more refined knowledge contributions, stimulating process innovation that could significantly increase several key performance indicators. He suspects that his employees' different approaches to EKR usage may have something to do with their values. For example, he noticed that employees who use the EKR innovatively to share their knowledge are generally of a more "giving" nature. To improve hiring decisions and redesign the jobs in his division, Frank needs guidance on which values trigger a more innovative use of the EKR's features.

This vignette illustrates a common problem of contemporary knowledge management initiatives: the underutilization of EKRs by knowledge contributors (Bock, Zmud, & Kim, 2005; Kankanhalli, Tan, & Wei, 2005; Olivera, Goodman, & Tan, 2008). On the one hand, knowledge sharing among members of organizations has become increasingly important for firm success, and a wide diffusion of EKRs exists to facilitate this sharing (the primary goal of EKRs is content and document management to facilitate knowledge sharing) (Durcikova et al., 2011; Kankanhalli et al., 2005; Sambamurthy & Sumramani, 2005). On the other hand, firms still struggle in their efforts to generate the promised benefits or the expected return on investment, because their employees rarely use the EKRs to their fullest potential (Bock et al., 2005; Kankanhalli et al., 2005; Olivera et al., 2008). Managers like Frank face a particular problem with the postadoptive use of EKRs by knowledge contributors (Phang, Kankanhalli, & Sabherwal, 2009): EKRs are implemented to sustain organizational innovation efforts for the discovery and development of new technologies, new products, or new business processes. But this kind of EKR usage, which is of particular value to organizations, only occurs after contributors have accepted the EKR, have used it for a number of years, and have tried to innovate with the different EKR features (Cooper & Zmud, 1990; Jasperson, Carter, & Zmud, 2005, Wang et al., 2008; Wang, Meister, et al., 2013).

One example reported in the literature examines a large grocery chain that uses rich social sources of knowledge to complement the codified knowledge available in its EKR. This significantly improved the chain's operations because social sources of knowledge help contextualize the codified knowledge in the EKR (Kim, Mukhopadhyay, & Kraut, 2016). Sharratt et al. (2017) offer a second example of how to innovate with an EKR. They report on the case of i-HOP, an online EKR that supports professionals in various occupations like education and health who work with children and families affected by parental offending. Among other features, this EKR provides a comprehensive collection of research studies, and there is evidence that some professionals proactively use i-HOP in novel ways. Sharratt et al. draw on research studies in order to develop new material that could be used, for example, to prepare young children for visiting a parent in prison. A third example concerns the "Q&A" feature of Schlumberger's InTouch EKR, whose innovative use has led to the creation of new forms of coordination and collaboration among subject matter experts (Braganza, Hackney, & Tanudjojo, 2009).

However, these success stories are not common. All too often, employees avoid trying to find new ways of using an EKR to share their knowledge (i.e., trying to innovate with an EKR; Ahuja & Thatcher, 2005), even though task performance and organizational processes could be optimized if employees tried to innovate with an EKR. Nevertheless, too many employees rely on basic EKR usage only, often because they do not find their own values reflected in the EKR (Choi, Lee, & Yoo, 2010; Leidner & Kayworth, 2006; Olivera et al., 2008; Stevens, 2000). Encouraging employees to go beyond basic EKR use is important because limited usage restricts the richness and the organizational value of knowledge contributions to EKRs. For example, research suggests that firms derive greater value from users who are enthusiastic knowledge seekers or thoughtful knowledge providers than from reluctant nonadopters of EKRs (Velasquez et al., 2011). Hence, managers like Frank and their organizations may benefit substantially from an understanding of the factors that promote postadoptive behaviors such as trying to innovate with EKRs.

Since innovative usage behaviors with information systems tend to emerge from individuals' socially constructed understandings of system characteristics (Jasperson et al., 2005), basic human values may play an important role in shaping innovative EKR usage (Alavi & Leidner, 2001; Davenport & Prusak, 2000; Garud & Kumaraswamy, 2005). Human values are guiding principles in people's lives and represent what is important to them (Schwartz, 2006). Thus, values generally define how people act and communicate—two crucial elements of knowledge sharing—implying that people's values have a "powerful impact on organizational knowledge" (Alavi & Leidner, 2001; Davenport & Prusak, 2000, p. 12; Leidner & Kayworth, 2006). In fact, values can guide people's thoughts and actions in a variety of knowledge sharing situations (Dulipovici, 2017; Schein, 2010). For example, group decision support systems, which are considered very flexible, are more likely to be utilized by individuals who value flexibility (Cooper, 1994). Moreover, values have been tied to firm performance. For example, in a study of law firms, values that support innovation exerted an effect on firm performance (Hogan & Coote, 2014). Therefore, individuals' values might encourage knowledge sharing (as opposed to hoarding) and be tied to innovative behavior such as proactively offering knowledge (Davenport & Prusak, 2000).

However, it remains unclear what human values promote knowledge sharing and innovative EKR usage. While descriptive studies have underscored that human values serve as a major catalyst of knowledge sharing, research examining which values foster this behavior is nascent (Dulipovici, 2017; Leidner, 2010; Ravishankar, 2011; Tams, 2013).

Table 1. The Importance of Conducting More Research on Human Values and Knowledge Sharing

Current state of knowledge	How to build on current knowledge	References
Human values were described as having an impact on knowledge sharing, and a few relevant values were identified through well-constructed data-driven research (case studies)	Creating quantitative, empirical support for the proposition that human values matter for knowledge sharing, i.e., providing precise evidence for the idea that values can predict EKR usage	Alavi et al. (2006); Davenport & Prusak (2000); Leidner et al. (2006)
	Creating a refined theoretical understanding of the relationship between human values and knowledge sharing by adopting a theory-driven approach, explaining further how and why this relationship exists	Alavi et al. (2006); Leidner et al. (2006); Schwartz (1992, 1996, 2006)
	Treating individuals' value systems as coherent structures, implying the connection of a carefully selected set of values to knowledge sharing in an organized, integrated manner	Alavi et al. (2006); Leidner et al. (2006); Schwartz (1992, 1996)
Prediction of the initial acceptance of EKRs for contributing knowledge (e.g., usage intentions) through rational beliefs (e.g., ease of use)	Predicting the postadoptive usage of EKRs, which only occurs after workers have initially accepted the EKR, and advancing understanding of how the postadoptive usage of EKRs can be predicted	Bock et al. (2005); Kankanhalli et al. (2005); Wasko & Faraj (2005)
Human values predict various usage behaviors in the context of initial technology adoption (e.g., attitudes, usage intentions), speaking to the problem of technology resistance	Increasing understanding of the role of values in the postadoptive usage of technologies that only occurs after people initially adopted a technology, speaking to the more contemporary problem of underutilized technologies	Karahanna, Evaristo, & Srite (2005); McCoy, Galletta, & King (2007); Srite & Karahanna (2006); Tams (2013)

Although scholars have called for studies that empirically examine the impact of human values on knowledge creation and sharing for quite some time (e.g., Alavi & Leidner, 2001; Chatterjee & Sarker, 2013; Leidner, 2010), few IS studies have followed this call by taking data-driven, exploratory approaches (Alavi, Kayworth, & Leidner, 2006; Dulipovici, 2017; Leidner, Alavi, & Kayworth, 2006). Research needs to build on this pioneering, exploratory work by adopting a theory-driven, explanatory approach in order to predict value-based variation in EKR postadoptive use (see Table 1, which also identifies closely related research needs). Such explanatory research could yield a theoretical and precise understanding of specific types of relevant values and clarify how those values might predict attempting innovative EKR use for knowledge sharing. In particular, such research could advance understanding of the positive, stimulating impacts of human values on postadoptive knowledge sharing (Alavi et al., 2006).

Overall, research examining the roles of human values in knowledge sharing is needed to provide organizations with specific guidance on what values they should promote to support their knowledge sharing goals (Alavi et al., 2006). This conclusion is further validated by recent sociological research showing that certain values, such as benevolence or universalism, can promote cooperative behaviors like sharing[1] (Schwartz, 2006). This research indicates that employees are more likely to fully utilize technologies such as EKRs when the characteristics of these technologies are consistent with their own values (Dulipovici, 2017; Kappos & Rivard, 2008; Leidner & Kayworth, 2006). Moreover, from a social-psychological perspective, human values are key to explaining the motivational bases of behavior (e.g., knowledge sharing and EKR use behaviors) because they act as mental representations of basic goals such as sharing (Schwartz, 2006) and because (as representations of basic goals) they have crucial survival significance from an evolutionary perspective (Schwartz, 2006).

In addition, recent IS research has called for more humanistic investigations that examine whether technology makes the world a better place (Walsham, 2012). This call for research underscores the need for an approach centered on human values. Taking a value-centered approach aligns our study with important emerging sentiments in the IS community—for example, the idea that technology plays a vital role

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[1] For example, benevolence values can promote cooperative behaviors like sharing because these behaviors often require the conventional decency and thoughtfulness that benevolence values entail (Schwartz 2006).

in societal challenges. Taking a value-centered approach also positions our study in line with current directions in IS research like information and communications technologies for development (ICT4D), which is aimed at bridging the digital divide. Values also relate to other current IS research trends such as data analytics, cybersecurity, and fintech.

To shed light on the roles of human values in knowledge sharing and to respond to the research needs identified in Table 1, this study examines the following research question:

RQ: Do human values promote innovative EKR usage for making knowledge contributions and, if so, which values are most important for promoting innovative EKR usage?

By investigating how human values impact trying to innovate with EKR usage, this study underscores the importance of taking a value perspective for advancing our understanding of knowledge sharing behavior, especially in the context of postadoptive EKR usage, and also shows that human values predict variation in EKR usage. Specifically, this study advances five hypotheses related to the first part of our research question (i.e., do human values promote innovative EKR usage for making knowledge contributions?—H1-H5) and two hypotheses related to the second part of our research question (i.e., which values are the most important for promoting innovative EKR usage?—H6-H7). In doing so, this study makes several important contributions (for details, see Table 7, in Section 4 below). First, this study moves knowledge management research from a largely descriptive discussion of the importance of human values for knowledge sharing toward a theory-driven and precise (i.e., quantitative) explanation of the role of values, which enriches the explanation, prediction, and analysis of the relationship between values and knowledge sharing behavior (Schwartz 2006). However, this movement is not only of theoretical interest, it also yields more detailed and specific guidance for managers on how to leverage human values as a knowledge resource and indicates which values managers should promote to support EKR usage.

Moreover, when human values are employed to further beneficial goals for the organization, they are seen as virtues that can influence organizational capabilities and ultimately contribute to an organization's innovativeness (Chatterjee et al., 2015; MacIntyre, 1985). We argue that the values studied in this research are analogous to Chatterjee et al's (2015) construct of organizational virtues, but at the individual level. As such, the values studied here are instrumental to the pursuit of innovative usage of EKRs and, ultimately, to organizational profitability and productivity goals (Chatterjee et al., 2015).

Furthermore, this study furthers knowledge management research by attempting to explain and predict postadoptive EKR usage, particularly in terms of trying to innovate with an EKR. Thus, our work is better aligned with contemporary knowledge management problems (e.g., underutilization) than the initial knowledge contributions examined in prior work.

This paper proceeds as follows: The next section provides background on the study context as a means of framing a model of value-based, innovative knowledge sharing in organizations and develops corresponding hypotheses indicating that certain human values promote innovative use behavior via the frequency of EKR usage. To develop these hypotheses, we use the theory of basic human values (Schwartz, 1992, 1994, 2006). This theory enables us to treat individuals' value systems as coherent structures, allowing us to relate a carefully selected set of values to EKR usage in an organized, integrated manner (Schwartz, 2006). Then, we offer details on the method employed to test our integrative model combining postadoption behaviors and human values in the knowledge management domain, and follow this by reporting our results. Finally, we discuss the implications of this study for research and practice.

2   Background and Hypotheses

In contrast to our approach integrating the concepts of human values, knowledge sharing, and postadoptive usage, most prior studies have examined these concepts in isolation (see Figure 1). Only a few studies have looked at the intersection of two such areas (e.g., Alavi and Leidner [2001] emphasized the importance of human values for the success of knowledge management initiatives) and no research to date has examined the point at which all three areas intersect. However, as further explained below, this intersection holds strong potential for explaining the postadoptive usage of EKRs by knowledge contributors; according to influential theory and review papers, human values are pertinent to both postadoptive use and EKR implementation success (e.g., Alavi & Leidner, 2001; Lamb & Kling, 2003; Kappos & Rivard, 2008; Leidner & Kayworth, 2006).
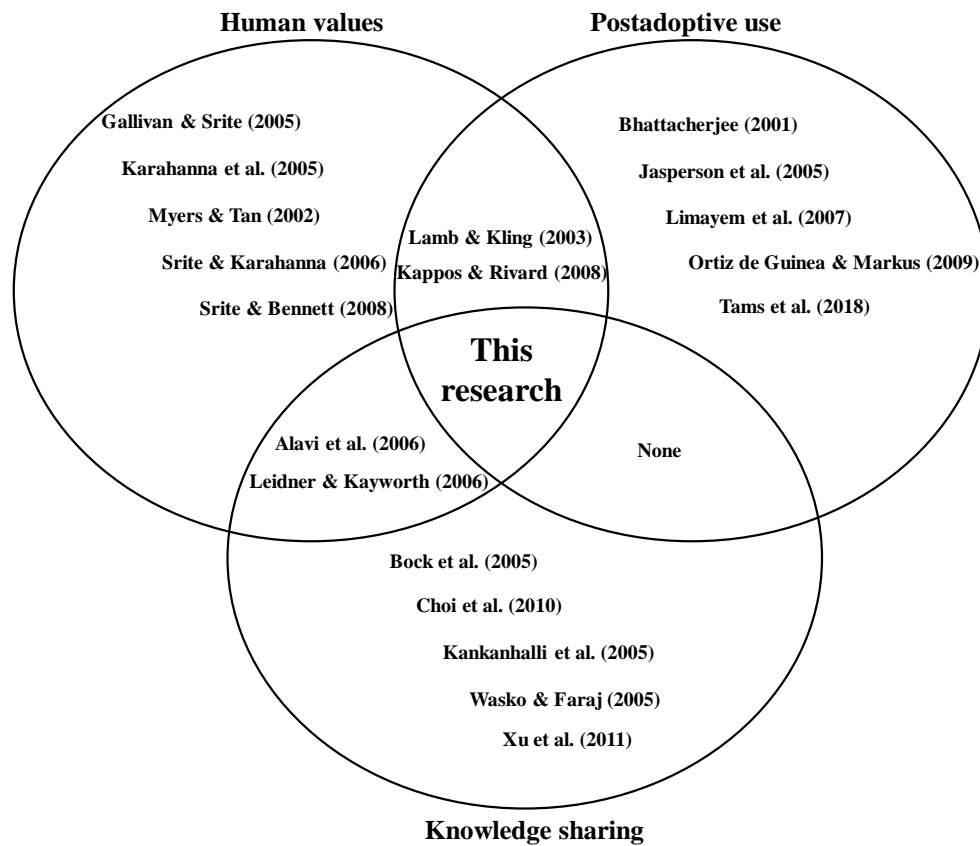
Human values

Gallivan & Srite (2005)

Karahanna et al. (2005)

Myers & Tan (2002)

Srite & Karahanna (2006)

Srite & Bennett (2008)

Postadoptive use

Bhattacherjee (2001)

Jasperson et al. (2005)

Limayem et al. (2007)

Ortiz de Guinea & Markus (2009)

Tams et al. (2018)

Lamb & Kling (2003)
Kappos & Rivard (2008)

This research

Alavi et al. (2006)
Leidner & Kayworth (2006)

None

Bock et al. (2005)

Choi et al. (2010)

Kankanhalli et al. (2005)

Wasko & Faraj (2005)

Xu et al. (2011)

Knowledge sharing

Figure 1. Illustrative Studies on Cultural Values, Postadoptive Use, and/or Knowledge Sharing

Human Values

Human values are guiding principles in people's lives and represent what is important to them (Schwartz, 2006). To identify values relevant to knowledge sharing, we use the sociological theory of basic human values (TBHV) developed by Schwartz (1992, 1994, 2006). The TBHV is considered to be a central value theory (for reviews of value theories see Hitlin and Piliavin, 2004, as well as Rohan, 2000); it is an individual-level theory that theorizes about human values that concern the relationship between an individual and a group. Therefore, the TBHV can serve to identify specific human values that have the potential to influence knowledge sharing.

Using the TBHV for this study has several advantages. First, the TBHV is appropriate for this study because it theorizes specifically about individuals' values, which are the focus here. Second, values are useful for IS research since they motivate action (e.g., knowledge sharing or EKR use), and they transcend specific situations so that they enable the deduction of specific hypotheses from general theories like the TBHV (e.g., hypotheses that predict postadoption behavior) (Schwartz, 2006; Walsh et al., 2010). The TBHV also combines a strong theoretical foundation with recent data (Okazaki & Mueller, 2007). Moreover, the TBHV

allows for the creation of a generalizable theory of postadoptive EKR usage since the model specifies basic human values that have been found to influence various behaviors such as sharing behavior around the world (Arthaud-Day, Rode, & Turnley, 2012; Schwartz, 1994, 2006). Perhaps most importantly for this study, the TBHV allows for an examination of the relative importance of different value types for postadoptive EKR usage since it theorizes that people's values form an ordered system of value priorities (Schwartz, 2006). As such, the TBHV is particularly useful for this study and it allows us to respond to the second part of our research question that focuses on which values are most important for promoting innovative EKR usage.

The TBHV is also practical: people adapt their values to their life circumstances (Schwartz, 2006) in that they upgrade the importance attributed to values they can more readily attain (Schwartz & Bardi, 1997). For example, employees in jobs that provide freedom of choice have been shown to upgrade the importance they attribute to values associated with self-direction (Kohn & Schooler, 1982). Hence, managers can leverage the insights provided by the TBHV not only to improve hiring decisions, but also to assist employees in developing values more conducive to knowledge sharing.

The TBHV proposes two bipolar value dimensions: namely self-transcendence versus self-enhancement and openness to change versus conservation (see Figure 2). These two bipolar value dimensions comprise the ten value types detailed in Table 2. These ten value types are organized in a circular motivational structure such that competing value types associated with opposed value dimensions are located at opposite ends of the motivational structure (see Figure 3). This structure is referred to as a circumplex model because it organizes the value types based on a circular order. Generally, a circular order of variables means that variables that are close together are more related than variables that are further apart, with opposite variables being negatively related. In short, a circumplex is a circle of variables with relations between them. As such, it is not a pie chart but a way of organizing a variety of variables that belong to the same domain.
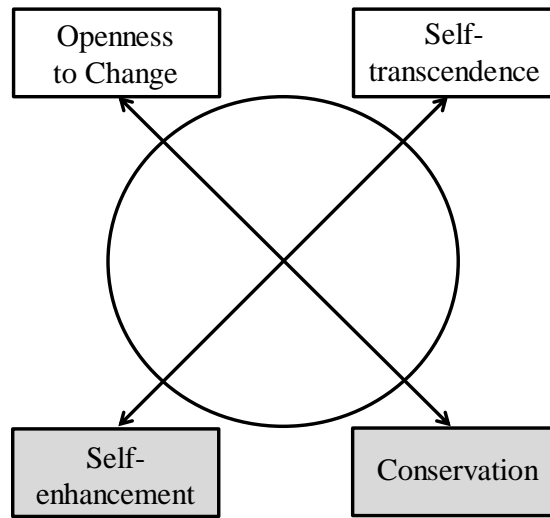

Note: the value dimensions with negative impacts on cooperative behavior like sharing are shaded.

Figure 2. Schwartz's Bipolar Value Dimensions (Schwartz, 1992)

Table 2. Bipolar Value Dimensions and Value Types (Schwartz, 1996, 2006)

Value Dimension	Value Type	Impact on Cooperative Behavior	Explanation
Self-transcendence	Benevolence	Positive	Voluntary commitment to the welfare of others
	Universalism		
Openness to change	Self-direction		Following own intellectual interests to actively adapt to and change one's environment
	Stimulation		
	Hedonism		
Self-enhancement	Power	Negative	Enhancement of one's own personal interests even at the expense of other individuals
	Achievement		
Conservation	Tradition		Preservation of the status quo and resistance to change as well as change-related initiatives
	Conformity		
	Security		
Note: the value types with negative impacts on cooperative behavior are shaded.			
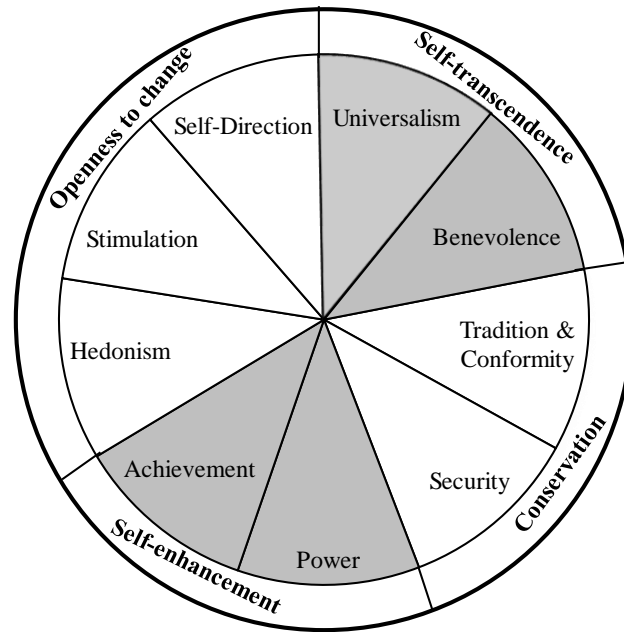
Note: Shading designates the two bipolar value dimensions

Figure 3. Schwartz's Circumplex Model of Values (Schwartz, 1992, 1996, 2006)

The first value dimension contrasts self-transcendence and self-enhancement values and, as such, captures the conflict between values that emphasize concern for the welfare of others (benevolence, universalism) and values that emphasize pursuit of one's own interests even at the expense of others (power, achievement) (Hitlin & Piliavin, 2004; Schwartz, 2006). The second value dimension contrasts openness to change and conservation values and, as such, captures the conflict between values that emphasize readiness for change (self-direction, stimulation, hedonism) and values that emphasize resistance to change (tradition, conformity, security). Since competing value types associated with opposed value dimensions are located at opposite ends of the circular motivational structure (e.g., the value types associated with self-transcendence and self-enhancement are competing and, hence, located at opposite ends of the circular structure), they have opposite impacts on human behavior (Hitlin & Piliavin, 2004; Schwartz, 2006). For example, the value types associated with self-transcendence (e.g., benevolence) and self-enhancement (e.g., power) have been theorized and shown empirically to have opposite effects on cooperative behaviors like sharing (Schwartz, 1996). Thus, this circular model is useful because it is intuitive, simple, and describes which value types are similar and which ones are dissimilar.

The value types are designed to constitute independent variables in explanatory research models; their objective is explanation and prediction (Schwartz, 1992). Consistent with past research on knowledge sharing that has generally focused on factors likely to promote the utilization of EKRs by knowledge contributors (e.g., Bock et al., 2005; Wasko & Faraj, 2005), five value types are pertinent to the present study. Specifically, benevolence, universalism, self-direction, stimulation, and hedonism are likely to promote the utilization of EKRs by knowledge contributors because the qualities of a "giving" nature (i.e., benevolence, universalism) and being open to change (i.e., self-direction, stimulation, and hedonism) have been described as important prerequisites to knowledge sharing (Alavi & Leidner, 2001; Davenport & Prusak, 2000). Moreover, these five value types have been theorized and empirically shown to promote cooperative behaviors like sharing (see Table 2) (Schwartz, 1996, 2006).

By contrast, the self-enhancement and conservation values of achievement, power, tradition, conformity, and security are unlikely to promote cooperative behaviors such as knowledge sharing (Alavi & Leidner, 2001; Davenport & Prusak, 2000; Schwartz, 1996) (see Table 2); they have been theorized and empirically shown to result in noncooperation (Schwartz, 1996). As such, self-enhancement and conservation values are less relevant to the present study, whose objective is to understand what factors promote and encourage knowledge sharing. Furthermore, their effects on knowledge sharing, by definition, conflict with self-transcendence and openness to change (Hitlin & Piliavin, 2004; Schwartz, 1996, 2006). For example, pursuing achievement

values conflicts with pursuing benevolence values because seeking success for the self tends to obstruct actions aimed at enhancing the welfare of others who need help (Hitlin & Piliavin, 2004; Schwartz, 2006). These opposite effects imply that the inclusion of self-enhancement and conservation values in our research model would be inefficient and would reduce the parsimony of the model without being likely to increase its predictive power and the guidance it can provide to managers.

Overall, based on our research objectives and consistent with prior research focusing on the factors likely to promote knowledge sharing (e.g., Bock et al. 2005; Wasko & Faraj, 2005), this study focuses on the five human values that comprise self-transcendence and openness to change with the expectation that these five human values promote postadoptive behavior in the form of innovative EKR usage.

Postadoptive Usage: Trying to Innovate with IT

Central to innovative EKR usage (i.e., trying to find new ways of using the EKR for sharing one's knowledge with co-workers) is the concept of trying to innovate with IT, which refers to individuals' attempts to find new ways of applying technology to their work tasks (Ahuja & Thatcher, 2005; Tams & Dulipovici, 2019). Knowledge management systems are introduced to organizations to improve decision-making by individuals and to improve the performance of groups of knowledge workers (Shaikh & Karjaluoto, 2015). For example, EKRs are designed to facilitate sharing ideas within organizations and communities, such that users might more easily find the ideas and guidance necessary to perform at higher levels (Kankanhalli et al., 2005). Research has extensively examined how factors such as social influence (Wang, Meister, et al., 2013), gender (Chai et al., 2011), and process (Newell, 2015) affect the use of EKRs. Going beyond studying use is important because work on innovation diffusion demonstrates that experience with a system diminishes the importance of factors like ease of use or familiarity with systems use (Szana, 1996; Venkatesh et al., 2003). In order to gain the maximum value for their performance, individuals must continue not only to use EKRs but also to explore and innovate with EKR features (Tams, Thatcher, & Craig, 2018).

As a form of postadoptive use, innovative EKR usage refers to individuals' interactions with a familiar system, implying that this use behavior occurs only after knowledge contributors have initially accepted an EKR and have begun to contribute their knowledge to it (Ortiz de Guinea & Markus, 2009; Venkatesh & Goyal, 2010). For example, a user's postadoption contributions to an EKR may depend on having witnessed others make contributions or use ideas drawn from the EKR. When a user sees colleagues reap

benefits from knowledge contributions or EKR use and consequently forms efficacy beliefs, one would expect this user to form goals around innovating with an EKR as a means of shaping his or her role within the organization (Bagozzi, 2006; Forsgren, Sabherwal, & Durcikova, 2018). Thus, in the postadoption phase, individuals may vary in their willingness to invest time in contributing to and learning new ways to use an EKR to make their knowledge available to others (Jasperson et al., 2005; Nambisan, Agarwal, & Tanniru, 1999; Wang, Li, et al., 2013).

Trying to innovate with an EKR is a richer form of usage than basic usage intentions or frequency of EKR use (Burton-Jones & Straub, 2006). As such, it implies incorporating more types of knowledge into one's contributions. Recalling the examples mentioned above, Kim et al. (2016) discuss the example of a grocery chain that began to supplement explicit documents from the EKR with social knowledge; Sharratt et al. (2017) give the example of the i-HOP system that professionals drew on to convert existing knowledge into new knowledge; and Braganza et al. (2009) show how knowledge workers at Schlumberger enriched their knowledge contributions by enhancing the use of their EKR's "Q&A" feature.

Trying to innovate with an EKR can also involve the move from using basic features to richer applications of the tool (Tams & Turel, 2018). As EKRs evolve, users can either continue to use the technology in familiar ways or identify new ways to take advantage of new functionality to share knowledge. However, users do not typically receive new training on every software update and, thus, often miss opportunities to use new functionalities. Because EKR updates often include changes in many features that are described only in complex documentation, the new features may easily go undiscovered by less engaged users. For example, the SharePoint 2016 update added or changed key functionalities such as the "sharing hint" feature, collection creation, and data-loss prevention capabilities, which might be missed, absent goals surrounding innovation. Consequently, one would expect users who have formed goals to try out new EKR features to innovate at a higher rate, thereby improving the effectiveness of their knowledge sharing. For instance, by trying out the new "sharing hint" feature, users could discover new ways of sharing their knowledge with their co-workers. Similarly, users trying out SharePoint's new document collaboration feature might apply it to their knowledge sharing behavior in order to help their co-workers more quickly and effectively.

Research on trying to innovate directs attention to examining features of the context or the self as sources of new, value-creating behaviors associated with EKRs. Work on technology and innovative behaviors has examined how features of the context, such as

autonomy (Carter, 2012) or management support (Wang et al., 2008), and features of the self, such as cultural values (Thatcher et al., 2003) or personality (Wang et al., 2008), explain innovation in the early phases of adoption. As experience with an EKR grows and users move into the postadoption context, research suggests that features like human values that are tied to the user become more germane to understanding individuals' willingness to innovate. Consequently, examining why and how individuals try to innovate holds great potential for expanding understanding not only of the frequency but also the quality of postadoption EKR use.

Research on trying to innovate with EKRs is nascent, as prior knowledge management research has often focused on initial and basic usage behaviors (e.g., usage intentions or frequency of use) (Bock et al., 2005; Kankanhalli et al., 2005; Wasko & Faraj, 2005). While the literature primarily directs attention to the tool or community, preliminary evidence suggests that factors such as personality and values contribute to users' decisions to contribute to EKRs. For example, Wang et al. (2008) found that personal propensity toward IT innovation helped predict the creative use of complex technologies. Similarly, Wang, Noe, and Wang (2014) found that personality traits, such as conscientiousness, neuroticism, and openness to experience, interacted with EKR features to predict knowledge sharing. To continue this line of work, more research is needed that connects individual values to EKR use.

Connecting Human Values to Postadoptive Usage

Prior IS research on the impact of human values on IT use indicates that technologies are infused with values, which are, more specifically, embedded in the work practices that IT is meant to support (Leidner & Kayworth, 2006). Such research also indicates that individuals are more likely to use a technology when its inherent values are in agreement with the human values they hold (Kappos & Rivard, 2008; Leidner & Kayworth, 2006). For example, individuals' value-based tendency to share knowledge may promote their likelihood to use EKRs because, in this case, the values inherent in the technology (e.g., EKRs are meant to support knowledge sharing) are in agreement with their own values. This logic is consistent with research on postadoptive use indicating that technology sensemaking (i.e., reflecting about a technology) determines postadoptive behavior (Jasperson et al., 2005; Tams, Hill, & Thatcher, 2015).

In accordance with this logic, the values related to self-transcendence (i.e., benevolence and universalism) may promote postadoptive EKR use for contributing knowledge. More specifically, these values, which

reflect the extent to which a person emphasizes voluntary commitment to the welfare of others (Schwartz, 1992), may be positively associated with the tendency to share knowledge since contributions to knowledge repositories tend to be voluntary, altruistic, and directed toward the welfare of others (Davenport & Prusak, 2000; Wasko & Faraj, 2005). In this case, the values embedded in the EKR are in agreement with the values held by the individuals, implying that the individuals are likely to use an EKR for contributing their knowledge to it since such use would conform to their value of self-transcendence (Kappos & Rivard, 2008; Leidner & Kayworth, 2006). Thus, to the extent to which they value altruistic commitment to the welfare of others, individuals may be more likely to engage in the postadoptive use of EKRs to share their knowledge voluntarily. Consistent with this idea, Davenport and Prusak (2000) suggest that many contributors to EKRs are motivated, at least in part, by a natural impulse to help others. For example, contributions to Chrysler's Engineering Book of Knowledge were based, at least in part, on altruism (Davenport & Prusak, 2000).

Nevertheless, postadoptive behaviors are a direct function of use history, which is a "key facet" in enabling them (Jasperson et al., 2005, p. 542; Limayem et al., 2007). Only when EKR usage is performed frequently will innovative postadoptive usage behaviors be motivated (Jasperson et al., 2005). As a postadoptive use behavior, trying to innovate develops over time; infrequent performances of a focal use behavior generally promote weaker postadoptive use behaviors than frequent performances of the same behavior (Jasperson et al., 2005; Limayem et al., 2007). As individuals frequently use an IT application, the ever-accumulating prior-use experiences imprint the use behavior within the cognitive scripts that direct the individual in terms of task accomplishment and motivate the individual to perform more refined and richer forms of usage (Jasperson et al., 2005). Hence, values related to self-transcendence should exert influence on postadoptive EKR usage by increasing the frequency of EKR usage (i.e., the frequency of EKR use for contributing knowledge should mediate value-related impacts on postadoptive EKR use) (see Figure 4; construct definitions are provided in Table 3). Formally:

H1: Benevolence promotes trying to innovate with an EKR for contributing knowledge indirectly via the frequency of EKR use for contributing knowledge.

H2: Universalism promotes trying to innovate with an EKR for contributing knowledge indirectly via the frequency of EKR use for contributing knowledge.
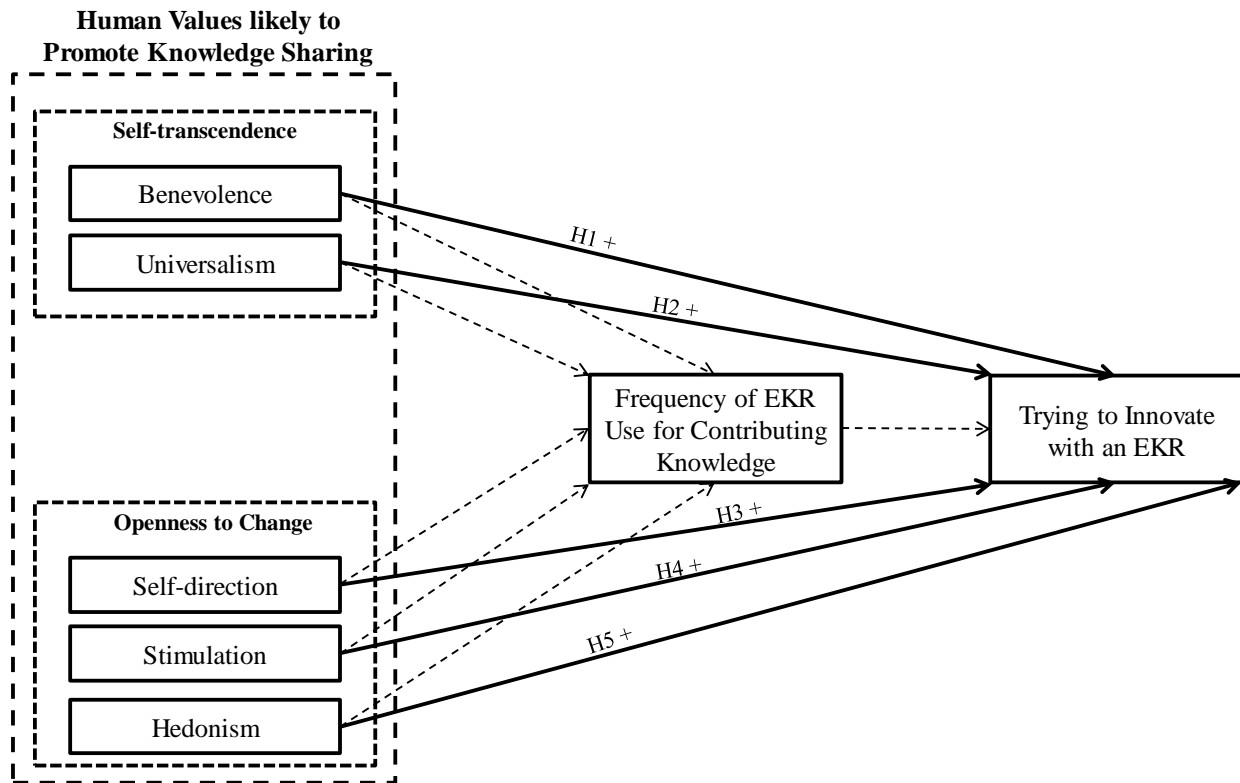
Note: The lines in bold represent our mediation hypotheses, suggesting mediation of value-related impacts by frequency of use. The dotted lines represent related direct effects, which are not the focus of our hypotheses but are modeled here for reasons of completeness only (i.e., the dotted lines show what direct effects make up our mediating hypotheses).

Figure 4. Research Model for Indirect Effects

Table 3. Construct Definitions

Construct	Definition	References
Benevolence	Extent to which a culture emphasizes preservation and enhancement of the welfare of others in daily interactions	Schwartz (1992, 1994, 2006)
Universalism	Extent to which a culture emphasizes understanding, appreciation, tolerance, and protection of the welfare of all people and nature	Schwartz (1992, 1994, 2006)
Self-direction	Extent to which a culture emphasizes independent thought and action for choosing, creating, and exploring	Schwartz (1992, 1994, 2006)
Stimulation	Extent to which a culture emphasizes change, variety, and excitement in life to maintain an optimal level of activation	Schwartz (1992, 1994, 2006)
Hedonism	Extent to which a culture emphasizes pleasure or sensuous gratification for oneself	Schwartz (1992, 1994, 2006)
Frequency of EKR use for contributing knowledge	Extent to which an individual uses an EKR for contributing knowledge	Kankanhalli et al. (2005)
Trying to innovate with an EKR	Extent to which individuals try to find new ways of using an EKR for sharing their knowledge with other organizational members	Ahuja & Thatcher (2005)

Like self-transcendence, the values related to openness to change (i.e., self-direction, stimulation, and hedonism) may promote postadoptive EKR use for contributing knowledge. Specifically, these values, which reflect the extent to which individuals are motivated to follow their own intellectual interests to actively adapt to and change their environment (Schwartz, 1992), may be positively associated with the tendency to share knowledge since changing the environment involves collaboration, which, in turn, involves knowledge sharing.

More specifically, changing an environment toward some desired end involves active collaboration because combined efforts tend to produce greater changes than individual efforts, particularly in organizations whose members often work together toward common goals (Schein, 1996). Collaboration involves knowledge sharing so that knowledge of the desired end state and the process involved in achieving it can spread across individuals, thus facilitating a combined effort (Alavi & Leidner, 2001; Davenport & Prusak, 2000). Therefore, if people value change, they should be likely to disseminate their knowledge. Consistent with this analysis, prior descriptive research suggests that both responding to change and being willing to adapt drive knowledge sharing (Davenport & Prusak, 2000). For example, if people value change and are willing to support their organization's goal of leaving its traditional market and entering a new one, they will be likely to disseminate their knowledge concerning major players in the new market (see Figure 5). Moreover, in this example, the values held by individuals are consistent with the values embedded in an EKR, implying that individuals are likely to use

an EKR to contribute their knowledge since such use would correspond to their value of openness to change (Kappos & Rivard, 2008; Leidner & Kayworth, 2006).

Therefore, to the extent to which individuals value following their own intellectual interests to actively adapt to and change their environment, they may be more likely to engage in the postadoptive use of EKRs to share their knowledge concerning the new environment. Consistent with this idea, perceptions of autonomy at work have been shown to promote postadoptive usage (Ahuja & Thatcher, 2005), and openness, in general, has been proposed as a positive human value for knowledge management behaviors (Alavi et al. 2006).

In literatures other than IS (e.g., organizational behavior, social neuroeconomics, cognitive neuroscience), theories help further explain why self-direction, stimulation, and hedonism can be expected to promote knowledge sharing behaviors. Concerning self-direction, role identity research suggests that individuals who espouse this value are more likely to help their co-workers and act in line with organizational interests (Arthaud-Day et al., 2012; Schwartz, 1994), implying that they are likely to share their knowledge with other organizational members to benefit the organization as a whole. The impact of self-direction on acting in line with organizational interests exists because people valuing self-direction seek freedom and independence in their lives; therefore, they expand their roles in the organization to include extra-role behaviors like helping the organization through knowledge sharing (Arthaud-Day et al., 2012; Schwartz, 1994).
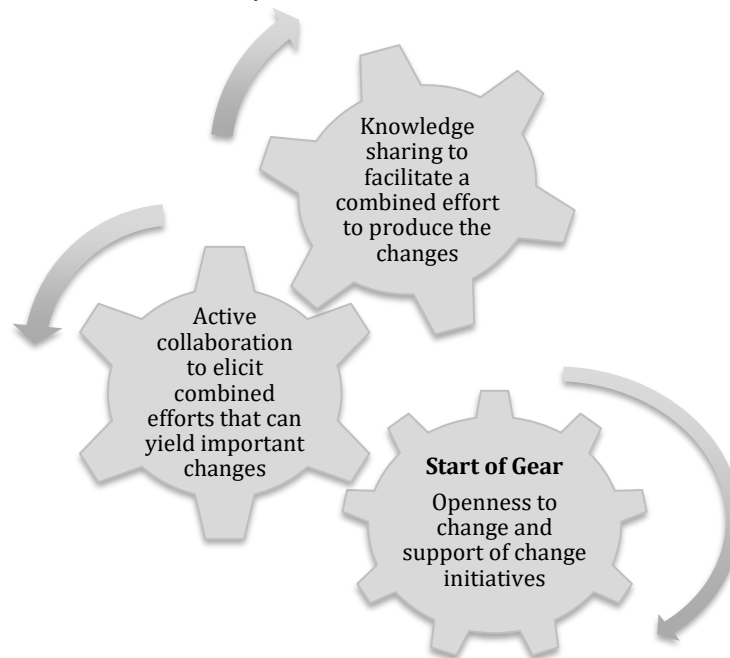
Figure 5. Explanation of the Effect of Openness to Change on Knowledge Sharing (Alavi & Leidner, 2001; Davenport & Prusak, 2000; Schein, 1996)

Concerning the impact of stimulation on knowledge sharing, stimulation has been shown to promote active pursuit of novelty, change, and excitement (Schwartz, 2006), implying that people who value stimulation may be likely to share their knowledge since such an activity can promote change and excitement in their jobs.

Similarly, hedonistic values may be positively related to knowledge sharing since people valuing hedonism are more likely to seek the "warm glow" that accompanies giving-related acts, such as the act of sharing (Harbaugh et al., 2007; Leknes & Tracey, 2008). In fact, recent functional magnetic resonance imaging (fMRI) studies have shown that the act of sharing activates the brain areas associated with pleasure, motivating individuals who value hedonism to voluntarily share something (e.g., their knowledge) (Fehr & Camerer, 2007). Furthermore, hedonic motivations are strongly linked to intrinsic motivations. In fact, hedonic motivations can be considered motivational factors that primarily seek to fulfill users' intrinsic motivations (Lowry et al., 2013; Lowry, Gaskin, & Moody, 2015). Intrinsic motivation often involves many factors, including a need for competence. Fulfilling one's intrinsic motivation increases one's sense of competence (Lowry et al., 2013), which creates a pleasurable experience that the user desires to repeat. Consequently, as users contribute their knowledge to the EKR, they fulfill their intrinsic motivations and enhance their sense of competence, which is a pleasurable experience that they will seek to repeat. As a result, they may be more likely to engage in frequent knowledge contributions.

Moreover, system socialization is an important facet of intrinsic motivation (Lowry et al., 2015). System socialization includes, for example, collaboration, communication, and affiliation with a community of interest (Lowry et al., 2015). All of these aspects of system socialization relate to knowledge sharing, which is a collaborative act that implies communication and affiliation with co-workers. For example, knowledge sharing implies collaboration, communication, and affiliation with co-workers who seek to verify or reuse the contributed knowledge. Consistent with this notion, prior work on knowledge management (KM) has suggested that intrinsic motivation could increase knowledge sharing (Bock et al., 2005).

Moreover, specifically related to self-direction, stimulation, and hedonism, prior IS research has indicated that independence in computer usage (self-direction), excitement (stimulation), and enjoyment (hedonism) positively impact technology usage (Agarwal & Karahanna, 2000; Thatcher, Zimmer, & Grundlach, 2008; van der Heijden, 2004). For example, enjoyment (hedonism) has been shown to impact system usage in the context of a movie-related knowledge platform where users could comment on a movie after they had seen it (van der Heijden, 2004). Similarly, Lowry et al. (2013) showed that intrinsic factors such as joy, immersion, and curiosity predict system use. However, as previously argued, frequency of usage is a key determinant of postadoptive use behaviors (Jasperson et al., 2005); thus, the three values types related to openness to change should exert their impacts on postadoptive use via the frequency of EKR usage (i.e., the frequency of EKR usage acts as a mediator of value-related impacts). Formally:

H3: Self-direction promotes trying to innovate with an EKR for contributing knowledge indirectly via the frequency of EKR use for contributing knowledge.

H4: Stimulation promotes trying to innovate with an EKR for contributing knowledge indirectly via the frequency of EKR use for contributing knowledge.

H5: Hedonism promotes trying to innovate with an EKR for contributing knowledge indirectly via the frequency of EKR use for contributing knowledge.

Theoretical Refinement: Relative Importance of Value Types

The TBHV also allows us to examine the second part of our research question, explaining which values are the most important for promoting innovative EKR usage, because the TBHV suggests that people's values form an ordered system of value priorities (Schwartz, 2006). This system is represented in the circular motivational structure of the TBHV; the value types are ordered by importance relative to one another (see Figure 3) so that for each value dimension (e.g., self-transcendence) relationships of value types (benevolence and universalism) with third variables decrease in both directions around the circle from the most positively to the most negatively associated value (Schwartz, 2006) (e.g., for self-transcendence, benevolence may be the most positively associated value, while universalism is less important). This system of value priorities suggests that once theory identifies the values likely to relate most positively to a variable (e.g., knowledge sharing), the circular motivational structure then implies a specific pattern of relationships for the remaining values (Schwartz, 2006).

The consequences of cooperative behaviors such as knowledge sharing for the goals of the value types suggest that for self-transcendence, benevolence is a more important driver of EKR usage than is universalism (see Figure 6) (Schwartz, 2006). Knowledge sharing is more a matter of conventional decency and care (i.e., benevolence) than of basic commitment to social justice (i.e., universalism) (Alavi & Leidner, 2001).
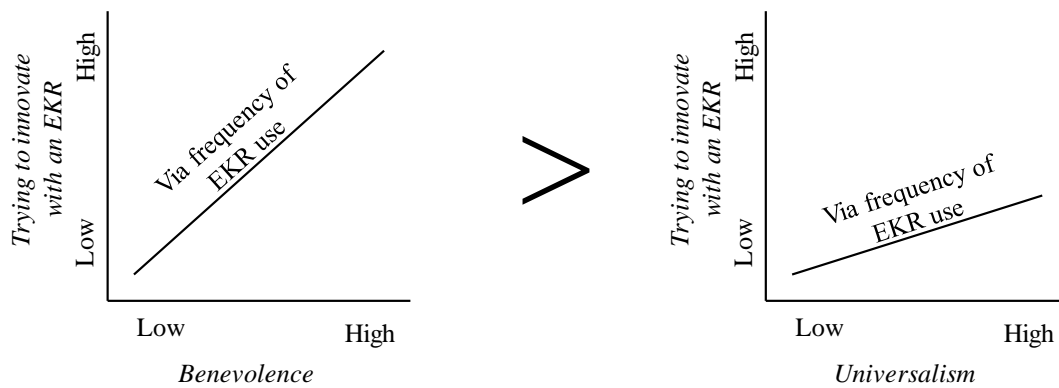
H6: Benevolence has a larger indirect effect than does universalism
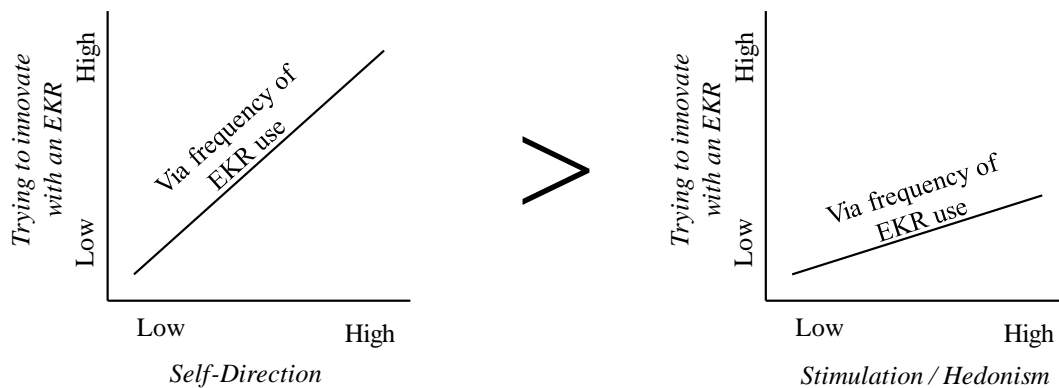
H7: Self-Direction has a larger indirect effect than do stimulation and hedonism

Figure 6. Research Model for the Relative Importance of the Value Types

Additionally, benevolence provides an internalized motivational base for cooperative behaviors like knowledge sharing (Schwartz, 2006). Hence, benevolence should relate to knowledge sharing more strongly than universalism. Consistent with this proposition, Schwartz (1996) found that benevolence correlates more positively with cooperative behaviors like sharing than does universalism.

Similarly, for openness to change, we expect self-direction to correlate more strongly with postadoptive EKR use than stimulation and hedonism since knowledge creation is concerned more with independent thought and action for creating and exploring (i.e., self-direction) than with activation/excitement and enjoyment/sensuous gratification (i.e., stimulation and hedonism) (Davenport & Prusak, 2000). Moreover, self-direction is generally more relevant to cooperative behaviors like sharing than stimulation and hedonism because individuals who value self-direction are more likely to define their jobs broadly to include extra-role behaviors, such as voluntarily contributing their knowledge to EKRs (Arthaud-Day et al., 2012). These individuals are more likely to go above and beyond the

mere "call of duty" (Arthaud-Day et al., 2012). Consistent with this notion, Schwartz (1996) found that, compared with stimulation and hedonism, self-direction correlates more positively with cooperative behaviors like sharing.

Overall, based on the motivational structure of value relations, the order of regression coefficients for our model (based on magnitude) should follow the order around the value circle—from benevolence to universalism for self-transcendence and from self-direction to stimulation and hedonism for openness to change. We hypothesize the following structural relations among the value types for self-transcendence (H6) and openness to change (H7):

H6: Benevolence has a larger indirect effect on trying to innovate with an EKR for contributing knowledge than does universalism.

H7: Self-direction has a larger indirect effect on trying to innovate with an EKR for contributing knowledge than do stimulation and hedonism.

Toward a Complete Understanding: The Negative Value Dimensions

For reasons of completeness, we also examine the negative value dimensions. As discussed earlier in this paper and as shown in the circular motivational structure (see Figure 2, Figure 3, and Table 2), the effects of the negative value dimensions on knowledge sharing should, by definition, be opposite to those of the positive value dimensions (Hitlin & Piliavin, 2004; Schwartz, 2006). For example, the value types associated with self-transcendence like benevolence and those associated with self-enhancement like power have been theorized and empirically shown to have opposite effects on cooperative behaviors like sharing (Schwartz, 1996). Therefore, we expect that the value types of achievement, power, security, conformity, and tradition will have negative impacts on trying to innovate. These effects will be examined in a second study.

3   Methodology and Results

We conducted two studies. Study 1 was a large-scale survey to test the effects of positive value dimensions through frequency of usage on trying to innovate (Hypotheses 1 to 7). These effects are the focus of this paper. Study 2 was conducted to examine whether negative value dimensions have negative impacts on knowledge sharing as the TBHV would lead us to believe.

Study 1

Consistent with prior research on knowledge sharing and on human values (e.g., Bock et al., 2005; Chattopadhyay & George, 2001; Kankanhalli et al., 2005; Wasko & Faraj, 2005), this study employed a large-scale survey to increase research relevance. Furthermore, consistent with prior research on knowledge sharing (e.g., Kankanhalli et al., 2005) and postadoption behaviors (e.g., Jasperson et al., 2005), we collected data from working professionals who had regular access to an EKR for at least three years at the time of data collection.

Following recent IS research (e.g., Ayyagari, Grover, & Purvis, 2011; Roberts & Grover, 2011) and methodological guidelines (Lowry et al., 2016), a market research company was used for data collection. Market research companies aim to provide researchers with samples representative of the general population (Ayyagari et al., 2011). To this end, they carefully construct large databases of panel members who are profiled across many attributes, such as job title, industry, and income (Ayyagari et al., 2011). These companies employ sophisticated quality assurance mechanisms, such as the verification of demographic information provided by panel members against validated consumer databases, quality assurance questions embedded in the surveys, and the identification of fraudulent acts. These mechanisms, together with the

employment of relevant screening questions, prevent sampling and statistical conclusion errors by ensuring that researchers have full access to a well-defined sample frame and can acquire an adequate sample size. In the paragraphs that follow, we report on the panel company used, as well as the sampling and screening methods employed. These methods are the principal means of ensuring data quality (Lowry et al., 2016).

In this study, we used the market research company Empanelonline, which has access to over 2 million individuals (www.empanelonline.com). As part of the panel member recruitment process, Empanelonline verifies that prospective panelists are who they say they are, including the verification of respondents against third-party databases, the validation of email and postal addresses, and the testing of whether respondents' responses are sound (e.g., Empanelonline uses data mining methods to compare respondents' stated income levels to their professions). Through careful maintenance of its panel, Empanelonline also ensures that respondents are qualified to answer surveys. For example, it removes unserious survey takers and implements knowledge-based questions that define whether a respondent is qualified to take a survey. To ensure the highest level of data quality, Empanelonline incorporates cutting edge security features into their panel, (visit www.survalidate.com for more details) including:

- Double opt-in requirements (confirmation that the person joining the panel really wishes to be a member and fully understands what to expect)

- SurValidate digital fingerprinting to protect against fraud and dupes

- CAPTCHA technology to protect against bots

- Survey Hub software to protect against "ghost completes" and to make sure that respondents cannot sneak into a survey uninvited

- A secure interface using Qualtrics software

To satisfy sample frame requirements, we developed four screening questions (see Appendix A). Prospective respondents who satisfied the sample frame requirements by replying to the four questions in accordance with study requirements were able to participate in the study. Those who did not satisfy the sample frame requirements were screened out so that they were unable to participate.

We also used an additional knowledge-based screening question to ensure that respondents were qualified to take the survey. The question was intended to assess whether prospective respondents knew what the purpose of an EKR was. Specifically, we included the following quality assurance question: In your experience, what is the primary goal of electronic knowledge repositories? Answer options were: "Word processing," "Database management," "Creation of presentations," "Content and document management," and "Spreadsheet usage." Only

subjects responding "Content and document management" were allowed to continue with the survey. This question ensured that the respondents understood the context of the study and thus directly targeted directly the desired sample frame.

We also used other kinds of quality assurance mechanisms to ensure that the respondents took the survey seriously. Throughout the survey, we had multiple questions such as: "For this particular question, please select the response option 'moderately disagree.'" Only subjects responding "moderately disagree" to these questions were allowed to continue with the survey. Other respondents were redirected to the end of the survey and their responses discarded.

All prospective respondents were located in the US. In total, 3,126 respondents started the survey and 233 completed it. Most prospective respondents were screened out because (1) they did not satisfy the sample frame requirements, (2) they did not fully understand the purpose of an EKR as a system for content and document management, or (3) they did not take the survey seriously (e.g., they were straight-lining). For example, 1,381 prospective respondents were screened out because they had not used an EKR for long enough (i.e., less than one year) and 830 were screened out because their knowledge contributions were required rather than voluntary. These respondents were redirected to the end of the survey and their answers discarded. This left us with 233 usable responses that satisfied our sample frame requirements as well as the various quality assurance mechanisms (e.g., understanding the context of the survey, taking the survey seriously, etc.). We paid US$25 per completed response. While relatively high, this price was justified given Empanelonline's strict panel management and verification procedures (including a double opt-in process) and our various quality assurance mechanisms necessary to ensure high data quality.

We collected data from 233 respondents. This sample size compares favorably to prior research in this area that has generally used sample sizes between 150 and 175 respondents (e.g., Bock et al., 2005; Kankanhalli et al., 2005; Wasko & Faraj, 2005). Most of the respondents were males (71%) and in the age group of 35 to 54 years (49%). On average, the respondents had an organizational tenure of eight years.

The respondents were queried regarding their EKR use behaviors and human values (see Appendix B). All use-related measures were adapted from prior IS research (frequency of use was adapted from Kankanhalli et al., 2005, and trying to innovate was adapted from Ahuja and Thatcher, 2005). To measure the human values associated with the TBHV, we used the Schwartz Value Survey (Schwartz, 1992, 2006). This survey, developed to operationalize the TBHV, was designed to provide optimal coverage of the circular motivational structure and of the heterogeneous content of the different value types (Schwartz, 2006). To ensure good content validity, the number of items used to measure each value type reflects the diversity of the conceptual elements in its definition. Hence, universalism is measured with the largest number of items and hedonism with the smallest. Overall, the survey emphasizes optimal coverage of the elements of each value type (Schwartz, 2006), an approach consistent with the understanding that in IS research values are wide-ranging and must be defined broadly (Tams, 2013). Consistent with prior research, we also captured gender, age, and organizational tenure as controls (Ahuja & Thatcher, 2005; Durcikova et al., 2011; Kankanhalli et al., 2005).

Constructs were modeled as formative or reflective following guidelines from Petter, Straub, and Rai (2007). In general, construct indicators should be modeled as formative rather than reflective when they are the defining characteristics of a construct rather than manifestations of the construct, when they are not interchangeable, or when they draw on different nomological networks or have potentially differing antecedents and consequences. In line with these guidelines and consistent with prior research (e.g., Ahuja & Thatcher, 2005; Kankanhalli et al., 2005; Limayem et al., 2007; Schwartz, 1992, 1994), we modeled the Schwartz value dimensions as formative and the use-related measures as reflective.

Before evaluating our hypotheses using formal tests of mediation, we followed two fundamental procedures. First, we standardized all of our measures using Zscores (Cohen et al., 2003) because of the different scale anchors used in the sociological sciences and in IS research. While the Schwartz Value Survey (SVS) response categories range from -1 to 5, the scales adapted from past IS research have response categories ranging from 1 to 7. The standardization procedure enabled us to conduct regression and correlational analyses in spite of the different distributions associated with these different scale anchors (Cohen et al., 2003; Tabachnik & Fidell, 2007).

Second, we assessed our survey instrument and computed the path coefficients using partial least squares (PLS). PLS models can include both formative and reflective indicators. Consistent with recent IS research (e.g., Furneaux & Wade, 2011; Kim & Benbasat, 2010; Polites & Karahanna, 2012), we used SmartPLS 2.0 for this evaluation. Following guidelines advanced by Chin et al. (2003), all indicators were standardized to avoid computational errors, and we used 500 bootstrap resamples to evaluate the significance of the path coefficients. Below, we report the PLS results following the reporting standards of Ringle, Sarstedt, and Staub (2012) and Gefen et al. (2011), as well as those of recent IS research (e.g., Marett, Otondo, & Taylor, 2013).

Table 4. Quality Criteria and Descriptives of Construct Measures

Construct	Number of items	AVE	Composite reliability	Mean	*SD*	Range
Universalism	8	n/a	n/a	3.83	0.74	4.00
Benevolence	5	n/a	n/a	4.04	0.64	3.00
Self-direction	5	n/a	n/a	3.90	0.70	3.00
Stimulation	3	n/a	n/a	3.47	1.00	6.00
Hedonism	2	n/a	n/a	3.64	0.90	5.00
Frequency of EKR use	4	0.82	0.95	6.03	1.03	6.00
Trying to innovate with an EKR	4	0.84	0.96	5.64	1.18	6.00

Note: AVE = average variance extracted; n/a = not applicable to formative measures

As regards the instrument validity of the reflective constructs (i.e., frequency of EKR use and trying to innovate with an EKR), their AVE values (average variance extracted) were above 0.50 (see Table 4) and the square root of the AVE for each construct was higher than the correlations between that construct and the other constructs in the model, indicating sufficient convergent and discriminant validity. The composite reliability scores were also high (all > 0.8), indicating good reliability (Gefen et al., 2011; Ringle et al., 2012; Werts, Linn, & Joreskog, 1973).

The formative constructs (i.e., benevolence, universalism, self-direction, stimulation, and hedonism) were validated following Petter et al. (2007) as well as Cenfetelli and Bassellier (2009) by examining the significance of the indicator weights, the variance inflation factors (VIF) that might point to multicollinearity among the indicators, and the loadings when the indicator weights were not significant. The indicators showed no evidence of multicollinearity (all VIFs were lower than the 3.33 threshold recommended by Cenfetelli and Bassellier, 2009), and the indicators had significant weights on their respective formative constructs and/or significant loadings. Hence, there was evidence of good measurement properties (Gefen et al., 2011; Petter et al., 2007; Ringle et al., 2012; Straub et al., 2004).

Moreover, we used both procedural and statistical remedies to control for common method variance (CMV) (Podsakoff et al., 2003). More specifically, we protected respondent anonymity, reduced evaluation apprehension, and assessed the significance of CMV in our data statistically using the single factor test (Malhotra et al., 2006; Mossholder et al., 1998; Podsakoff et al., 2003). In this approach, all indicators reflect a single construct representing method effects. Method variance is considered significant if the model fits the data. The underlying logic is that if the covariation among the indicators is due to method bias, a single (method) factor fits the data (Podsakoff & Organ, 1986). In our data, a one-factor model exhibited large misfit (chi square = 2,606.20, CFI = 0.64, RMSEA = 0.12), suggesting that CMV was not a problem.

Since the instrument exhibited good measurement properties, we calculated the path coefficients in PLS (see Figure 7) and conducted formal tests of our mediation hypotheses using the Sobel test (Sobel, 1982). This test is recommended over the causal steps approach (Baron & Kenny, 1986) because it is a more direct test of the indirect effect that accounts for several of the problematic assumptions in the causal steps approach (Zhao, Lynch, & Chen, 2010).[2] The results showed that three of the hypothesized five indirect

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[2] According to Zhao et al.'s (2010) paper published in the influential *Journal of Consumer Research*, Baron and Kenny's test makes two improper assumptions. Both relate to the fact that Baron and Kenny's test is not a direct test of the indirect effect but rather tests the indirect effect indirectly through a number of disparate regression models. First,

Baron and Kenny claim that mediation is strongest when there is an indirect effect but no direct effect in Step 3. Yet the strength of mediation can best be measured by the size of the indirect effect rather than by the lack of a direct effect because mediation is by definition concerned with the indirect effect. For the same reason, a significant "effect to

effects were significant (see Table 5). More specifically, a significant indirect effect was found for the relationship between benevolence and trying to innovate with an EKR (β = 0.132, *SE* = 0.063, *p* < 0.05), supporting H1. Moreover, a significant indirect effect was found for the relationship between universalism and trying to innovate with an EKR (β = 0.127, *SE* = 0.063, *p* < 0.05), supporting H2. A significant indirect effect was also found for the relationship between self-direction and trying to innovate with an EKR (β = 0.138, *SE* = 0.056, *p* < 0.05), supporting H3. However, significant indirect effects were not found for the relationships between stimulation and trying to innovate with an EKR (β = 0.012, *SE* = 0.045, *p* > 0.05) or between hedonism and trying to innovate with an EKR (β = -0.004, *SE* = 0.041, *p* > 0.05). Overall, the results indicate that certain values can promote the postadoptive use of EKRs for making knowledge contributions by increasing the frequency of EKR use for making such contributions.

Relative importance can be evaluated based on the relative magnitude of the regression coefficients (Cohen et al., 2003). To test whether the differences in coefficients were significant, we used Cohen et al.'s (2003) conservative test for differences between regression coefficients:

$$\frac{BV - BW}{\sqrt{(SEBv)^2 + (SEBw)^2}} \qquad (1)$$

where BV is the product of Paths a and b paths for Variable Pair 1, BW is the product of Paths a and b paths for Variable Pair 2, and SE denotes the standard errors for these indirect effects.

For H6, benevolence had a higher coefficient than did universalism (see Figure 8 and Table 6). While this difference in coefficients was consistent with our prediction, it was not statistically significant. However, self-direction showed a significantly higher coefficient for trying to innovate with an EKR than did stimulation and hedonism, supporting H7
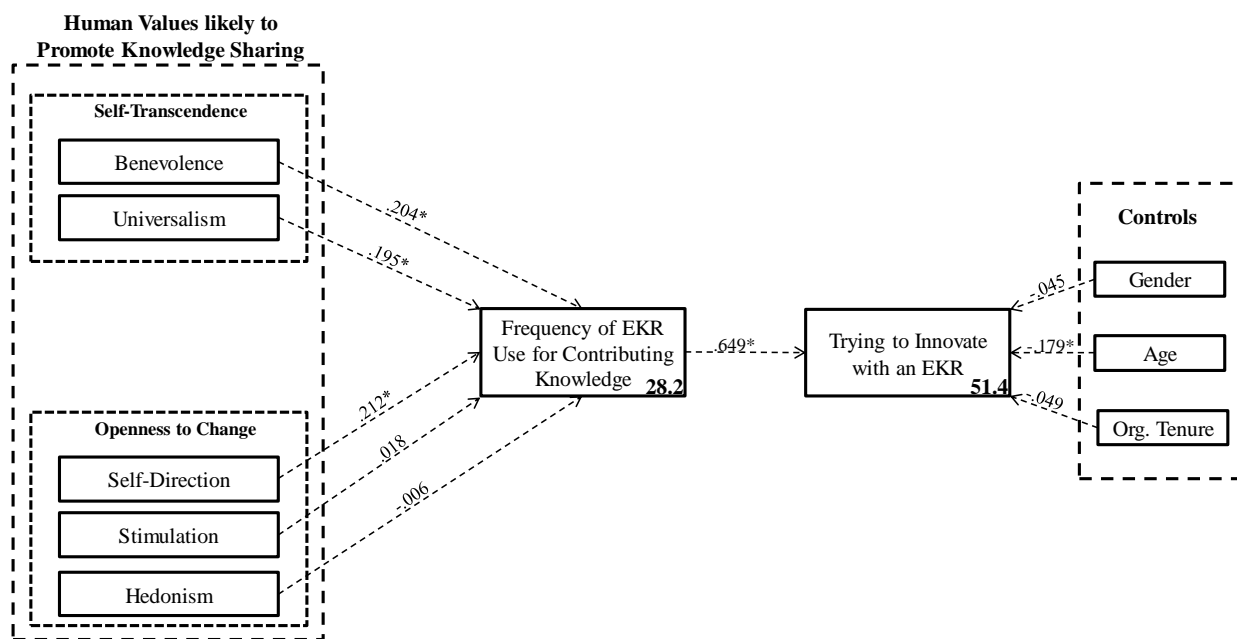
* indicates significance at the 0.05 level. Numbers in **bold** are variance explained.

Figure 7. PLS Results

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be mediated" in Step 2 is not needed. The only requirement to establish mediation should be that the indirect effect (i.e., the product of Paths a and b) is significant. Moreover, it is not sufficient to show that the total effect of the independent variable is reduced when the mediator is added to the model as this reduction does not indicate a significant difference between the two models. Similarly, this reduction does not

indicate a significant indirect effect in the numerator of Step 4 when evaluated against the standard error of the indirect path in the denominator. The Sobel test accounts for these problems by directly evaluating the indirect effect as the product of Path a (Independent Variable → Mediating Variable) and Path b (Mediating Variable → Dependent Variable).
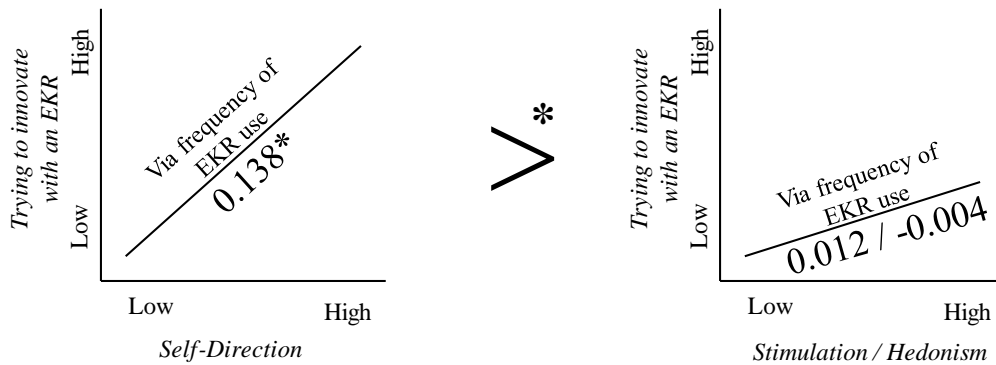
Table 5. Test of the Significance of the Indirect Effects

Hypothesis #	Hypothesis	Mediating effect	Support
H1	Benevolence leads to trying to innovate with an EKR via the frequency of EKR use	0.132*	Supported
H2	Universalism leads to trying to innovate with an EKR via the frequency of EKR use	0.127*	Supported
H3	Self-Direction leads to trying to innovate with an EKR via the frequency of EKR use	0.138*	Supported
H4	Stimulation leads to trying to innovate with an EKR via the frequency of EKR use	0.012	Not supported
H5	Hedonism leads to trying to innovate with an EKR via the frequency of EKR use	-0.004	Not supported
Note: * indicates significance at the 0.05 level			
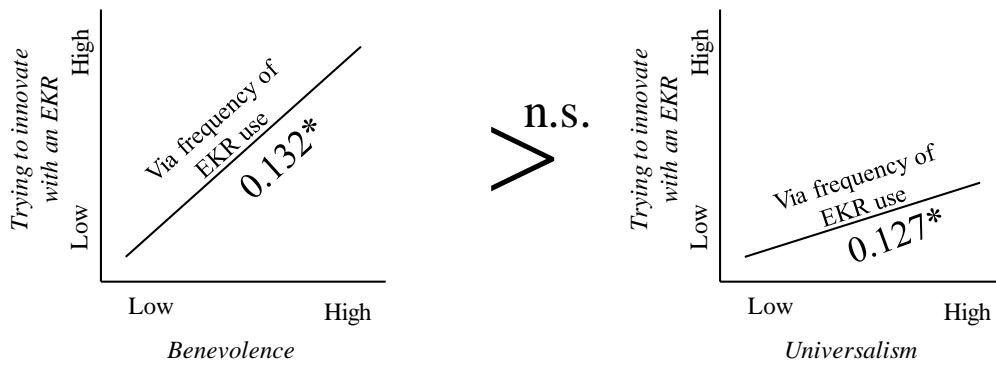
H6: Benevolence has a larger indirect effect than does universalism

H7: Self-Direction has a larger indirect effect than do stimulation and hedonism

* indicates significance at the 0.05 level.

Figure 8. Results for the Relative Importance of the Value Types

Table 6. Results for Relative Importance

Hypothesis #	Hypothesis	Regression coefficients
H6	Benevolence has a larger indirect effect on trying to innovate with an EKR for contributing knowledge than does universalism.	β (benevolence) = 0.132 β (universalism) = 0.127
H7	Self-Direction has a larger indirect effect on trying to innovate with an EKR for contributing knowledge than do stimulation and hedonism.	β (self-direction) = 0.138 β (stimulation) = 0.012 * β (hedonism) = -0.004 *
Note: * indicates that the difference between regression coefficients is significant at the 0.05 level		

Study 2

Consistent with past research on knowledge sharing that has generally focused on factors likely to promote the utilization of EKRs by knowledge contributors (e.g., Bock et al., 2005; Wasko & Faraj, 2005), Study 1 focused on the value types that are likely to promote EKR usage by knowledge contributors and found that benevolence, universalism, and self-direction have this desirable impact. In contrast, the value dimensions of self-enhancement and conservation should have negative impacts on EKR usage by knowledge contributors as the TBHV indicates. According to this theory, the effects of the value types related to self-enhancement and conservation should, by definition, be opposite to those identified in Study 1. However, this hypothesis cannot substitute for original empirical research, which means that further development of a comprehensive taxonomy of human values should also evaluate the remaining value types and demonstrate how they relate to the ones examined in Study 1. This was the goal of Study 2.

To operationalize the remaining value types, Study 2 used the short version of the SVS described by Lindeman and Verkasalo (2005). In the short SVS, each value type is measured with one item indicating the value type along with its value items as descriptors (see Appendix C). Data were collected from 51 respondents using the same sample specifications, market research company, and quality assurance mechanisms as in Study 1. However, to extend our original model, we substituted deep usage for frequency of use. Deep usage goes beyond frequency of use and should have a more direct link to individuals' innovation behaviors (Burton-Jones & Gallivan, 2007; Burton-Jones & Grange, 2012; Burton-Jones & Straub, 2006). Therefore, deep usage should be more immediately relevant to our study than frequency of use. We measured deep usage using a three-item scale adopted from Burton-Jones and Straub (2006). A sample item is "I use most of the available

features of the EKR to share my knowledge with others."

Moreover, in addition to the control variables used in Study 1, we added the following controls (see Appendix C): type of EKR used (Lotus Notes, Microsoft SharePoint, Salesforce.com chatter tool, company intranet, company Wiki, or other), the organization size, and the organization's sharing culture (extent to which the organization offers extrinsic and intrinsic incentives for knowledge contributions, especially monetary compensation and reputation).

The results confirmed our expectations. The value dimensions of self-enhancement and conservation had negative impacts on EKR usage by knowledge contributors. Specifically, we found a negative indirect effect of achievement through deep usage on trying to innovate (β = -0.842, SE = 0.419, $p < 0.05$). Likewise, a negative indirect effect of power on trying to innovate via deep usage was found (β = -0.856, SE = 0.354, $p < 0.05$). Similarly, we found a negative indirect effect of security through deep usage on trying to innovate (β = -0.631, SE = 0.348, $p < 0.05$). Consistent with these results, we also obtained a negative indirect effect of conformity on trying to innovate via deep usage. However, this effect was not significant (β = -0.337, SE = 0.285, $p > 0.05$). Finally, we found a negative indirect effect of tradition on trying to innovate via deep usage (β = -0.697, SE = 0.330, $p < 0.05$). Taken together, these results support the hypothesis that the value dimensions of self-enhancement and conservation have negative impacts on EKR usage.

4   Implications for Research

This paper examines whether human values impact knowledge contributors' attempts to innovate with EKRs. This endeavor is important not only because knowledge contributions are critical for organizational success but also because of the difficulty associated with generating such contributions, especially given

that the globalization of business requires people from diverse backgrounds to work together. The results from Study 1 show that human values do impact trying to innovate with EKRs; in particular, most of the value types associated with self-transcendence and openness to change impacted EKR usage. Based on the magnitudes of the regression coefficients, the results of Study 1 also show that self-direction was the most important value type in the openness to change category and that benevolence was the most important value type in the self-transcendence category; however, only the former result was statistically significant. The results from Study 2 complete our understanding of the role of human values in knowledge sharing by demonstrating that self-enhancement and conservation values have negative relationships to knowledge contributions to EKRs.

Thus, this study improves our understanding of the complex relationships between human values and postadoptive use in the context of knowledge sharing and it quantitatively validates the importance of values for EKR usage.

Overall, this study makes a number of contributions both to knowledge management research and to IS research on human values (see Table 7). First, it validates prior research on the impact of values on knowledge sharing that was largely descriptive in nature (e.g., Alavi & Leidner, 2001; Davenport & Prusak, 2000; Ravishankar, 2011) by showing that human values can be used in predictive variance models to predict EKR usage for contributing knowledge.

Table 7. Value Added by this Research

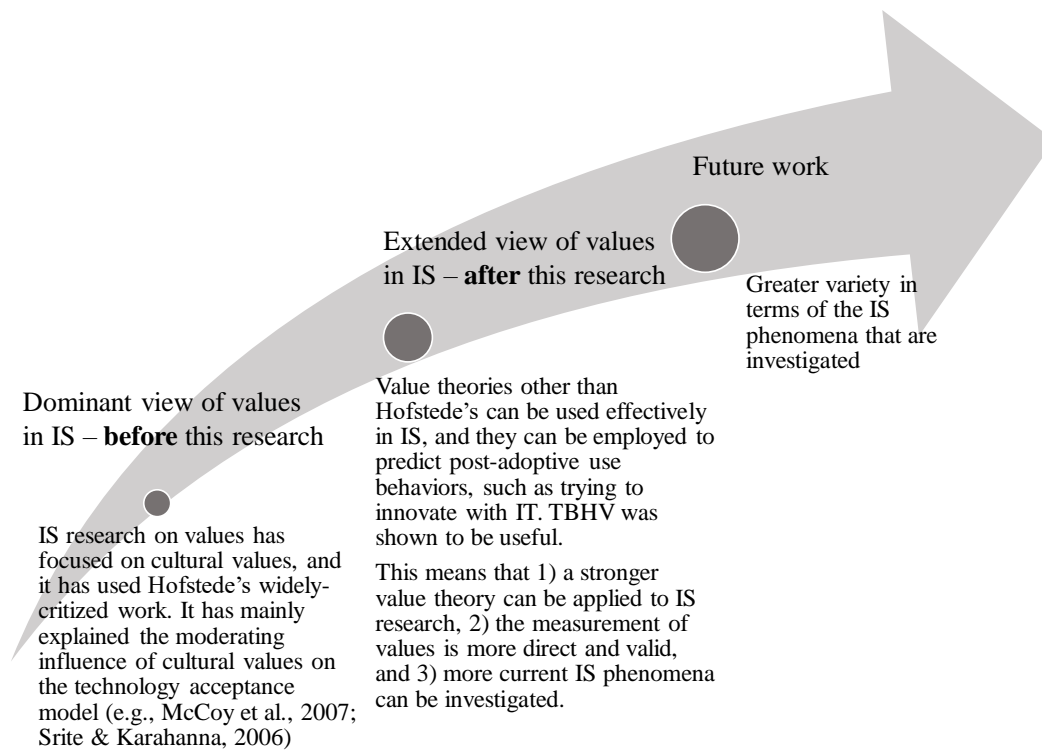| Findings of the present study	Theory used	State of knowledge before this study	Potential to build on prior knowledge	Value added by this study	Practical implications of this study
Human values can be used to predict (quantitatively) knowledge contributions to EKRs	Theory of basic human values	Values were described as having an impact on knowledge sharing, and a few relevant values were identified through qualitative case study research	Creating a refined theoretical understanding of the relationship between culture and knowledge sharing by adopting a theory-driven approach	Enriched theoretical understanding of why values impact knowledge sharing	Managers must be aware that values improve knowledge sharing when they are aligned with the values held by EKRs
Precise, theory-driven, and specific understanding of what types of values impact knowledge sharing	Theory of basic human values	A few relevant values were identified through well-constructed exploratory research (case studies)	Treating people's value systems as coherent structures, connecting a carefully selected set of values to knowledge sharing in an organized, integrated manner	Treating value systems as coherent structures and connecting a carefully selected set of values to knowledge sharing in an organized, integrated manner	Managers must promote values related to self-transcendence and openness to change in the workforce, especially self-direction and benevolence (but the relative importance of benevolence was not statistically conclusive)
Prediction of the Postadoptive usage of EKRs	Research and theory on postadoptive technology usage	Instrumental, rational belief constructs can be used to predict the initial acceptance of EKRs for contributing knowledge (e.g., usage intentions)	Predicting postadoptive usage of EKRs, which only occurs after workers have initially accepted the EKR, and advancing understanding of how such usage can be predicted	Demonstrating that nonrational values can be used to predict the postadoptive usage of EKRs by knowledge contributors	Managers must realize that values related to self-transcendence and openness to change can promote the postadoptive usage of EKRs by knowledge contributors

Future work

Extended view of values
in IS – **after** this research

Greater variety in
terms of the IS
phenomena that are
investigated

Dominant view of values
in IS – **before** this research

Value theories other than
Hofstede's can be used effectively
in IS, and they can be employed to
predict post-adoptive use
behaviors, such as trying to
innovate with IT. TBHV was
shown to be useful.

This means that 1) a stronger
value theory can be applied to IS
research, 2) the measurement of
values is more direct and valid,
and 3) more current IS phenomena
can be investigated.

IS research on values has
focused on cultural values, and
it has used Hofstede's widely-
critized work. It has mainly
explained the moderating
influence of cultural values on
the technology acceptance
model (e.g., McCoy et al., 2007;
Srite & Karahanna, 2006)

Figure 9. Principal Value Added by this Study

Second, it extends the few pioneering, empirical prior studies on the impact of values on knowledge sharing that were largely data driven (Alavi et al., 2006; Leidner, 2010; Leidner et al., 2006) by applying a pertinent value theory, yielding an enriched explanation, prediction, and analysis of values' impacts on knowledge sharing (Schwartz, 2006).

Third, in using the TBHV, the present study extends prior pioneering, empirical research that was largely exploratory in nature (Alavi et al., 2006; Leidner et al., 2006) by treating people's value systems as coherent structures. In doing so, this study relates a carefully selected set of values to EKR usage in an organized, integrated manner (Schwartz, 2006). As a result, this study provides organizations with specific guidance on what values they should promote to support their knowledge sharing objectives.

Fourth, while prior research on EKR usage by knowledge contributors has greatly advanced our understanding of how to promote intentional and, hence, initial and irregular knowledge contributions (e.g., Bock et al., 2005), this study explains how organizations can promote employees' attempts to innovate with an EKR, which goes well beyond basic usage. Thus, this study speaks to the contemporary problem of underutilized EKR features rather than the less current problem of system resistance.

Finally, this study demonstrates that human values can be used effectively in the postadoption context. In addition, since Schwartz's Value Survey is universal by design and has been validated in over 70 countries, our findings can be cross-validated across a range of organizational and national settings (Arthaud-Day et al., 2012; Schwartz, 2006; see Figure 9).

This study shows that the TBHV can predict the postadoptive usage of EKRs in the context of KM. There is reason to believe that these values or virtues (given that they seek a beneficial goal) can potentially provide much of the intellectual thrust in IS in the future and that they can contribute to IS research in general, not only KM[3]. In particular, it has often been suggested that cultural values influence IS acceptance and use in general (e.g., Gallivan & Srite, 2005; Karahanna et al., 2005; Leidner & Kayworth, 2006; McCoy et al., 2007; Srite, Thatcher, & Galy, 2008; Srite & Karahanna, 2006). For example, Srite and Karahanna (2006) found that the strengths of the relationships in the technology acceptance model depended on espoused national cultural values such as uncertainty avoidance or power distance. Our study sheds light on how broader, more universal values shape the use of information technology.

Values might be widely applicable across IS phenomena and technologies, and the TBHV could potentially impact various aspects of IS research,

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[3] We thank an anonymous reviewer for suggesting that human values can be useful for IS research in general.

including IS design, implementation, and use. This conclusion holds especially true since the TBHV is consistent with the sociotechnical tradition in IS research. One example of the wide applicability of the TBHV relates to analytics, a topic that may, at first, seem far removed from human values. In analytics and the statistical recommendations that follow, prime importance is often given to statistically significant relations, whereas fundamental human concerns such as privacy, comfort, or intrusiveness tend to be overlooked. Absent a richer understanding of human values and their implications for technology use, we lack a foundation for understanding how initiatives like the Bright ICT can help ameliorate human exploitation and dehumanization across the world (Lee, Cho, & Lim, 2018). Armed with the TBHV, IS researchers can begin to address such problems.

Our theoretical framing can also be linked to the emerging literature on organizational virtues.[4] Organizational virtues are values that are beneficial for an organization (Chatterjee & Sarker, 2013). Specifically, possessing these virtues (or beneficial values) enables organizations to become more innovative (Chatterjee et al., 2015). If the logic of organizational virtues extends to the individual level of analysis, then one could make two assumptions: First, the TBHV's value dimensions self-transcendence and openness to change can be considered virtues because they are beneficial for knowledge sharing; second, in light of our results, virtues might positively impact the innovative use of EKRs for making knowledge contributions. This inference holds especially true since, at least at the organizational level, virtues enable organizations to become moral agents and to develop core ethical characteristics (Walsham, 1993). Ethics, in turn, are not only related to values but also to knowledge: "to be ethical is to be knowledgeable and to be knowledgeable is to be ethical" (Chatterjee & Sarker, 2013, p. 454). Many philosophers have discussed the intertwining relationships among ethics, values, innovation, and knowledge, but these ideas have received little attention in the IS literature (Walsham, 1996; Chatterjee & Sarker, 2013). In this sense, the powerful lens of virtue ethics could complement and enhance research on knowledge sharing. Likewise, the four key components of positive organizational scholarship,[5] namely self-efficacy, hope, optimism, and resiliency, could prove useful in predicting knowledge sharing. Future work could explore these ideas related to virtue ethics and positive organizational scholarship.

5   Implications for Practice

This research also yields important implications for organizations struggling with the underutilization of EKRs after their initial adoption. First, this research suggests that managers may be well-advised to consider candidates' values in hiring decisions. Other factors being equal, prospective employees valuing benevolence, universalism, self-direction, stimulation, and hedonism should be given preference. To this end, managers could administer the Schwartz Value Survey to candidates since it was shown in this research to have good measurement properties. Moreover, on the basis of prior research discouraging the "big bang" approach to knowledge management initiatives (e.g., Davenport & Prusak, 2000), the present study indicates that managers should target divisions or departments for pilot installations of EKRs that are characterized by a relatively large number of employees valuing benevolence, universalism, self-direction, stimulation, and hedonism.

The study also shows that self-direction is the most important value type in the openness to change category to foster in the workforce, while benevolence may be the most important value type of the self-transcendence category to nurture (although there was no conclusive evidence for the latter inference, the difference in means was in the expected direction). As a result, this study offers specific recommendations to practitioners regarding various managerial approaches that can be taken to achieve better EKR utilization. It is often impractical to simultaneously consider several related factors, such as several value types, when making hiring decisions or decisions about where to implement EKRs in an organization. To help managers resolve this impracticality, this study's findings indicate which values are particularly relevant and should be the focus of managerial decision-making. By using these findings, decision makers can improve their decisions in terms of both validity and utility (LeBreton et al., 2004). For example, concerning the openness to change value category, the relative importance analysis conducted here revealed that self-direction is the most important value type in the context of postadoptive EKR usage by knowledge contributors, with stimulation and hedonism having significantly lower levels of importance. In this instance, organizational decision makers might elect to drop stimulation and hedonism from the test battery used for the recruitment process. Such a decision could result in a more parsimonious test battery with higher validity and increased utility (conditional on the total costs of the assessments dropped) (LeBreton et al., 2004).

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[4] We thank an anonymous reviewer for pointing us to the interesting literature on virtue ethics.

[5] Positive organizational scholarship is an emerging field in the organizational behavior literature that seeks to understand what represents the best of the human condition.

Additionally, and perhaps most importantly, this study has important implications for job redesign since managers often face situations in which existing employees do not share the values that we demonstrated promote knowledge contributions to EKRs. In such situations, our findings suggest that managers could benefit from adjusting their employees' job designs to influence employees' value formation. It has been shown that, over time, people adapt their values to their life circumstances (Schwartz, 2006) in that they upgrade the importance attributed to values they can more readily attain (Schwartz & Bardi, 1997). For example, research has shown that employees in jobs that provide freedom of choice upgrade the importance they attribute to self-direction values (Kohn and Schooler, 1982). Self-direction values, in turn, have been shown in this study to be important drivers of EKR usage. Hence, managers facing situations in which existing employees do not value self-direction as much as desired may benefit from empowering those employees and from affording them more freedom of choice in their jobs. As a result, those employees might upgrade the extent to which they value self-direction, thus eventually increasing their knowledge sharing tendencies and their contributions to EKRs.

Moreover, our results yield implications for value-sensitive design. Value-sensitive design is a design approach that considers human values throughout the design process in a principled and comprehensive manner (Friedman et al., 2013). According to our results, EKR designers should emphasize the values of benevolence, universalism, and self-direction throughout the design process. For example, trust is critical for benevolent behavior. Therefore, designers of EKRs should design their systems in such a way that users trust the system's helpfulness, reliability, and functionality (McKnight et al., 2011). When users trust an EKR, they may perceive greater benevolence in the context of its usage, thus contributing more knowledge to it. Future research in the area of design science could propose specific IT artifacts that consider these values.

6   Limitations and Future Research

Like any research, this study has a few limitations. First, consistent with prior IS research in the areas of values and knowledge management (e.g., Bock et al., 2005; Kankanhalli et al., 2005; Srite & Karahanna, 2006), this study did not employ a longitudinal research design, potentially limiting its internal validity. However, this study adopted other research design elements strengthening its internal validity. Specifically, by using the TBHV this study measured human values directly by querying respondents regarding their basic values; respondents were asked to rate the extent to which basic values represented

guiding principles in their lives (Schwartz, 1992). This approach is consistent with Straub et al.'s (2002) call for theory-based, individual-level research on human values and IT usage and ensured high internal validity compared to past IS studies on values. Typically, past studies have not employed actual measurements of values (Straub et al., 2002). Rather, they have often drawn conclusions on the basis of potentially outdated country scores—for example, the operationalization of human values through a comparison of US citizens with the Japanese based on data collected in the 1960s.

Second, it is possible that common method bias may have affected our results. To reduce the likelihood of method bias influencing our results, we used attention tasks ensuring that respondents took the survey seriously and did not engage in straight-lining. For example, as discussed above, throughout the survey we implemented multiple attention tasks such as: "For this particular question, please select the response option 'moderately disagree.'" Subjects who did not respond as expected to these questions were redirected to the end of the survey and their responses discarded. Thus, it was unlikely that the subjects responded in some methodological way to our survey. Consistent with this conclusion, our earlier analysis showed that a single factor representing method effects did not fit the data. Therefore, it is unlikely that method bias significantly influenced our results.

Third, to advance understanding of what factors promote innovative EKR usage, this research focused on the value dimensions likely to promote such usage. This focus is consistent with our study objective. Nevertheless, there might be another side to EKR utilization, namely deliberate resistance. This other side could be explored on the basis of the remaining value dimensions. However, the effects of the remaining value dimensions should, by definition, be the mere opposites of the effects of self-transcendence and openness to change (Schwartz, 2006), implying that the inclusion of the remaining value dimensions in this study would have reduced the parsimony of our model without being likely to increase its predictive power or the guidance it can provide to managers. In any case, since this idea does merit further investigation, we examine it from a theoretical and empirical perspective as follows.

This study offers four important directions for future research: (1) developing an understanding of for whom (i.e., for what types of users) these values manifest in postadoptive EKR usage; (2) understanding the relative importance of the different value types for nonutilitarian, hedonic systems; (3) examining questions regarding knowledge reuse; and (4) conducting omnibus tests of continuance and innovation.

1. Discovering for whom these values manifest in postadoptive EKR usage: This research found that human values can promote postadoptive EKR use by knowledge contributors via the frequency of EKR use. Further insight could be gained by studying the types of users for whom these indirect effects crystallize (i.e., first- or second-stage moderated mediation; Muller et al., 2005). As EKRs become increasingly infused in organizations, it becomes increasingly important to examine whether factors such as age or gender moderate the nomological network between use-related antecedents such as human values or usage (Venkatesh, Thong, & Xu, 2012). For example, the impacts of values on EKR usage uncovered here may be bounded by gender such that they are stronger for females than for males (Schwartz & Rubel, 2005). In this case, the use-history-related mediating process that intervenes between values and postadoptive EKR usage would be different for female versus male users. As such, gender would contribute to the varying relevance of values manifested in EKR usage by knowledge contributors. Such insight would further contextualize our results, bounding their applicability and yielding an even more detailed and specific understanding of the EKR use phenomenon.

2. Understanding the relative importance of the different value types for hedonic systems: Our research found that self-direction was the most important value type in the openness to change category in the context of postadoptive EKR usage and suggested that benevolence may be the most important value type in the self-transcendence category (there was no conclusive evidence for the latter inference, but the difference in means was in the expected direction). These findings highlight the relative importance among the different value types for EKR usage by knowledge contributors. Understanding relative importance is a "key question" in organizational research (LeBreton & Tonidandel, 2008, p. 330) because such an understanding yields more nuanced explanations of, for example, drivers of postadoptive EKR usage. More specifically, the findings related to relative importance aid in explaining the extent to which each value drives postadoptive EKR usage, and they also facilitate the development of parsimonious models of the impacts of human values since they enable the identification of a more succinct set of relevant values. The latter contribution is particularly important; parsimony is a critical evaluation criterion for theoretical models since models function to reduce complexity: "A theory which can best approximate this ideal (i.e., a parsimonious theory) is preferable to one that does less to reduce the complexity of the empirical world" (Bacharach, 1989, p. 509). However, since this study set out to shed light on the use of organizational knowledge repositories, it was necessarily limited to the context of utilitarian systems (i.e., EKRs). Future research could examine the relative importance of value types for hedonic systems and may yield a different ordering among the value types, suggesting, for example, that hedonism is more important than self-direction. Such a finding could refine current theory in hedonic system usage (e.g., van der Heijden, 2004).

Moreover, while we direct attention to postadoptive use (e.g., deep use and trying to innovate), it might be useful to examine whether the values that we examine are also relevant to the initial use of information technology. Where Srite and Karahanna (2006) direct attention to national values, our work suggests that rich insight might be gleaned from examining the relative importance of values tied to the impact of daily life on decisions about when and how to use technology (e.g., benevolence, universalism, stimulation, hedonism, and self-direction). This is particularly important for understanding hedonic system use, given that meta-analytic results have offered competing explanations for drivers of hedonic system use. Values may thus constitute a boundary condition that helps explain differences across studies (Wu & Lu, 2013).

3. Examining questions regarding knowledge reuse by knowledge seekers: This study focused on knowledge contributors and their knowledge contributions to EKRs. Another important phenomenon concerns knowledge reuse by knowledge seekers. It would be useful from an IS research standpoint to examine some idiosyncrasies of EKRs in terms of knowledge reuse, evaluating, for example, how these idiosyncrasies can contribute to or impede knowledge reuse. One especially interesting question is whether knowledge reuse from EKRs can contribute to information overload. Another interesting but broader question is whether EKRs can discourage knowledge reuse. A related question is whether EKRs are structured adequately enough to allow knowledge seekers to easily find the information they are looking for. To answer such questions, we collected some additional data as part of Study 2. Specifically, we asked the respondents three additional questions, using 7-point Likert-type scales:

1. When you seek to reuse knowledge from the EKR that others contributed, do you feel that knowledge reuse leads to information overload?

2. When you seek to reuse knowledge from the EKR that others contributed, do you feel discouraged from reusing knowledge?

3. When you seek to reuse knowledge from the EKR that others contributed, do you feel that the EKR is adequately structured so that you can find the information you are looking for easily?

Table 8. Frequency Distribution for Information Overload Experienced by Knowledge Seekers

Response option	Frequency	Percent
1 (strongly disagree)	7	13.7
2 (moderately disagree)	9	17.6
3 (slightly disagree)	14	27.5
4 (neutral)	4	7.8
5 (slightly agree)	8	15.7
6 (moderately agree)	5	9.8
7 (strongly agree)	4	7.8

Table 9. Frequency Distribution for Discouragement Experienced by Knowledge Seekers

Response option	Frequency	Percent
1 (strongly disagree)	11	21.6
2 (moderately disagree)	16	31.4
3 (slightly disagree)	8	15.7
4 (neutral)	4	7.8
5 (slightly agree)	6	11.8
6 (moderately agree)	1	2.0
7 (strongly agree)	5	9.8

Table 10. Frequency Distribution for Ease of Finding the Information Sought

Response option	Frequency	Percent
1 (strongly disagree)	1	2.0
2 (moderately disagree)	4	7.8
3 (slightly disagree)	9	17.6
4 (neutral)	4	7.8
5 (slightly agree)	8	15.7
6 (moderately agree)	19	37.3
7 (strongly agree)	6	11.8

As regards Question 1 related to information overload, we found that about half of our respondents did not experience information overload from knowledge reuse, while half of them did feel overloaded (mean of 3.55, *SD* of 1.83). Table 8 shows the frequency distribution for the different response options (1 = *strongly disagree*, 7 = *strongly agree*).

As regards Question 2, we found that less than half of our respondents felt discouraged from knowledge reuse (mean of 3.02, *SD* of 1.88). Table 9 shows the frequency distribution for the different response options (1 = *strongly disagree*, 7 = *strongly agree*).

As regards Question 3 on the adequateness of EKR structure for knowledge seekers, we found that over half of our respondents felt that their EKR was adequately structured so that they could easily find the information they were looking for (mean of 4.86, *SD* of 1.64). Table 10 shows the frequency distribution (1 = *strongly disagree*, 7 = *strongly agree*).

These results demonstrate that there is large variation across knowledge seekers in the extent to which they perceive information overload, discouragement, and ease of finding the knowledge they seek. Therefore, future research should look into these factors in more detail to locate the source of the variation. Moreover, future research could explore whether these factors interact with human values in the prediction of knowledge reuse. Such an endeavor is outside the scope of this study, which focuses on knowledge contributions by knowledge contributors, but it would be a valuable enterprise.

4. Conducting omnibus tests of continuance and innovation: There remains a need to research models that simultaneously evaluate established factors tied to the continuance of EKR use and the relationship of values with different forms of postadoptive use. Recent work on postadoption has demonstrated that individual difference factors such as IT mindfulness (Thatcher et al.,2018) and technology-specific factors such as design aesthetics (Lowry et al., 2015) exert direct and indirect effects on postadoption outcomes such as continuance, exploration, and innovation. Nevertheless, there remains a need for integrative models. This paper informs future research in two ways. First, we illustrate that not all values or individual differences will have comparable outcomes on postadoptive behaviors. Second, we demonstrate how to evaluate the relative importance of different factors on postadoption, both conceptually and empirically. This is rarely done in IS research. Future research may employ approaches like ours to integrate

and rigorously evaluate the various threads in the postadoption literature.

7   Conclusion

Past descriptive research on EKR usage by knowledge contributors has suggested that human values may be primary determinants of EKR usage but has not examined specific types of values that could promote such use. Past empirical research has provided insight into some important values but has not adopted a theory-driven, quantitative approach to explain value-based variation in EKR use by knowledge contributors. Hence, IS research previously lacked a theoretical and precise understanding of specific types of relevant values and of how these values might predict EKR usage behaviors for knowledge sharing, particularly in the postadoption context. This lack of understanding implied the need to further knowledge in this important area.

Based on the TBHV, the present research has examined the impact of certain values likely to promote knowledge sharing on postadoptive EKR usage. By doing so, this paper has resulted in a deeper understanding of what types of values can promote postadoptive EKR usage and of how and why they do so (by increasing the frequency of EKR use in Study 1 and by increasing deep use in Study 2). Thus, this study not only validates the importance of human values for EKR usage quantitatively, but it also helps knowledge management research progress toward more detailed and specific explanations of the role of human values in knowledge sharing.

Our findings also help managers like Frank (from our opening vignette) counter the underutilization of EKRs. For example, Frank could modify job designs such that his employees increase the importance they attribute to values likely to promote knowledge sharing. This could yield richer knowledge contributions. Moreover, Frank could use our findings to improve hiring decisions. Overall, this study represents an important step toward clarifying the role of human values in the postadoptive use of EKRs. We hope that our research will lead to more work in this important area in order to help organizations and their managers elicit richer knowledge contributions to EKRs.

Acknowledgments

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Appendix A

Screening and Quality Assurance Questions

Screening Questions

1) In your employing organization, do you currently have access to an Electronic Knowledge Repository so that you can contribute your knowledge to it with the goal of helping your co-workers with your knowledge and expertise? Examples of knowledge contributions include creating documents, reports, articles, or videos and uploading them to Lotus Notes, Microsoft Sharepoint, Salesforce.com chatter, or to a company intranet or Wiki.

> Options provided as answers to this question were "Yes," "No," and "Not Sure." Only subjects responding "Yes" were invited to participate in the survey. This question ensured that the respondents fit the context of the study.

2) Does contributing knowledge to the Electronic Knowledge Repository in your organization help co-workers that you do not know?

> Options provided as answers to this question were "Yes" and "No." Only subjects responding "Yes" were invited to participate in the survey. This question ensured consistency of our study with prior knowledge management research arguing that the most interesting aspect of knowledge sharing is that people help others they do not know (Wasko and Faraj 2005).

3) For how many years have you had the opportunity to routinely contribute your knowledge to your organization's Electronic Knowledge Repository?

> Options provided as answers to this question were "For less than one year," "For more than one year but less than three years," and "For more than three years." Only subjects responding "For more than three years" were invited to participate in the survey. This question ensured that the respondents had sufficient time to develop postadoptive EKR use behaviors.

4) Are you required to contribute your knowledge to the Electronic Knowledge Repository in your organization, or are your knowledge contributions voluntary?

> Options provided as answers to this question were "Required" and "Voluntary." Only subjects responding "Voluntary" were invited to participate in the survey. This question ensured consistency of our study with prior research.

Quality Assurance Questions

In addition to the screening questions, our survey included multiple quality assurance questions, which ensured that our respondents were well-versed in the subject area and were taking the survey seriously. For example, we included the following quality assurance question:

In your experience, what is the primary goal of electronic knowledge repositories?

> Options provided as answers were "Word processing," "Database management," "Creation of presentations," "Content and document management," and "Spreadsheet usage." Only subjects responding "Content and document management" were allowed to continue with the survey. This question ensured that the respondents understood the context of the study.

Appendix B

Measurement Items for Study 1

Measurement Items for Human Values (Schwartz Value Survey)

In accordance with the theory of basic human values, this study employed the Schwartz Value Survey (SVS) to query people about their human values (Schwartz 1992, 1994, 2006). Subjects were asked to rate the extent to which each basic value represents a guiding principle in their lives. The instrument employed a 7-point scale: *Opposed to my values* (-1), *not important* (0), *unlabeled* (1), *important* (2), *unlabeled* (3), *very important* (4), and *of supreme importance* (5).

Question stem for all value items:
Below, you will be asked to rate the extent to which certain basic values represent guiding principles in your life. Your task is to rate how important each value is for you as a guiding principle in your life. Please use the scale below:

0 - means the value is not at all important, it is not relevant as a guiding principle for YOU.
2 - means the value is important to YOU.
4 - means the value is very important to YOU.

The higher the number (0, 1, 2, 3, 4), the more important the value is as a guiding principle in YOUR life.

-1 is for rating any values opposed to the principles that guide you.
5 is for rating a value of supreme importance as a guiding principle in your life: ordinarily there are few such values.

Please distinguish as much as possible between the value items by using all the numbers—that is, -1, 0, 1, 2, 3, 4, and 5. Thank you!

Universalism (Schwartz Value Survey [SVS]; Schwartz, 1992, 1994, 2006):
 Universalism1: A world at peace (free of war and conflict).
 Universalism2: Social justice (correcting injustice, care for the weak).
 Universalism3: Equality (equal opportunity for all).
 Universalism4: Protecting the environment (preserving nature)
 Universalism5: Broad-mindedness (tolerant of different ideas and beliefs)
 Universalism6: Wisdom (a mature understanding of life)
 Universalism7: A world of beauty (beauty of nature and the arts)
 Universalism8: Unity with nature (fitting into nature)

Benevolence (Schwartz Value Survey [SVS]; Schwartz, 1992, 1994, 2006):
 Benevolence1: Forgivingness (willingness to pardon others).
 Benevolence2: Honesty (genuine, sincere).
 Benevolence3: Loyalty (faithful to my friends, group).
 Benevolence4: Helpfulness (working for the welfare of others).
 Benevolence5: Responsibility (dependable, reliable)

Self-Direction (Schwartz Value Survey [SVS]; Schwartz, 1992, 1994, 2006):
 Self-Direction1: Freedom (freedom of action and thought).
 Self-Direction2: Creativity (uniqueness, imagination).
 Self-Direction3: Independence (self-reliant, self-sufficient).
 Self-Direction4: Choosing own goals (selecting own purposes).
 Self-Direction5: Curiosity (interested in everything, exploring).

Stimulation (Schwartz Value Survey [SVS]; Schwartz, 1992, 1994, 2006):
 Stimulation1: A varied life (filled with challenge, novelty, and change).
 Stimulation2: An exciting life (stimulating experiences).
 Stimulation3: Daring (seeking adventure, risk).

Hedonism (Schwartz Value Survey [SVS]; Schwartz, 1992, 1994, 2006):

Hedonism1: Enjoying life (enjoying food, sex, leisure, etc.).
Hedonism2: Pleasure (gratification of desires).

Measurement Items for EKR Use-Related Constructs

Frequency of EKR Use (Burton-Jones & Straub, 2006; Kankanhalli et al., 2005)
For each of the statements below, please indicate how frequently you contribute your knowledge to the Electronic Knowledge Repository in your organization (1 = *strongly disagree*, 7 = *strongly agree*):

Frequency1: I often use the Electronic Knowledge Repository in my organization to share my knowledge with other organizational members.
Frequency2: I use the Electronic Knowledge Repository in my organization a lot to share my knowledge with other organizational members.
Frequency3: I frequently use the Electronic Knowledge Repository in my organization to share my knowledge with other organizational members.
Frequency4: I repeatedly use the Electronic Knowledge Repository in my organization to share my knowledge with other organizational members.

Trying to Innovate with an EKR (Ahuja & Thatcher, 2005):
Thinking about ways you use the Electronic Knowledge Repository in your organization to share your knowledge with other organizational members, please indicate the extent to which you agree or disagree with the following statement: (1 = *strongly disagree*, 7 = *strongly agree*):

Trying1: I try to find new ways of using the Electronic Knowledge Repository for sharing my knowledge with other organizational members.
Trying2: I try to identify new ways of applying the Electronic Knowledge Repository for sharing my knowledge with other organizational members.
Trying3: I try to discover new ways of using the Electronic Knowledge Repository for sharing my knowledge with other organizational members.
Trying4: I try to use the Electronic Knowledge Repository in novel ways for sharing my knowledge with other organizational members.

Appendix C

Measurement Items for Study 2

Value Dimensions of Self-enhancement and Conservation Using the Short SVS
Respondents were presented with the name of each value type together with its value items (Lindeman & Verkasalo, 2005). For instance, the respondents were asked to rate the importance as a life-guiding principle of "Achievement, that is, success, capability, ambition, influence." A similar phrasing was used for the other four value types. Hence, the SSVS included five items, each of which indicated one original value type and the related value items as descriptors. The value items were rated on a 7-point scale ranging from -1 (*opposed to my principles*), 1 (*not important*), 4 (*important*), to 5 (*of supreme importance*).
1. Achievement, that is, success, capability, ambition, influence.
2. Power, that is, preserving my public image, authority, wealth, social power.
3. Security, that is, cleanliness, national security, reciprocation of favors, social order, family security.
4. Conformity, that is, self-discipline, honoring of parents and elders, obedience, politeness.
5. Tradition, that is, humbleness, devotion, moderation, respect for tradition, accepting my portion in life.

Deep Usage (7-point Likert-type scale adopted from Burton-Jones & Straub, 2006)
1. I use most of the available features of the EKR to share my knowledge with others.
2. I use all available features of the EKR to share my knowledge with others.
3. I make use of the available features of the EKR thoroughly to share my knowledge with others.

Trying to Innovate with an EKR (Ahuja & Thatcher, 2005):
Trying1: I try to find new ways of using the Electronic Knowledge Repository for sharing my knowledge with other organizational members.
Trying2: I try to identify new ways of applying the Electronic Knowledge Repository for sharing my knowledge with other organizational members.
Trying3: I try to discover new ways of using the Electronic Knowledge Repository for sharing my knowledge with other organizational members.
Trying4: I try to use the Electronic Knowledge Repository in novel ways for sharing my knowledge with other organizational members.

Control Variables
1. Gender
2. Age
3. Tenure
4. Type of EKR used (Lotus Notes, Microsoft SharePoint, Salesforce.com chatter tool, Company intranet, Company Wiki, or other)
5. Organization size
6. Sharing culture—extrinsic and intrinsic incentives
    a. Extrinsic: My employer gives me strong incentives for contributing my knowledge to the EKR in my organization (e.g., monetary reward, higher salary, promotion, recognition, job security, etc.).
    b. Intrinsic: Sharing my knowledge through the EKR in my organization improves my image (reputation) within the organization.

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