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A social representations perspective on information systems implementation

Rethinking the concept of "frames"

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Abstract

Purpose – The purpose of this paper is to advocate a "social representations" approach to the study of socio-cognitive processes during information systems (IS) implementation as an alternative to the technological frames framework.

Design/methodology/approach – The paper demonstrates how social representations theory can improve research outcomes by applying it to three recent studies that employed the technological frames framework.

Findings – It is found that because the technological frames framework is overly technologically centered, temporally bounded, and individually focused, it may lead to symptomatic explanations of IS implementation. Alternatively, using the theory of social representations can offer more fundamental causal explanations of IS implementation processes.

Research limitations/implications – IS researchers are encouraged to use a social representations approach to study IS implementation as the theory provides a rich vocabulary to examine the formation, change, and content of representations of IS, and their relationship to people's actions toward IS.

Originality/value – The paper introduces a new theoretical perspective into the IS research discipline, which can be applied to provide better research results concerning IS implementation.

Keywords Information systems, Sociology, Technology led strategy

Paper type Conceptual paper

Introduction

The implementation of information systems (IS) is a complex process that entails a mix of technological, social, and organizational interactions. It typically involves multiple stakeholder groups which have varying needs, interests, and capabilities. Additionally, different groups may have different interpretations and perceptions of the implemented technology and its purpose. In light of these issues, socio-cognitive approaches have been increasingly used to study IS implementation. The main premise underlying such research is that organizational members' acceptance, deployment and actions toward information technologies are mediated by their shared interpretations of these technologies (Gephart, 2004; Griffith, 1999). Therefore these interpretations can have a significant impact on the success of the implementation efforts (Orlikowski and Gash, 1994).

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To explain shared interpretations of technologies, "frames of reference" (e.g. cultural assumptions, interpretive schemes, technological frames, etc.) are commonly used in IS research (e.g. Barrett, 1999; Yoshioka *et al.*, 2002; Davidson, 2002). Typically, the incongruence of frames across relevant organizational groups is used to explain difficulties associated with technology implementation. However, the very idea of a frame has been put into question. Boland (2001) claimed that the concept of frames imposes a spatial conceptualization of shared sense-making processes and that frames are unproblematically assumed by researchers as cognitive structures that exist in the minds of organizational members *a priori* to any organizational processes. Therefore the concept of frames can lead researchers to "lose site of the temporal experience of meaning making" (p. 20) and overlook the broader organizational and social processes in relation to which frames are formed.

In response to Boland's argument, we present the theory of social representations (Moscovici, 1961). The theory of social representations is a socio-cognitive framework used to study the social production of commonsense knowledge. It offers a set of concrete conceptual tools for addressing the social context from which shared meanings emerge and for capturing the temporal nature of socio-cognitive activity. Therefore the theory is well suited to inform IS implementation research.

We juxtapose the theory of social representations and the technological frames framework (Orlikowski and Gash, 1994). We chose this framework as it underlies much of the socio-cognitive research in the field of IS (Orlikowski and Gash, 1994; Barrett, 1999; Davidson, 2002). Orlikowski and Gash (1994) define technological frames as a "core set of assumptions, expectations, and knowledge of technology collectively held by a group or community" (p. 199). Technological frames help organizational members to make sense of technology and reduce ambiguities in relation to its nature and functioning.

We review the technological frames framework and highlight three caveats that characterize its use. Specifically, we argue that since the framework is *technologically centered*, *temporally bounded*, and *individually focused*, its use as a theoretical lens can limit researchers' ability to understand the underlying drivers and impediments to IS implementation. By solely using a technological frames framework, researchers can make themselves vulnerable to mistakenly attributing symptomatic effects, represented by the observed technological frames, with causal power. To address these caveats we propose using the theory of social representations (Moscovici, 1961). The theory acknowledges the wider social context from which technological frames emerge, how they evolve over time, and the collective processes by which they are shaped and reshaped, and can therefore offer more fundamental causal explanations of IS implementation.

The remainder of the paper will be organized as follows: first we introduce the concepts of technological frames and social representations and juxtapose them, emphasizing how social representations can provide a more comprehensive theoretical lens through which IS implementation research can take place. Then we demonstrate how this theory can improve research outcomes using three recent studies that employed technological frames as examples. Next we outline the implications of the theory for the design and conduct of empirical research and discuss the benefits of applying the theory. We conclude by suggesting opportunities for IS research using social representations.

Technological frames

The concept of technological frames calls attention to shared interpretive processes that take place within organizational groups (Orlikowski and Gash, 1994). These processes contribute to shaping organizational members' perceptions of and actions towards technology and can therefore have a considerable bearing on how effectively information technologies are implemented and appropriated within organizations.

This form of theorizing draws on a long tradition of cognitive and socio-cognitive research in psychology and organizational studies. As early as the mid-1950s researchers were calling attention to the importance of exploring an individual's "frames of reference" and "givens" to understand the meanings people attribute to their actions (March and Simon, 1958; Simon, 1955). In addition, some researchers were highlighting the social nature of interpretative mechanisms. Instead of treating frames at an individual level, they were claiming that the origins and nature of frames were in fact social, and that cognition was a shared process rather than an individual one (Levine and Resnick, 1993). Various names have been given to those group-level frames, such as collective cognitive maps (Axelrod, 1976), a collective cognition (Langfield-Smith, 1992), a dominant logic (Prahalad and Bettis, 1986) and a negotiated belief structure (Walsh and Fahey, 1986). The underlying principle behind all of these approaches is that when a group of individuals, each with their own unique cognitive structure about a particular information environment, come together and interact with one another, a collective cognitive structure would emerge (Walsh, 1995). This cognitive structure would then serve to organize and shape people's interpretations of things and events in their environment, and guide their actions.

Similarly, Orlikowski and Gash (1994) highlight the importance of *technological frames* as a "subset of members' organizational frames that concern the assumptions, expectations, and knowledge they use to understand technology in organizations" (p. 178). Technological frames are shared conceptual devices which serve to make technology in organizations meaningful to organizational members and which reflect tacit understandings, values, concerns, and assumptions that organizational members commonly hold with regard to the technologies that they use[1]. Orlikowski and Gash (1994) additionally indicate that the existence of incongruent frames across organizational groups could lead to ineffective implementation of technology in organizations.

Social representations

Compared with technological frames the theory of social representations provides a more holistic stance from which to understand processes of meaning-making that take place within social groups. The theory's starting point is that people's relationship with the world is invariably mediated by a layer of socially constructed and continuously evolving symbols, or representations, which serve to render the world meaningful for social actors. The theory provides a rich vocabulary to examine the formation, change, and content of these representations, and their relationship to people's actions.

In essence, social representations are ways of constituting the world (Moscovici, 1988). Moscovici defines them as "a system of values, ideas and practices with a twofold action: first, to establish an order which will enable individuals to orient themselves in their material and social world [...] and secondly to enable communication to take place among the members of a community by providing

them with a code for social exchange and a code for [. . .] classifying [. . .] the various aspects of their world and of their individual and group history" (Moscovici, 2001, p. 12). This definition highlights that social representations enable people to make sense of their world and to interact and communicate with other social actors.

One of the important characteristics of social representations is that they serve to familiarize the unfamiliar, because it is the unknown or the unrecognized that poses a threat to shared and socially constructed realities (Voelklein and Howarth, 2005). New and unfamiliar events or phenomena that groups encounter in their daily lives can be seen as challenges that need to be symbolically and collectively coped with by group members. At these moments of perceived gap between what people know and what they cannot understand there is a lack of meaning, a point where the unfamiliar appears, and representational work is set in to re-establish a sense of familiarity (Moscovici, 2001). Social representations can thus be understood as collective elaborations of unfamiliar phenomena or events (Wagner *et al.*, 1999). Such phenomena or events only become *social* reality by virtue of their representations which the community holds. Only by being represented by a group of people by means of familiar conceptual devices can an event or phenomenon become a *social* object that can be perceived, characterized, compared to other social objects, and used in language and action.

Anchoring and objectification

Two important concepts in the process of familiarizing social objects are anchoring and objectification. Symbolic coping with unfamiliar phenomena or events initially involves *anchoring*. When first encountering a new phenomenon a group lacks a representation to render it meaningful. For the group to come to a basic understanding of the unfamiliar phenomenon it first needs to name it and attribute some characteristics to it so that it can be communicated and referred to (Wagner *et al.*, 1999). At first this is done by anchoring the new phenomenon in existing representational structures and categorizations that are deemed relevant. For example, in the first days following the terrorist attacks on the World Trade Center and Washington DC, the events were described and talked about in terms of previous major terrorist attacks. Only later did a representation called "9/11" emerge which allowed the attacks to be distinguished from other terrorist activities. This elaboration of a new representation is termed *objectification*.

After anchoring a new phenomenon and interpreting it in familiar terms and representations, further communicative activities among group members lead to an objectified representation in the form of a metaphor, symbol, or image (Wagner *et al.*, 1999). Objectification is the process whereby socially represented knowledge receives its concrete and distinct form, or representation. The objectification process involves the development of a signifier which stands for the phenomenon or object that it represents. The representation captures the essence of the phenomenon and weaves it into the social fabric of the group's common sense.

The choice of a representation is not arbitrary. It is typically related to the stock of knowledge, vocabulary and imagery that group members have in common and which reflect their shared identity, history, and their everyday "social terrain" (Moscovici, 2001). Accordingly, different groups may develop different representations of the same phenomenon depending on their socio-historical contexts.

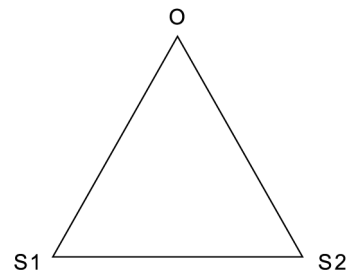
Representing as a social activity

Social representations are collective phenomena which pertain to a community and which are co-constructed by individuals in their daily interactions (Wagner *et al.*, 1999). It is through ongoing inter-personal communicative activities that group members articulate their understandings of their surroundings. Therefore, although representations can be expressed in individual cognition and action, they also exist across minds, in the inter-subjective space that is continuously enacted through multiple group members' talk and action. Accordingly, social groups are the locus of representations. Understood as communicative systems, groups provide a space where representations emerge, circulate, evolve and eventually die out. The action of representing, therefore, involves at least three distinct components: two persons (subject 1 and subject 2) who are concerned with an object (O) (see Figure 1).

The meaning of the object, or its representation (represented by the surface of the triangle in Figure 1), is a matter to be negotiated between the two subjects. Therefore, meaning-making is not an individual act and cannot be properly understood merely as a cognitive process that takes place inside of people's minds. Instead meaning making always implies the other, and requires some form of communication to take place among group members (Bauer and Gaskell, 1999).

To this basic representation model a time dimension is added, both past and present, to denote a mutual project that binds the two subjects through mutual interests, activities, goals, and concerns (see Figure 2). The stretched model (which resembles the shape of a Toblerone chocolate bar) now captures triangular relations in the context of time. Each surface of the triangle represents a common-sense meaning, a representation of the object O, at a given point in time (Bauer and Gaskell, 1999). However, a representation can only be understood as an emergent property of a system that is composed of the two subjects, the object and the project which stretches both to the past and to the future. Hence, on the one hand representations are constructed against a background of constant social interactions and negotiations, where allegiances to existing social identities, group norms, and cultural traditions play a major role. On the other hand social representations also need to be construed in light of a group's future shared goals, aspirations and concerns.

Another consideration in examining social representations involves taking into account the existence of multiple social groups and the changing dynamics among them. Groups do not exist in a social vacuum. Rather, they are intricately implicated in a web of social relations, activities and discourses that involve other groups. Therefore, over time various triangles of representations emerge, evolve, and coexist to form a larger social



Source: Taken from Bauer and Gaskell (1999)

Figure 1.
Basic representation model

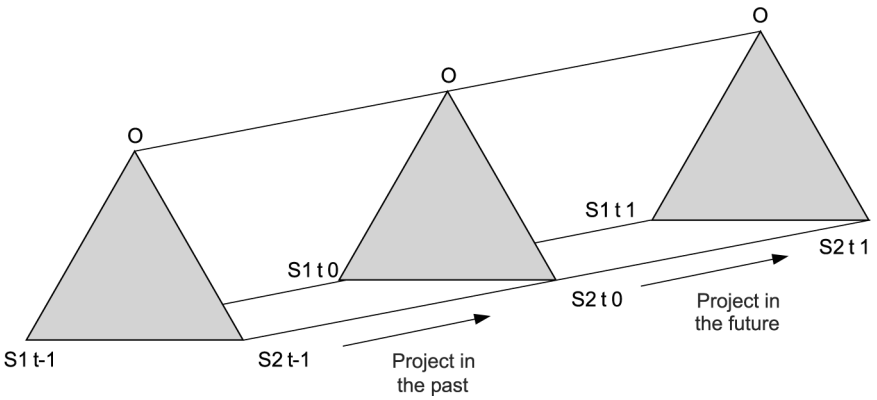


Figure 2.
The "Toblerone" model

Source: Adapted from Bauer and Gaskell (1999)

system, characterized at different times by inter-group conflict, collaboration, or indifference (Bauer and Gaskell, 1999). A represented object can be seen as a reference point that the groups have in common, which serves as a common denominator based on which groups engage in some sort of social relations. Formed around different projects, different groups may have different representations of the same object, and those representations can change over time. Such changes should be examined not only in relation to a group's project, but also in light of adjacent groups' projects.

Social representations as an alternative to technological frames

Because of its parsimony and theoretical clarity, the technological frames framework has become a popular approach among IS researchers. It has been used to examine various IS implementation processes in different organizational contexts (Barrett, 1999; Lin and Cornford, 2000; Lin and Silva, 2005; Orlikowski and Gash, 1994; Bjorn *et al.*, 2006), power relations in a requirements determination process (Davidson, 2002), implementation of a user-centered-design approach in a software company (Iivari and Abrahamsson, 2002), and political processes during technological change (McLoughlin *et al.*, 2000).

However, recurring uses of the framework have contributed to its blackboxing (Latour, 1987) and, consequently, to uncritical acceptance of its theoretical underpinnings and their methodological implications. Below we elaborate on three areas where we believe the framework is lacking and where social representations theory can be used to provide a more fundamental understanding of IS implementation in organizations (see Table I).

Contextual focus

The technological frames framework focuses exclusively on *technological* frames and uses them as an explanatory mechanism. Although they intentionally limit the scope of technological frames to interpretations associated with technology, Orlikowski and Gash (1994) recognize that such frames are more broadly couched. Citing Bloomberg (1986), they claim that "the meaning of technology can only be appreciated in the context of its uses and users" (p. 42). Their framework thus aims to take into account

	Technological frames	Social representations theory
Contextual focus	Specifically targeted to explain how groups interpret technology	Broadly applied to examine the formation and change of social knowledge
Temporality	Technological frames may change during an IS project, thereby influencing its trajectory. No link to espoused group projects	Representations are an emergent property of a system composed of ongoing communication among group members and espoused group projects
Level of analysis	Focus on individual cognition by using personal interviews	Focus on interpersonal interactions in addition to individual cognition

Table I.
Main differences between technological frames and social representations

the contexts of design and use of technology along with the technological artifact itself. However, despite its stated objective, the framework remains limited in that technological frames are generally taken as given without methodically exploring the social processes that give rise to them or inquiring why specific frames exist and how they relate to wider social and organizational contexts.

The focus on technological frames while excluding their wider context is reminiscent of treating social actors as "socially thin", one-dimensional users of technology (Lamb and Kling, 2004). A more suitable approach may be to consider the multidimensionality of social actors and organizational groups and to take into account that a group's interpretations and uses of technology are part of a larger and interconnected web of social relations, meanings and activities. Given the complexity that characterizes information systems implementation processes, which involve social and organizational considerations in addition to technical ones, research that does not consider the processes that shape a group's conceptions of technology may run the risk of producing partial explanations. In addition, exclusively focusing on technological frames may lead to confusing symptomatic effects with causal forces. Such explanations may ignore important factors that lead to the formation of specific technological frames, and how those frames are shaped by the broader social and organizational contexts in which the technology is situated. Consequently, these explanations may lead researchers to conclude that the observed technological frames themselves shape the implementation process, when in fact the frames reflect more fundamental processes that contribute to the shaping of this process.

Social representations theory can account for the complexity that is inherent in IS implementation processes. It can do this because it is concerned with the way the meanings that new information systems acquire relate to or fit into existing categorizations of technologies, social structures or relationships that are deemed relevant by group members. Treating social groups as open systems, social representations theory recognizes that communicative processes within groups invariably take place in relation to larger social and organizational contexts. These contexts include similar processes that take place in adjacent groups in addition to relevant inter-group relations. When studying a group's representation of a technological system during an implementation process, social representations research examines how the group's representation of the technology relates to the group's representations of other groups it interacts with, its representations of itself in

relation to these other groups, and its representations of its relationships with other groups. Employing such a holistic perspective is more likely to uncover key drivers and impediments associated with IS implementation through a more complete understanding of the processes and considerations that lead to the emergence of specific representations of technology, and of their significance to group members.

Temporality

Technological frames have been employed in research as cross-sectional accounts of shared interpretations to explain different organizational members' reactions to IS (Barrett, 1999; Orlikowski and Gash, 1994). Although they are acknowledged to change over time (Davidson, 2002; Lin and Cornford, 2000; Ovaska *et al.*, 2005), their very nature does not embody that change. Rather, a given technological frame implies only that moment in time. By observing the existence of technological frames at any given point in time without exploring how they embody an extended time horizon which stretches to the past, but also to the future, researchers open themselves up to the possibility of treating the effect (i.e. technological frames) as the cause.

Technological frames are interpretive social phenomena and as such they emerge and receive their meaning when actors actively link objects, people and events that they encounter in the present to their past experiences, and to plans, goals and aspirations that they have for the future. Despite the importance of this point, it has not been thoroughly addressed in research. For example, Orlikowski and Gash (1994) do not explicitly attend to the temporality of technological frames in their examination of the implementation of Lotus Notes, where the key frames remain static over a five-month period. Other studies using the technological frames framework have been somewhat more conscious of the evolvement of technological frames over time (e.g. Davidson, 2002; Lin and Cornford, 2000; Ovaska *et al.*, 2005). These accounts acknowledge technological frames to be dynamic entities which may change over time. They all recount the change process as bearing consequences to the way technologies are perceived by the different groups involved, and therefore to the IS implementation project that is studied. However, these studies take a narrow perspective to understanding the temporality of technological frames. That is, the concept of technological frame is applied without giving much attention to ongoing socio-historical projects of social groups. While these studies use longitudinal research designs, they remain restricted in that they typically take the beginning of an IS implementation project as their temporal point of departure. They do not take into account that the very maintenance of organizational groups can be seen as an ongoing project which stretches both backwards and forwards in time. This project represents an espoused, shared venture that links group members via mutual interests, goals, and activities (Bauer and Gaskell, 1999). Within this project, the common sense meaning of objects and events is an emergent property. The unfolding consequences of this project can manifest themselves in shared group norms, behavioral routines, and identities, in relation to which technological frames are formed.

Therefore, research informed by social representations theory considers how groups couch the technology in the context of their history and identity, and anchor it into existing images and traditions. For example, it may examine how representations of an implemented technology relate to past group experiences with technologies that are deemed similar by group members or to institutionalized way of accomplishing

group tasks. Also, it may look at how representations of the implemented technology relate to group concerns about how the technology might influence their identity, role, and status in the organization in the future.

Level of analysis

Orlikowski and Gash (1994) conceptualize technological frames as social constructs. They recognize that "while frames are necessarily individually held, and hence inevitably reflect individual variation, it is nonetheless useful to distinguish those cognitive elements that – through socialization, interaction or negotiation – individuals have in common. It is these collective cognitive elements that people draw on to construct and reconstruct their social reality" (pp. 177-8). Consequently, Orlikowski and Gash (1994) theorize technological frames to be shared by group members. Technological frames are not merely the result of individual cognitive processes that take place within people's minds. Frames emerge out of the social interactions, and communicative activities through which the meaning of group members' surroundings (in this specific case, of technology) is constructed.

A main challenge in establishing cognitive processes at a group level empirically is to account for the role of *social* processes in the formation, maintenance, and change of frames. Therefore, to understand the emergence, nature, and evolvement of technological frames, researchers need to use research methods that will allow them to tap into the unfolding of social interactions and communicative activities of organizational members. However, as detailed in Table II, most studies using the

Author/s	Data sources	Primary sources of evidence[a]
Orlikowski and Gash (1994)	Unstructured interviews; review of firm documents, reports, and promotional material; field observations	Unstructured interviews
Davidson (2002)	Formal interviews; informal discussions; observations; review of training materials, memos and meeting notes	Formal interviews
Lin and Silva (2005)	Project documentation; interviews	Project documentation; interviews
Ovaska *et al.* (2005)	Written project material, meetings minutes; interviews	Written project material, meetings minutes; interviews
Barrett (1999)	Interviews; review of strategy plans, notes, newsletters; sectoral studies; ethnographic observations	Interviews
Iivari and Abrahamsson (2002)	Interviews; meeting memos	Interviews
Lin and Cornford (2000)	Interviews; documentation; information conversations; observations; email questionnaire	Interviews
McLoughlin *et al.* (2000)	Interviews; review of project documentation; site visits	Interviews
Shaw *et al.* (1997)	Survey; interviews	Survey; interviews

Note: [a]Data that were systematically analyzed and used to produce the findings presented in the paper

Table II.
Implementation studies using the technological frames framework

technological frames framework, while theorizing frames at a social level, use individual interview data as their primary source of evidence[2]. While interviews may be useful to elicit beliefs, knowledge or understandings of technology that are socially shared, they focus on individual cognition of organizational members and are insufficient to gain a profound grasp of collective processes.

Social representations theory, on the other hand, explicitly addresses the social domain as an arena where shared meanings are created, negotiated, changed, and disappear. Moscovici (2001) refers to the social discourse that takes place in public markets and cafes where people freely discuss topics, exchange views, and form opinions. In contemporary organizational settings such markets and cafes may appear in the form of online chat rooms or forums, in informal conversations among employees, e-mails, meetings, or formal documents. Accordingly, research using social representations theory, in addition to examining individual cognition, usually uses a variety of research methods that tap into the public sphere. These research methods try to capture the inter-personal processes whereby organizational members collectively make sense of new phenomena that they need to cope with, such as new technologies. Using such techniques as group interviews, mass media content analysis, observations of group interactions, and focus groups, researchers can gauge and compare social processes of meaning-making and their products.

Applying the theory of social representations

In this section we describe three studies that used technological frames to examine IS implementation, and demonstrate how using a social representations approach can yield more fundamental explanations of the difficulties and complexities encountered in the implementation process. First, we address Barrett's (1999) study of the London insurance market; second, we focus on a case of a meeting system implementation (Yoshioka *et al.*, 2002); and third, we look at Davidson's (2002) study of the requirements process for a healthcare application (see Table III).

Electronic data interchange implementation in the London insurance market

Barrett (1999) studied the attempted adoption of an electronic data interchange (EDI) system in the London insurance market. His study looked to answer the following questions:

- Why has EDI not been adopted successfully to support the risk placement process in the London insurance market?
- In what ways, if any, have organizational and social issues been significant in explaining the low levels of adoption?

Drawing on Orlikowski and Gash's (1994) technological frames framework, Barrett (1999) identified three groups that played a part in the implementation process:

(1) brokers and underwriters;

(2) IT professionals; and

(3) senior managers.

He found that while IT professionals and senior managers shared similar frames (which he terms "cultural assumptions") about the nature of the technological change,

Study	Research questions/goals	Findings	Unexplored questions	SR perspective
Barrett (1999)	Why has EDI not been adopted successfully? How have social and organizational issues been significant?	A key reason for low adoption levels is incongruence of frames across groups	What are the underlying reasons for the observed differences across the groups? How do the observed frames reflect power dynamics, interaction patterns, or alliances among different companies? How are the observed frames couched in existing interaction patterns and identities of organizations in the London insurance market?	Examine categories of vocabulary and imagery in relation to which EDI was anchored and objectified by the different groups Examine the group identities, concerns, traditions, institutionalized practices, and relationships that these categories reflect to gauge the significance of EDI to each group
Yoshioka *et al.* (2002)	Why was the use of a synchronous meeting system not sustained over time across multiple organizational units?	Differences in interpretive schemes across different sites, nationalities, languages, roles and over time explain the difficulties in the use of the meeting system	What are the underlying reasons for the observed differences across the units? How are the observed interpretive schemes couched in existing social relations and identities of organizational units?	Examine over time categories of knowledge, vocabulary and imagery in relation to which the system was anchored and objectified by the different units Examine the site-specific identities and inter-site relationships that are reflected in these categories to understand the significance of the system to different sites
Davidson (2002)	Understand how ISD participants make sense and assign meanings in the social process of formulating IT requirements	Shifts in frame salience destabilized ISD participants' understanding of the project and made it difficult to maintain an agreement about requirements long enough to deliver system functionality	What are the reasons for the emergence of the observed frames? How are the observed frames implicated in existing social relations among different organizations?	Examine interaction patterns among multiple organizations to provide information on the reasons for the recurring changes in the salience of frames Examine continuing anchoring and objectification of the system by each organization to shed light on how the meanings that were assigned to the system were reflective of existing traditions and identities

Table III.
Applying a social representations perspective to studies that used technological frames

the nature of business transactions and the importance of market institutions, brokers and underwriters' frames differed. For example, senior managers and IT managers believed that the new system could provide significant efficiency benefits to brokers and underwriters and radically change their work practices. Brokers and underwriters, on the other hand, believed that the system could only incrementally improve their efficiency and mainly support existing work practices. Barrett (1999) consequently concluded that a key reason for the low adoption levels of the system was the incongruency of cultural assumptions across the three groups.

In his analysis, Barrett (1999) provides little information as to the shared histories, identities, concerns, cultural values and norms which characterize each of the groups and form the basis for the observed assumptions. Instead, he treats these assumptions as "ready-made" explanatory constructs. We argue that such analysis provides a symptomatic answer to Barrett's research questions. A more fundamental explanation would address the root causes of the incongruent assumptions and the low adoption levels[3].

Research informed by social representations theory would look for the reasons behind the emergence of cultural assumptions by observing the categories of knowledge, vocabulary, and imagery used by members of each group to anchor and objectify the system. Also, social representations research would address the group identities, traditions, and relationships that these categories reflect. Doing so would illuminate the salient aspects in the lives of each group in relation to which the system received its shared meaning, and help explain its significance to each group. For example, the London insurance market is comprised of over 500 brokers and underwriting companies, each containing heterogeneous professional communities. It could be the case that the frames in Barrett's study reflected power dynamics, interaction patterns, or alliances among different companies, which engendered the difficulties in the adoption of the system. Also, the London insurance market has been in operation for over 300 years. It is reasonable that some of the practices, identities and traditions that have been institutionalized over the years played a significant role in the formation of the frames that Barrett observed.

A meeting system implementation in a multinational organization

Yoshioka *et al.* (2002) studied the implementation of a multi-media meeting system in several geographically dispersed units of a global organization. Their research question was: why was the use of this collaborative technology not sustained over time across the multiple units? They found differences in assumptions and expectations (which they term "interpretive schemes") about the nature of the technology, the rationale for the technology, and its intended use, across different sites, nationalities, languages, roles, and over time. They concluded that these differences explain the difficulties in the use of the system: "The different (and often incompatible) expectations and assumptions of the participants, together with the absence of a common, compelling motivation among the sites and participants to use the [...] technology, contributed to making it difficult for the new technology to become an established and routinely-used communication medium in this global and diverse organization" (Yoshioka *et al.*, 2002, p. 9).

In their analysis the authors provide no information about the shared histories, identities, cultural values and norms which characterize each of the sites and form the

basis for the observed interpretive schemes. There is no examination of the dynamics within and across the different sites and how those dynamics might have contributed to the emergence of the observed schemes. Instead the authors take the schemes for granted and use them to explain the difficulties in sustaining the use of the system. The authors do not explore the likely possibility that the different expectations and assumptions that existed across the sites and nationalities may have only been a manifestation of deeper social or organizational processes and issues, and that these in fact were the fundamental reason for the difficulties encountered.

Research informed by social representations theory would examine the categories of knowledge, vocabulary, and imagery that were used by people from different sites to anchor and objectify the technology over time. Such analysis could reveal the shared identities, relationships, and traditions, in relation to which the technology acquired its meaning. Doing so could demonstrate, for example, if there existed patterns of conflict or collaboration within or across the sites and how the meanings that were attributed to the new technology were implicated in such relationships. Also, it is likely that the different sites had over the years developed distinct institutionalized practices, traditions and identities. Examining discourse around the use of the new technology could shed light on how these institutionalized practices and identities shaped the observed schemes. Doing that could offer more fundamental explanations for the difficulties in sustaining the use of the system.

Requirements determination process at a healthcare insurance company

Davidson (2002) studied the requirements determination process during an IS delivery (ISD) project at a healthcare insurance company. Her research goal was "to understand how ISD participants make sense and assign meanings in the social process of formulating IT requirements" (p. 334). She traced the changes in the salience of different technological frames that different project participants had during the life span of the project. She concluded that the recurring shifts in frames triggered reinterpretations of the project and its requirements and hindered project participants' efforts to arrive at and maintain agreements about requirements: "The [. . .] case demonstrates how shifts in frame salience that occurred during requirements determination activities destabilized ISD participants' understanding of the project and made it difficult to maintain an agreement about requirements long enough to deliver system functionality" (p. 348).

While she describes the requirements determination process in detail, Davidson (2002) provides little information about the shared identities, histories, values or norms which characterize the different groups involved in the process and form the basis for the observed frames. Similar to the two previous studies, Davidson uses frames as an explanatory device and does not consider that the observed frames could be a reflection of other organizational processes that contributed to the experienced difficulties in the ISD process.

For example, participants in the requirements determination processes came from different organizations (healthcare insurance company, IS vendor, and external consultants). Examining the interaction and communication patterns among those organizations could provide some information as to the reasons for the recurring changes in the salience of frames throughout the requirements determination process. In addition, Davidson's stated goal was to understand how participants made sense

and assigned meanings during the requirements determination process. As Moscovici (1961) observed, group sense-making is implicated in identities and traditions that group members share. Examining how the developed system was continually anchored and objectified by the various participating groups could shed light on how the meanings that were assigned to the system were reflective of existing traditions and identities. Doing so could give a more fundamental understanding of why different meanings were assigned to the system during the requirements determination process, and why recurring changes in the salience of different understandings were experienced.

Researching social representations: an ideal type

Having demonstrated how social representations can be applied to studies that used technological frames, we next outline four implications of the theory for the design and conduct of empirical research. Specifically, these implications pertain to *when* to apply the theory, *who* it is best suited to study, *where* social representations are most likely to be manifested, and *how* a researcher can go about studying them. These implications form an ideal-type for research on social representations (Bauer and Gaskell, 1999). That is, not all implications are expected to be implemented in one study. However, this ideal type allows researchers to make informed choices regarding their own studies, as well as assess the strengths and limitations of other studies. In outlining the four implications, we draw on work by Bauer and Gaskell (1999).

When? During time of social change

Social representations are most salient when a group faces a new or unrecognized situation, which presents a challenge to group members. This challenge is encountered in the form of unfamiliar ideas, phenomena or events that impose themselves on the group members and that require dealing with. Around these periods of time where new concerns arise for group members, social representations are best studied (Bauer and Gaskell, 1999). When unrecognized ideas or events are met by group members, they can crack the group's existing representational system and create pockets of "un-meaning". Social representational work then needs to be put into motion to familiarize the unfamiliar and restore a sense of meaning to group members by anchoring and objectifying the new event or phenomenon. In the context of IS research, challenges of newness are typically encountered during the implementation of new IS, when organizations experience a significant technological change and consequent changes in work processes, distribution of responsibilities and hierarchical divisions.

Who? Natural groups

Social groups constitute the space in which representations emerge, circulate, and change through communicative processes among group members. Typically in IS research, groups are defined along organizational functional divisions, such as marketing or accounting. Technological frames research also characteristically examines groups that are defined by their functional organizational role (e.g. Barrett, 1999; Orlikowski and Gash, 1994). Alternatively, social representations research advocates researching *natural groups*. Such groups are characterized by a common socio-historical project that brings group members together through shared experiences, activities, and interests (Bauer and Gaskell, 1999). While natural groups in organizations can reflect functional divisions, often this is not the case. For example,

a natural group can emerge when a cohort of new employees enter different positions in the organization. Although functionally they belong to different groups, new employees may go through similar induction activities, undergo shared training sessions, be referred to in similar terms by organizational veterans, and therefore develop a sense of mutual faith and shared identity. In such cases, the examination of social representations that are produced in functional groups will not be as informative as it could have been had natural groups been examined.

Deciding which natural groups to study is an issue to be determined by considerations of relevancy. That is, different natural groups may be relevant depending on the phenomenon whose representations it is that researchers wish to study. As a principle, researchers should look beyond traditional forms of social segmentation and exercise "sociological imagination" to identify possible intersections between interesting issues, groups, and projects (Bauer and Gaskell, 1999).

Where? In behavior, cognition, and communication

Social representations are a complex social phenomenon that manifests itself in a multifaceted fashion. Representations emerge in social settings when group members communicate and interact with one another to create shared understandings of their environment. In such social settings, representations are embodied within the workings of different modes and mediums (Bauer and Gaskell, 1999) (see Table IV). Researching social representations therefore involves examining the various shapes and forms that representations can take. For example, a study of the representation of a new IS in an organization might include an analysis of stories of the organization's history, myths, organizational symbols, formal implementation plans and strategy documents, employees' behaviors around the new technology, etc.

The various ways in which representations are manifested require a multi-method research approach to simultaneously observe the multiple modes and mediums and their consequences. This implies utilizing some combination of field observations to capture habitual behaviors, questionnaires and individual interviews to capture individual cognition, group interviews and focus groups to capture informal communication, and documents and mass media analysis to capture formal communication (Bauer and Gaskell, 1999) (see Table V).

Modes	Medium
Habitual behavior	Bodily movements, rituals
Individual cognition	Words, lingual structures, non-linguistic sounds
Informal communication	Conversations, stories, unofficial symbols
Formal communication	Press, mass media, official documents and symbols

Table IV.
Modes and mediums of social representations

Modes	Research methods
Habitual behavior	Field observations, ethnographies
Individual cognition	Interviews, questionnaires
Informal communication	Group interviews, focus groups
Formal communication	Content analysis of documents and mass media

Table V.
Modes of social representations and associated research methods

Triangulation of different data sources is recommended to map consistencies or contradictions of representations, and to explore the functions of a representation across different modes and mediums (Bauer and Gaskell, 1999). For example, information acquired from group interviews or focus groups may indicate that a newly implemented IS is represented by group members as important to accomplishing group tasks. However, members' behavioral routines around the system may imply that it is actually not used by them and that they try to find ways to work around it. Such inconsistencies between different modes and mediums of the representation are indicative of the complex structure of the representation. Further inquiry is then required to understand what the reasons for the existence of such complexity are and what purposes it serves.

How? Longitudinal study design

The phenomenon of social representations cannot be understood fully without taking into account that representations become meaningful only in a context of extended group projects which stretch both to the past and to the future[4]. Furthermore, representations are dynamic entities which evolve to reflect changes in the group's environment, and in its communication and interaction patterns. Therefore, research designs that incorporate some temporal dimension are essential to observe how social representations emerge and change in social settings. This can be achieved by conducting extended ethnographies, by repeating interviews, and by extending media and document analysis over several time points.

Discussion

The idea of a frame as a discrete cognitive element has come under criticism in the past. Boland (2001) argued that the notion of a frame is something we tend unproblematically to take for granted and employ as an *ad hoc* explanatory device. This notion suggests the existence of bounded spaces that reside in the minds of people and that contain identifiable constructs. They lead us to think of problems in organizations as often being created by an absence of sufficient "shared understandings" or "shared meanings" and propose that the creation of such "shared" cognitions will provide a solution to many organizational problems (Boland, 2001). Focusing on frames may therefore limit researchers' ability to understand the underlying drivers and impediments to organizational processes and lead researchers to mistakenly attribute symptomatic effects, represented by the observed frames, with causal power. Boland (2001) further argued that the idea of a frame tends to ignore the temporal aspects of human meaning-making processes. To remedy this limitation he proposed to conceptualize the way we make sense of our experiences in terms of a narrative mode of cognition:

> We narrativize our life and its meaning to ourselves and others in real time as well as retrospectively and prospectively. Through narrative we construct the identity of self and other as moral agents, assert what is true about our culture, repair apparent breeches in the canonicality of culture, and construct the conditions of our own action. If there is something like a frame [. . .] it is created through narrative (Boland, 2001, p. 12).

The narrative mode of cognition is well captured by social representations theory. One benefit of using the theory is that it focuses on the social communicative processes by which the meaning of the environment is shaped by group members in terms of

representations. Hence, representations are not taken as given in the same manner that frames are accepted as ready-made cognitive constructs. Instead, by emphasizing an ongoing and dynamic narrative mode of cognition, the processes that lead to the structuring of representations (i.e. anchoring and objectification) are unpacked in order to understand how their emergence and significance are couched in a group's shared experiences, traditions and identities[5].

Indeed, an explicit examination of identities is a second benefit of using social representations theory. As implied in the quote above, examining the process of representing can yield a richer understanding of the way identities are implicated in the construction of collective understandings. To construct social representations involves proposing an identity. When constructing a representation, groups state who they are, how they understand themselves and others, and what are the cognitive and affective resources that are available to them. Social representations, therefore, tell us about who is doing the representational work. This is demonstrated vividly in Moscovici's seminal work describing how three groups in French society – the Communists, the Catholics, and the urban-liberals – received the theory of psychoanalysis in the 1950s and represented it differently (Moscovici, 1961). In the Communist group the theory was negatively represented as an attempted infiltration of imperialistic North American ideas that must be rejected. In the Catholic group, psychoanalysis was anchored in the traditional concepts of the confessional, yet its theory of sexuality was rejected. In the urban-liberal group the theory was accepted with little resistance. Each group couched the theory in the context of its history and identity, and anchored it into existing images and traditions. Underlying the multiple representations of psychoanalysis were attempts to protect the symbolic autonomy of the social groups whose identities were rooted in a stock of knowledge and practices that were to be preserved (Bauer and Gaskell, 1999)[6].

A third benefit of using a social representations perspective is that it highlights power relations that underlie the construction of social knowledge. Social representations are collective accounts of events or phenomena that are of concern to members of particular groups in society. They propagate and are narrated through the media, conversations, rituals, myths, stories, and art, among many other forms of social mediation. However, the production of collective accounts is never a neutral affair. Some accounts provide one version of reality whereas other accounts provide a different one. These divergent accounts express ongoing symbolic struggles that exist in a given society. Some groups have a greater capacity than others to assert their version of reality and the asymmetrical situation of different groups must be considered seriously, for different groups bring different resources to bear when it comes to imposing their representations. Social representations theory explicitly addresses these issues by exploring how the construction of knowledge is grounded in conflicts among different interests and worldviews, and struggle for power and prestige. This is exemplified in various studies that look at the forging of representations of excluded groups such as AIDS patients (Joffe, 1995) and mentally ill people (Foster, 2001) by larger segments of the population. These studies demonstrate how power relations play an important part during the construction of representations as well as how power is exercised through the manifestation of established representations[7].

When examining the meanings that different organizational groups attribute to the technologies that they use or adopt, and those meanings' impact on group members'

actions, it is essential to take the narrative form of cognition into account. The meanings of technologies are not discrete cognitive frames that can be taken as given and compared with one another. Rather, they always emerge, develop, and change, in relation to a group's ongoing stream of experience and the way it is collectively made sense of and narrativized by group members. Social representations theory is particularly suitable to tap into such processes, for it is through the social action of representing that negotiation, cooperation, conflict, and sense-making relating to a new phenomenon play out over time (Howarth, 2006). For example, the theory can be used to study resistance to implementation of new IS. Examining the anchoring process of a new technology, even before it is implemented, can provide managers and implementers with valuable knowledge on pre-existing conceptions among intended users, as well as offer some indication of the established natural groups and their identities. Analysis of group communication can reveal that group members anchor the new system in existing conceptions of a previous technology that has failed to meet the group's expectations, or that the new technology clashes with some aspect in the group's identity. In such cases, trying to influence the anchoring process can prove to be helpful in spotting and mitigating issues associated with resistance and consequently in shaping actions towards the new technology.

When discussing representations and social cognition, it is important to situate research of social representations relative to other perspectives on social or distributed cognition. A particularly salient perspective is Hutchins' notion of distributed cognition (Hutchins, 1995, 2000). Hutchins argued that cognition can be distributed between an individual and an artifact, across individuals in a social group, or across time (Hutchins, 1995, 2000). Distributed cognition involves action, or "computation", which is necessarily based on representation. For example, between humans "computation is implemented in the coordination of representational states, and the human participants coordinate their coordinating actions with one another" (Hutchins, 1995, p. 219). The meanings of representations, however, are treated as unproblematic and fixed once established, much like mainstream cognitive science research (Simon, 1996). While Hutchins does describe the origins of some representations and the selection of certain representations over others, he does not provide a theory by which the generation of representations and their dynamic nature can be addressed. Thus, work in distributed cognition, while it emphasizes the transactional, mediating nature of representations, can likely benefit from an analysis of emergent representations that reconcile histories, identities, political bases, and existing knowledge sources over time. Through theoretical devices such as anchoring and objectification, the theory of social representations provides mechanisms by which researchers can capture emergent meaning-making from self-evident symbols, codes, and metaphors that occur in the social sphere, yet are also continually imbued with meaning.

Conclusions

In this paper we presented the notion of social representations as a theoretical lens to study IS implementation, as an alternative to existing socio-cognitive IS research. Having discussed the main limitations of prominent socio-cognitive approaches in IS research (Orlikowski and Gash, 1994), we demonstrated how the theory of social representation can be applied to better address practical issues and processes in IS implementation, and outlined the main implications of the theory for the design and conduct of empirical research.

The possibility of using social representations as a theoretical lens to guide IS research is just now starting to gain ground. At the 2006 International Conference on Information Systems, social representations were introduced to the IS research community in a panel on knowledge management (Vaast *et al.*, 2006). During this panel, social representations were used to highlight the criticality of concepts such as "common" knowledge, how knowledge is created, and the structure of knowledge. Other research has leveraged social representations to understand how work practices can transform over time with information technology (Vaast and Walsham, 2005), and the implications associated with different representations of IS security across different groups (Vaast, 2007). As we have described in this paper, social representations are useful in understanding how new IS become meaningful for different group members as they enter an organizational setting.

Future research on social representations looks promising in many IS areas. One example is the requirements elicitation process. Requirements elicitation practices are typically focused on eliciting individual perspectives about the technology at a moment in time, essentially capturing the technological frames of potential users. Therefore, our discussion of the limitations of technological frames may offer some insight as to the prevailing problems with established requirements elicitation practices. Requirements elicitation informed by social representation theory would be more in-line with alternative approaches to requirements elicitation using iterative cycles of inquiry (Checkland and Scholes, 1990), or conversation analysis (Auramaki *et al.*, 1992), and could complement and ground their application.

We believe and hope that the foundations for IS research informed by social representations theory that we outlined in this paper will encourage other researchers to apply the theory in their work. Given the theory's holistic stance and focus on communicative activities, and given that much IS research focuses on information and communication in organizational settings, it seems reasonable that the theory can enrich IS research in a variety of ways, of which this paper has indicated only a small number.

Notes

1. Orlikowski and Gash (1994) root their conceptualization of technological frames within socio-cognitive theory, but also claim to draw on the same term from the sociology of technology (Bijker, 1987). Davidson (2006) distinguishes between the two uses of technological frames, however. The sociological view (Bijker, 1995) of the concept is that of something that lies between individuals, including the technology itself. In this view, technological frames are not something that can be found within actors. Since Orlikowski and Gash (1994) indicate that technological frames are both individually and collectively held, this points to a nuanced yet significant difference between the two, of which researchers should be aware.
2. It should be noted that most studies, in addition to using interviews, use other data sources such as field observations of group interactions, review of documents from group meeting, and review of training material. However, rarely are these data sources methodically analyzed and presented in an orderly fashion as evidence to support the findings of a study.
3. One exception is Barrett's (1999) description of the brokers' and underwriters' allegiance to the institutional practice of maintaining personal trust relations within a localized physical marketplace. This description sheds some light on the cultural values that brokers and underwriters share and helps explain their negative reaction to the new system, which they

perceived as a threat to this practice. No such descriptions are provided for the senior managers and IT managers groups.

4. The temporality of representations is therefore closely linked to the notion of mutual group projects. Although there are no strict rules of thumb, in studying social representations, a researcher would be advised to trace the history of a representation to the origins of the project in relation to which is it appropriated and becomes meaningful. This does not necessarily require the researcher to be present at that point in time, but necessitates utilizing methods that can capture it. For example, investigating how a group's identity is involved in shaping a group's representation of a recent event can help to gauge that group's history.
5. This is demonstrated in Table III in the "Unexplored questions" column (for example, in asking what are the underlying reasons for the observed differences across the groups that were identified in Barrett's study?) and the "SR perspective" column (for example, in proposing to examine the categories of vocabulary and imagery in relation to which the EDI system was anchored and objectified by the different groups in Barrett's study.)
6. Social representations theory's focus on identity is also demonstrated in Table III in the "Unexplored questions" column (for example, in asking how the frames that were observed by Barrett (1999) in his study are couched in existing interaction patterns and identities of organizations in the London insurance market) and the "SR perspective" column (for example, in proposing to examine the group identities and traditions in relation to which the EDI system was anchored and objectified to gauge the significance of the system to each of the groups identified by Barrett).
7. The importance of power issues in social representations theory is also demonstrated in Table III in the "Unexplored questions" column (for instance, in asking how the frames observed by Barrett (1999) in his study reflect power dynamics, interaction patterns, or alliances among different companies) and the "SR perspective" column (for instance, in proposing to examine the institutionalized practices and traditions in relation to which the EDI system was anchored and objectified to gauge the significance of the system to the groups identified by Barrett).

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