In this article, the author examines an enterprise resource planning (ERP) adoption process in a particular case setting to explore the knowledge management challenges encountered, specifically challenges related to the sharing and integration of knowledge, and the ways that social capital is used to overcome these challenges. More specifically, the author relates the different sources and effects of social capital to the different implementation phases, with their differing knowledge management challenges. By doing so, he highlights the relative importance of the bridging and bonding aspects of social capital that vary during different phases because of the different types of knowledge that become more or less important over the lifecycle of the project—embrained, embodied, encultured, embedded, and encoded.

Introduction

Since the mid-1990s, enterprise resource planning (ERP) systems have become the de facto standard for the replacement of legacy systems in large and multinational companies (Bancroft, Seip, & Sprengel 1998; Holland & Light, 1999; Robey, Ross, & Boudreau, 2002). In particular, an increasing number of multinational enterprises (MNEs) have adopted ERP systems with the intention of leveraging productivity and efficiency gains to improve organizational competitiveness (Davenport, 1998; Hitt, Wu, & Zhou, 2002). Enterprise resource planning systems have also been developed in response to the need to manage across global businesses—a difficult task made more so where each business is using different systems and technologies (Imra, Murphy, & Simon, 2000).

Despite potential benefits to firms, the adoption of an ERP can be complicated, typically involving a lengthy project lifecycle, and problematic, sometimes ending in failure and often involving delays and budget over-runs (Robey et al., 2002; Shanks & Seddon, 2000). This is because such packages are highly generalized and so need to be adapted to meet the multifarious unique requirements of the specific situation (Lim, Pan, & Tan, 2005). In addition, the real value-adding potential of ERP comes from radically reshaping how business is done and exploiting the new automated, seamless ERP capabilities when redesigning business processes (Willcocks & Sykes, 2000). This explains why ERP adoptions are often coupled with business process reengineering (BPR) initiatives (Robey & Boudreau, 1999; Markus, Tanis, & Fenema, 2000). This is why the implementation process is described as an organizational revolution, not simply a technological exercise. Noting the revolutionary characteristic of ERP, Markus, Axline, Petrie, and Tanis (2000) and Ross (1999) both observe that major problems arise in most ERP adoptions because of organizational rather than technical issues, for example social and cultural barriers, and user resistance.
In exploring these problems, researchers have focused on critical success factors and risks associated with ERP adoption (e.g., Holland & Light, 1999; Markus, Tanis, et al., 2000; Shanks & Seddon, 2000; Sumner, 2000). Although the specific critical success and risk factors identified by these different accounts vary, there are nevertheless some common elements that can be observed. This consensus portrays an ERP system as not merely a software package to be tailored to an organization but an organizational infrastructure that affects how people work with it in its own underlying logic and thus affecting a company’s strategy, organization, and culture (Davenport, 1998). In other words, the adoption needs to ensure that the two sets of logic (i.e., that of the ERP and of the adopting organization) can work in harmony. This is exemplified in the study by Soh, Sia, and Tay-Yap (2000), who argue that ERP adoption failure is closely related to “misalignment”—the gap between the functionality embedded in the software and the requirements of the adopting organization. In their study, Soh et al. found that different types of misalignment-resolution strategies were employed and that these had different impacts on the adopting organizations. In their view, the knowledge gap between the end-users, information science (IS) department personnel, and the ERP vendor was the main cause of unsuccessful adoption. However, although Soh and colleagues caution about the difficulties and importance of sharing the knowledge of all involved in an IS adoption, they fail to explore the process of knowledge sharing in any detail.

Building on the findings of Soh et al., I explore the different types of knowledge that need to be utilized over the different phases of an ERP adoption project in a particular case company and consider the challenges raised by managing different types of knowledge. Specifically, I consider how the knowledge management (KM) challenges faced arise from the need to share and integrate different types of knowledge over the lifecycle of an ERP project, and identify the social networking mechanisms that were used to meet these challenges. Therefore, the objective is to complement the existing ERP implementation literature by highlighting the KM challenges encountered, and the social capital that can be used to overcome these challenges. Specifically, this study aims to address two research questions: What types of knowledge need to be shared and integrated in an ERP adoption? What is the role of social capital in relation to addressing the knowledge management challenges associated with these knowledge sharing and knowledge integration requirements over the project lifecycle of an ERP adoption?

The article is structured as follows, after the Introduction, I proceed by exploring KM activities and its relationship with ERP adoption. I then include a section on social capital because as Nahapiet and Ghoshal (1998) argue, exploring knowledge integration essentially involves examining the social networks through which knowledge is exchanged (or shared) and combined (or integrated). Following that, details of the data collection methods employed are given. I then describe a case study that focuses on a particular ERP adoption project experience. I present the case data around the different phases of the ERP adoption project and then in the case analysis, focus on the main KM challenges encountered at each phase and the accompanying social capital mechanisms that were used to overcome these challenges. Thus, the case of TechCo presents the opportunity to examine how different types of knowledge become important to share and integrate over different phases of the project lifecycle, requiring different social network processes. Finally, the research findings are discussed and conclusions drawn from this analysis.

Knowledge Management and Enterprise Resource Planning Adoption

The growing popularity of ERP systems can be linked to changes in the business environment and the increasing need to integrate transaction-oriented data and business processes throughout organizations (Davenport, 2000; Markus, Axline, et al., 2000). An ERP system is marketed as an enterprise-wide package that will integrate all necessary business functions into a single system with a shared database (Lee & Lee, 2000; Shanks & Seddon, 2000). To achieve these ends, an ERP system involves the adoption of a common information technology (IT) infrastructure and common business processes (Davenport, 1998; Gefen, 2004), allowing organizations to develop a fully integrated and homogenous enterprise-wide information systems infrastructure.

Knowledge is a, if not the most, vital resource for organizational competitiveness. However, more recently it has also been recognized that organizational knowledge can be a burden rather than an asset (e.g., Robey et al., 2002), especially in circumstances where radical organizational change (Markus & Keil, 1994) is called for, as is the case with ERP adoptions. In other words, to leverage the strategic value of the technology, there is a need to configure the new technology to support radically altered business processes that take advantage of the integrating functionality of ERP. Enterprise resource planning projects thus involve both an organizational reengineering component and a technological configuration component. Robey et al. (2002) discuss these two aspects in terms of knowledge barriers that they refer to, respectively, as assimilation and configuration barriers. They explore these barriers from a perspective of dialectical learning, with the main dialectic occurring between the old

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1Knowledge management involves a range of processes including creating, sharing, integrating, storing, and reusing knowledge but here the focus is on the sharing and integration challenges generated by ERP project adoption as it is these processes that appeared to be so central.

2In this study, adoption is defined as the entire process of ERP implementation (agenda formation, design, implementation, and appropriation). On the other hand, implementation is only considered as one of the adoption processes.
knowledge embedded in business processes and practices and the new processes and practices that the ERP system is designed to support. Robey et al. explore ways in which organizations can overcome these knowledge barriers, noting, however, that in all the cases they studied there were opposing forces that continued to operate, especially in relation to changing business processes. Although I also consider these knowledge barriers in this article, I do so from the perspective of the challenges they represent for knowledge sharing and integration over the duration of a project lifecycle. In doing so, I identify how these challenges were overcome through different types of networking in one particular case organization.

To achieve this objective, I adopt a KM view (Grant, 1996; Huang, Newell, & Pan, 2001; Newell, Huang, Galliers, & Pan, 2003) that focuses not on the distribution and adoption of an ERP system but on the processes and structures through which functionally dispersed and differentiated knowledge is accessed, shared, and, combined during implementation (Tsoukas, 1996). This perspective is important because prior information and knowledge (Pisano, 1994) must be used as a basis for creating new knowledge that will facilitate the configuration of the ERP system and the design and assimilation of new organizational processes. This prior knowledge that is needed during an ERP adoption is, however, both diverse and widely distributed across an organization (Grant, 1996), thus posing significant knowledge sharing and integration challenges. These challenges are likely to vary over the lifecycle of an ERP project because at different points in the project process there will be different kinds of information that need to be shared and integrated. I use the phase model of Robertson, Swan, and Newell (1996) to consider how the challenges of knowledge management, and the social mechanisms to overcome these challenges, changed over the different phases of an ERP adoption project.

Robertson et al. (1996) outline a four-phase model, which builds on the original stage model of Rogers (1983), viz:

- **Agenda formation**, when the original idea, here to adopt ERP, is accepted and preparations made (e.g., formation of project teams) to facilitate adoption.
- **Design**, which involves understanding the ERP and organizational processes and fashioning a mutual fit.
- **Implementation**, which involves configuring the IT system and introducing changes to organizational systems and processes.
- **Appropriation**, when the ERP system is fully embedded within the organization so that it is accepted as routine.

These phases—or rather, episodes—should be seen as iterative, rather than linear (Robertson et al., 1996). In adopting this view, ERP adoption can be seen as a socio-technical challenge where group and organizational dynamics and technological advancement continuously and mutually shape and reshape each other (Coakes, Willis, & Lloyd-Jones, 2000).

In terms of initiating ERP projects, knowledge of organizational processes and the legacy systems that support these processes, are first identified to design new, more efficient, processes. In terms of the technological configuration component, knowledge of the ERP system is used to configure the many ERP tables that will support the agreed new organizational processes. Managing knowledge of existing organizational processes, legacy systems and the ERP system is not straightforward, however, because much of this knowledge is tacit (Polanyi, 1966), dispersed, differentiated (Tsoukas, 1996) and embedded within routines, few of which are stand-alone (Blackler, 1995). In other words, the collective and tacit nature of knowledge means that managing knowledge is likely to be extremely difficult since knowledge is both “sticky” (Szulanski, 1996) and slow moving (Lam, 1997).

Traditionally, knowledge is viewed as residing in the minds of individuals. Knowledge, from this perspective, is seen as a possession that can be readily made explicit so that it can be stored or transferred to other individuals (Nonaka, 1994). However, more recently, a growing number of researchers have expressed concern over the privileging of individual over group knowledge and of explicit knowledge over tacit knowledge (e.g., Cook & Brown, 1999). Instead, some are now emphasizing that much human knowledge is context-bound and tacit in nature (Lam, 1997). For example, the situated organizational learning perspective, building on the situated learning view of Lave and Wenger (1991), views knowledge as “embedded in the connections between individuals, in rules, divisions of labor and roles, and other artifacts that determine patterned interaction and behavioral regularities” (Nidumolu, Subramani, & Aldrich, 2001).

In understanding the KM challenges during ERP adoption, different types of knowledge may be considered. Blackler (1995), for example, extending the work of Collins (1993), identifies five different images of knowledge—embrained, embodied, encultured, embedded, and encoded. These different images of knowledge are discussed more fully in the Case Analysis and Discussion section, where they are related to the knowledge management issues in the case company.
organizational knowledge. Knowledge integration can be seen as the sharing and synthesis of specialized knowledge through ongoing collective processes of constructing, articulating, and redefining shared beliefs through the social interaction of organizational members (Alavi & Tiwana, 2002). This involves mapping existing organizational processes, identifying the processes that are embedded in the ERP software, and defining new organizational processes that fit both the software and the organization (Soh et al., 2000). In other words, the team tasked with configuring and facilitating the adoption of an ERP system must access and share widely distributed knowledge and integrate this knowledge in new ways with a view to designing new organizational processes that will be supported by the system. This includes the knowledge possessed by groups and individuals that allows them to carry out their daily activities, as well as the knowledge that is embedded in existing systems, routines, and cultures because this knowledge forms the foundation for reengineering organizational processes and configuring the ERP system.

Understanding this process of knowledge integration, as Okhuysen and Eisenhardt (2002) emphasize, involves understanding the “micro-social interactions among individuals.” Thus, the ERP project team will need to network among themselves and other stakeholders to make sense of both organizational processes (current and potential) and the ERP system. In doing this they will be drawing upon their collective social capital, that is, the information that can be accessed through the social networking activities of the different team members (Adler & Kwon, 2002).

Social Capital

The concept of social capital implies that a network of relationships can be useful in providing access to resources, including information (Nahapiet & Ghoshal, 1998). However, authors differ in terms of whether they emphasize internal relations (within a community) or external relations (across different communities). Adler and Kwon (2002) refer to this as the distinction between the bridging (Burt, 1997) and the bonding (Coleman, 1988) views of social capital. The bridging view focuses on the important role played by individuals in providing a bridge between different communities within a larger collective, so ensuring that information is shared across these communities. The bonding view, by contrast, focuses on the internal ties within a community that allow the members of that community to develop internal cohesiveness and pursue shared goals (Coleman, 1988). The bridging view thus emphasizes the importance of weak ties across communities whereas the bonding view emphasizes strong ties within a community (Granovetter, 1973).

Of course, what would be considered bridging or bonding within any human activity system would depend on the unit of analysis. In this study, I adopt a multilevel analysis that offers insights into how knowledge is integrated at the individual, team, and community level through an ERP adoption process and its respective implications from a social capital perspective. I explore how the bridging and bonding aspects of social capital were related to different KM challenges (knowledge sharing and integration) associated with surfacing and combining the different types of knowledge (Collins, 1993; Blackler, 1995) that arise during the different phases of an ERP adoption project.

Research Methodology

Research Method

Guided by the research focus of examining the importance of social capital on KM issues of ERP adoption, methodological concerns related to research design, data collection and analysis are now outlined.

The research reported in this article employs an interpretative case study methodology (Klein & Myers, 1999; Walsham, 1993). Case studies involve the examination of phenomena in their natural settings and are appropriate for research in new topic areas, with a focus on “how” or “why” questions concerning a set of events (Eisenhardt, 1989). A single case study is described here, which enables in-depth analysis of multiple aspects of ERP adoption in an organization. In this case, the approach allowed for different knowledge integration phenomena to be surfaced within a single case study. As Eisenhardt (1989) argues, the case study approach enables deep understanding of the dynamics present within organizational settings and thus helps to deal with Blackler’s (1995) concern to ensure the dynamic, emergent, and contested nature of knowledge sharing and integration is surfaced. In applying the concept of social capital in practice, where knowledge sharing and integration involves intricate interrelationships during the various phases of ERP adoption, I thought an in-depth case study would be appropriate, despite any concerns that might be expressed regarding the findings’ generalizability (Klein & Myers, 1999; Walsham, 1993).

In the choice of single case study design over multiple case design, I posit that “one must follow a more opportunistic approach even if that means settling for a single case study” (Keil, 1995, p. 447) especially where quality and in-depth data are difficult to obtain, as in this study. Besides, a single case is also useful in theory building (Eisenhardt, 1989).

Data Collection and Analysis

A participant observation-based case study method was adopted to investigate the relationship between phases in the adoption process and the knowledge integration challenges encountered by various stakeholder groups during the project’s lifecycle. The focus of this analysis was the adoption process where knowledge integration activities, related to ERP adoption, were central. At the same time, the broader organizational context was taken into account. Twelve months were spent documenting data at the research site, coincident with the ERP project. During this period, there was
constant interaction with key stakeholders to develop contextual understanding. Key stakeholders were interviewed and observed, and their roles and interaction with others in the organization investigated, within this broader social context.

The core of the research reported on here is based on face-to-face interviews (see the Appendix) with employees of TechCo, as well as observation of their interactions with others. Data were collected through 40 semi-structured face-to-face interviews, workshop participation, and brain-storming sessions. Interviews were conducted with managers at various levels of the organization who were directly or indirectly involved in the ERP project (see Table 1). All interviewees were contacted prior to interview, assured of anonymity and promised a summary of the research findings. Additionally, informal conversations, discussions, and meetings added to the data collected through interviews, allowing the researchers to build a joint account of the organization. The approach provided excellent access and openness in terms of rapport and data collection. Field notes of daily observations were taken as well as recordings of specific events.

Data collected from the interviews and through direct observation are reported in the next section to give a more complete picture of the organization and the ERP adoption process. In addition to interview data and observation notes made, the research team had access to nonconfidential materials recorded in internal documents as well as information that appeared on TechCo’s intranet. These documents and reports were found to be very useful in not only providing important contextual data for the study, but also in helping to triangulate (Denzin, 1988) the data thus collected with the interview and observation data.

Qualitative data analysis requires a different approach from quantitative analysis because the data can provide insightful stories only when the social context and meanings given by the social actors are considered collectively (Walsham, 1993, 1995) and iterated continuously (Orlikowski, 1993). In our review of the interview transcripts and observation notes taken, segments that related to the research questions addressed in this article were highlighted and collected on summary sheets. As part of the data analysis, the main themes found in the early stages were reexamined in the subsequent stages of analysis in an iterative manner (Orlikowski, 1993). Thus, our analysis focused not just on the initial issues that surfaced but emerging issues in addition. For additional validation, method and data triangulation (Yin, 1984) were undertaken. The data collection stage was concluded when repeated themes became evident and the information appeared to reach saturation (Glaser & Strauss, 1967).

### Case Description: An ERP Project Journey

The case concerns an ERP adoption experience of a multinational organization (TechCo4) whose business spans various products and services, such as financial services, oil, transportation, and manufacturing in 190 countries. TechCo has a diverse Intranet and information technology (IT) infrastructure functioning across various geographical locations, and these support its international operations.

Many factors were found to influence the decision to adopt an ERP system. One, in particular, was the realization that TechCo’s existing information systems were no longer keeping pace with e-commerce developments worldwide. As a result, headquarters decided to adopt ERP as the new core business system to integrate the diverse needs of its fast changing and growing business. As a senior manager commented, adopting an ERP system was important because:

> The organization has been operating a traditional supply chain using legacy system functionality for many years. We lacked the capability necessary to manage the diversity of information and knowledge needed for functioning in today’s e-business environment. Thus, implementing ERP is a learning process not only for [TechCo] to be updated with technology, but also provides the opportunity to integrate business processes as well as knowledge needed in facing new challenges.

The ERP system selected was the SAP/R3 package. By drawing upon session announcement protocol’s (SAP’s) technological facilities and its consultancy experiences in the packaged software industry, TechCo was determined to incorporate the large number of differing business systems that existed within the company into a uniform IT architecture that would enforce information transmission standards to facilitate knowledge cooperation between its various global business entities. Technically, the plan was to develop a common ERP platform using multiple phases of adoption because of the growing divergence of the business. Due to the size and scope of the project, and the existence of different corporate practices across different regions worldwide, the project was divided into three separate regions: Europe, United States, and Asia Pacific. This study examines the adoption process and experiences in the Asia Pacific region, considering this in terms of the different phases of the project identified earlier.

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*Note. IT = Information technology; ERP = enterprise resource planning.*

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**TABLE 1. Profile of interviewees.**

<table>
<thead>
<tr>
<th></th>
<th>Number of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top management</td>
<td>2</td>
</tr>
<tr>
<td>Business managers</td>
<td>6</td>
</tr>
<tr>
<td>IT Managers</td>
<td>6</td>
</tr>
<tr>
<td>ERP project team members</td>
<td>17</td>
</tr>
<tr>
<td>IT Vendor–Software analysts and business process consultants</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

*Note. IT = Information technology; ERP = enterprise resource planning.*

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*The identity of the company is withheld at its request.*
**Agenda Formation Phase**

Agenda formation was initiated when an evaluation team in Europe was tasked with studying the feasibility of the proposed global adoption of an ERP system. A core task team was formed with 20 members working fulltime on an experimental project before a formal proposal was prepared and presented to senior management. This proposal was approved. A formal ERP project team for the Asia Pacific region was formed as a result. The team had 21 core members, including regional branch representatives, staff members of various business units from local branches, and external IT consultants.

The project team members were selected by top management at regional headquarters. Selection was based on previous project and technical experience in SAP-related projects, domain knowledge of the business processes, and social status and influence in their respective work groups. As the project manager recalled,

> When we were considering who to include in the project team, one thing which was very clear to the management was that we knew we needed to have a multifunctional team comprising not just people with prior ERP adoption experience and expertise but also influential representatives from different business units from some of the regional offices.

The team members did not know each other prior to this project assignment, but the team leader (Mr. K) worked extremely hard to ensure that members got to know each other well as quickly as possible. He used various electronic meetings as well as social interactions to achieve this.

A steering committee, consisting of eight top management project sponsors was also established. The steering committee was responsible for signing off on proposed new business processes and providing necessary resources to the project team. In addition, over 100 other people were involved formally and informally over the lifecycle of the project, for example, providing information to the project team about existing business processes or legacy systems. Of these 100 or so people, some 50 of them were considered as “power users” because of their influence in their respective business units (BUs). They included heads of the 27 BUs as well as senior people from other departments. The participation of these “power users” was seen by the project sponsors to be key to the overall success of the ERP project.

The project team’s immediate task was to evaluate existing legacy systems and to identify business practices. In particular, they focused on identifying how business practices differed from one department to another. This was important because the previous corporate policy of decentralization and autonomy meant that there were very different information systems and business practices that had evolved across departments and BUs. Initially, this policy of decentralization was seen as a threat to the ERP initiative as most BUs had been comfortable functioning fairly independently. Thus, the issues arising from the decentralization policy posed the first set of challenges the project team had to address. Specifically, they had to try to understand the mindset of people in the BUs before technical and organizational changes could be made. They did this through familiarizing themselves with this diversity and then attempting to mediate across the different departments and BUs to identify common business practices that were acceptable to all. Although at later phases the process involved working with people from across the various BUs, the initial familiarization process during agenda formation involved the different team members sharing knowledge with each other to learn about parts of the corporate environment with which they were less familiar. Given the diversity of team member backgrounds, the team gradually built up an understanding of the differences across departments and the reasons for these differences. This, in turn, allowed the team to consider the kinds of common processes that might be acceptable across different parts of the corporation. However, in the early period this sharing of knowledge was often difficult, as explained by a project member, “Initially, it was almost painful to share what we knew that was relevant to the ERP adoption. We knew we had the appropriate knowledge in us but to externalize it, it was difficult. The situation improved over time as we began to engage in team meetings.” Similarly, another project member commented: “The internal team discussions, in some instances, not only lacked understanding and in-depth process knowledge, but also such contextual issues as corporate terms, corporate policies and business practices.”

Thus, the early phase of the project involved the sharing of knowledge between team members, with the main challenge being to develop a common understanding within the team. This was considered to be critical as individual members came from diverse backgrounds and had very different understandings of organizational practices and of the way the software was to be implemented. For example, two project team members represented two different BUs—the Production and Sales Group (PSG) and the Industrial and Consultancy Group (ICG)—that both serviced the same group of customers. These two BUs operated very different business processes and also had very different orientations to their customers. The PSG supplied automation parts to industrial customers. The products were mostly component-based and the staff members within the group focussed on pre-sales and sales activities, adopting a short-term vision of the customer relationship. Conversely, the ICG focussed on providing consultancy services to these same customers on their use of PSG parts. With a longer-term outlook, the ICG focussed on providing specific technical knowledge to help customers use and manage big production projects. The different approaches and foci in servicing the same customers made integrating different business processes very challenging for the project team.

This example is illustrative of how the initial learning was often problematic because business processes and practices in one part of the organization were often very different from those used by some of the other members. Thus, the team members took time to gain knowledge about the infrastructure of various technical systems currently being used...
as well as cultural variations within the organization, especially with regard to information systems adoption. Approximately 2 months were devoted to this learning process, after which members of the team began to understand better the contexts within which they were working and the resources available to the adoption effort. This sharing of knowledge about local business processes and “best” practices was seen to be very helpful, as indicated in the comments made by a computer engineer from the IT department: “These familiarization efforts provided the team with better knowledge and appreciation of the organization culture, practices and systems, which proved later to be very useful for the team in the adoption of ERP.”

Although much of this familiarization took place within the team itself, some additional effort was made during this early phase to build links across the departments where the system was to be implemented. This included both formal and informal activities. For example, team members set up formal meetings with the various heads and BU managers. Building on this formal process, the team members also began to socialize with those concerned. The meetings, formal and informal, enabled the overall directions and strategic goals of the ERP project to be explained. These efforts were seen as extremely useful in building support from the departments prior to the adoption.

**Design Phase**

Following this general familiarization phase, the team set out to engage more systematically with the wider audience of potential ERP users, both internally and externally in aspects of design. For example, some project members were busy identifying potential process owners, as well as contacting external partners (both product parts suppliers and business service partners). At the same time, the team realized that they did not possess all the necessary knowledge and understanding to design the new system and organizational processes. They also realized, however, that much of this needed knowledge already existed within the organization. Thus, according to notes taken in a discussion with the steering committee, the project team acknowledged that they needed to work with others from across the organization to prevent “re-inventing the wheel.” Specifically, the team recognized that they needed to access knowledge from across the organization to establish the “best practices” that would be supported by the new system. With some help from the IT consultants, the team members were able to identify both current business processes and respective business partners. This was an important step to take for the team because it gave them a “bird’s eye” view of the entire business process. As pointed out by one project team member, who was in charge of coordination between the project team and the BUs: “The documentation and participative discussion between the team and various BUs helped us to understand the different work practices and processes which various BUs have in common. We found that a lot of the differences are perceptual and have been ongoing between formal groups/functions that we do not openly discuss.”

Once key business process owners and partners had been identified, the team members held meetings with them to help cement relationships. In addition to inviting them to occasional social events, important process owners and business partners were also invited to some of the regular project briefing sessions. This facilitated their input and their knowledge to be tapped and, at the same time, enticed them to become project champions.

The team then set about identifying experienced and knowledgeable individuals so that they could provide the team with a bridge to the more detailed knowledge of particular processes and systems. However, there were very few clear candidates for this because most of the legacy systems were compartmentalized. As a project member in charge of project coordination recalled, “I could still remember there were times and incidents where we found ourselves stranded with very few answers to the questions we had on hand. At that time, the kinds of difficulties we were facing were mostly related to trying to understand some of the complex business processes and legacy systems.”

Moreover, most of the existing knowledge about the legacy systems and business practices was not well documented and what existed was, at best, partial. With the help of the external consultants, therefore, the team set out to re-discover and document key business processes. This was a tedious process involving bringing together members of different departments to extract knowledge about related business processes. Through this process the team gradually built up a detailed collective knowledge of how things were done within and across functions.

This process started with one of the consultants teaming up with two other project members to visit project champions in various BUs. They aimed to capture the roles of the BUs in the overall business process, document important knowledge needed in the BUs, and identify the person/persons with most knowledge for future contact. As a result, the team produced a document that contained contact information about various experts and their knowledge and interactions within the overall organization, with detailed descriptions of work routines also included. As commented by one of the IT managers in the team: “This knowledge extraction and documentation process made the knowledge integration process of the adoption easier as it allowed project members to be able to identify the ‘locations’ of [TechCo’s] key knowledge.”

At the same time, the team began to search for knowledge about the diverse work processes and practices of external business partners. This was also an uphill task because the links with vendors and customers that had been established over a long period were often very complicated. To understand better the hard-to-obtain knowledge that existed in these externally based processes, the consultants suggested that the team conduct a knowledge audit. This exercise involved observing actual practices and organizing face-to-face discussions with business partners to understand their
business processes and practices. In this way, most of the key business processes and practices were examined and categorized. As one of the business partners remarked, “These painful efforts proved useful to the overall [adoption] process as some of the workflows (expressed in terms of routines) were later customized to satisfy the business requirements of the business partners.”

**Implementation Phase**

Once the process analysis had been completed the project team moved to the implementation phase, working together with appropriate BU members to configure the ERP system. The close links that had been established during the earlier phases were crucial in facilitating this work, ensuring that all those involved had a shared understanding of what needed to be done. At the beginning of the implementation phase, it became clear that most of the users were interested in comparing how consistent or similar the new ERP system was with their previous legacy systems. Thus, the project team was constantly reminded by BU managers of the need for a functionally complex and culturally sensitive system—one that would support an autonomous environment of control and competition. The project team responded to these concerns and was very careful to address different IT needs, as the system was to be used both by people with a strong IT background as well as relative novices. For example, when communicating with the production department, the project team learned that the employees there preferred to work with “bar-code technology” as they had been using the same system interface for many years. Taking this comment very seriously, the project team customized all the system interfaces to look as much like the previous system as possible for the entire production department. This tendency of “benchmarking against the legacy systems” illustrates users’ reluctance to change and re-learn. As explained by one of the users in the business planning department:

> When the project team was conducting a study on what special features and functionalities we would like to have in the ERP, we were constantly comparing the proposed system with the legacy systems that we had. Though we knew we might be resisting new changes, but honestly, we thought there were some very good functionality and features that should be included in the new system.

In addition, the team found that many users were reluctant to take on new responsibilities or participate in discussions. This was because these users were afraid that they would be held responsible for mistakes made because of offering inaccurate or misleading information. The team overcame this reticence by introducing a “participation policy,” aimed at nurturing a new understanding and at building trust. As noted by a user from the marketing department:

> After the participation policy was introduced, I noticed that personal responsibility was emphasized, employees were not blamed when things went wrong, and rather, they were often offered help. Mistakes made were taken as ‘lessons learnt’ and viewed as opportunities for learning. Most people take it upon themselves to solve problems to ensure things are flowing smoothly, even if they do not arise within their sphere of work. The ownership and responsibility for failures was reduced down to a minimum.

The participation policy included statements by senior management affirming the importance of sharing knowledge. Indeed, their support was such that knowledge sharing was incorporated into performance evaluation. The participation policy provided a clear indication of personal responsibility in terms of participating in the implementation process as well as sharing knowledge in general, even after the implementation. With the help of this participation policy, a variety of user communities emerged, each involved in sharing information related to particular functional aspects of the new ERP system. According to one user, “When the ERP system was first set up, many people were not used to it and felt very uncomfortable using it. They registered their complaints online and called SAP a bad word.”

However, the emerging user communities helped greatly to improve this situation as participants helped to address some of the technical issues being confronted by others. Some even made appointments to go to colleagues’ offices to show them how the system worked. As a senior manager explained,

> The [communities] evolved as a result of knowledge sharing needs and were used informally to coordinate activities across different regions. In a way, we found that members of these communities provided valuable expertise of the global workflow and insights of how the global information systems infrastructure functions. They not only provided the expertise but also helped increase knowledge integration during regional ERP implementation.

Although the emergence of these communities was informal, they proved highly effective in providing somewhere to ask questions and identify problems and solutions. After going “live,” it was estimated that the ERP system had impacted over 90% of organizational operations. For the first 6 months of its life, the system was run in parallel with the legacy systems. After this period, the legacy systems were decommissioned. The appropriation of SAP/R3 resulted in significant changes within the organization. Fifteen legacy systems were finally replaced by the new ERP system with only three legacy systems remaining operational. According to a migration engineer, “The remaining legacy systems were primarily engineering systems . . . used as channels for information use. The systems provide consolidation and management of information by providing an interface for individual engineers to share information. These systems were also seen as mission critical systems for product engineers.”

**Appropriation Phase**

Once the ERP system was up-and-running and the legacy systems had been decommissioned, the project
moved to its appropriation phase. The project team was disbanded because it was thought that its task had been completed. However, concerns were soon raised about the need for continuous support for both the day-to-day use and evolution of the system to meet changing needs and opportunities. In particular, it was recognized that it would be useful to share information across business units and across the user communities, as one sales executive explained, “With the integrated business process in place, we see no reason why we should not help each other in getting more business, after all we are all BUs and we survive on making more profitable deals.”

To overcome these concerns, a centralized service center (CSC) was set up with approximately 30 staff members whose role was to manage the centralized services and coordinate the ERP initiative in this postimplementation period. The CSC was established as an external BU located away from other clusters in the company building. The center was used to provide very specific ERP knowledge not present in the IT department, combined with business-relevant knowledge. The role played by the CSC is described by an IT manager as follows, “CSC was set up to jointly manage the ERP system instead of having the IT department doing it on its own. This is because the IT department did not have sufficient business expertise and the specific ERP skill-sets to be capable of managing ERP-induced changes on its own.”

Three members of the ERP adoption project were assigned to the CSC to ensure that knowledge obtained from earlier processes was made available to all involved in the postproject period. With the help of the CSC, different communities began to exchange views and business leads via regular meetings. The CSC also managed an electronic knowledge hub to facilitate discussion across communities. In short, mechanisms were put in place by TechCo to ensure that there were adequate bridges between these dispersed communities that were using and contributing to the evolution of the ERP system, even after implementation.

As the ERP system became appropriated into TechCo, it brought about transformation to a number of the company’s key business processes. For example, according to a production clerk:

Before the ERP system was implemented, I used to enter production data in two separate systems. I had to first record our daily production figure in our own Production Information Systems (PIS) and then key-in the same data in another system owned by the accounting department. With the current ERP system, it made my job easier and helped reduce the number of data entry errors.

Throughout TechCo, there were at least 15 such transformations (mainly found in production, sales, and marketing) identified in the final report on the ERP project. Many of these transformations were seen to be cost effective and to have enabled the simplification and integration of a number of complex business processes. Another example of ERP-induced transformation was cited by a user, who had been involved since the beginning of the project:

One of the biggest transformations brought about by the entire ERP experience was the new mindset of implementing information systems in TechCo. For most of us, this ERP project was an eye-opening experience. As early as [the initial phases], we learned very quickly that, in the future, any of the information systems implementation would have strong implications for not just within the organization but also for our business partners outside the organizational boundaries. The lesson learned here was new and would take a while for most of us to get used to it.

Thus, the ERP experience not only challenged the existing project management environment and practice, but also foreshadowed future information science (IS) adoptions.

Case Analysis and Discussion

The case illustrates that a key problem during ERP adoption lies in the fact that the organizational and technological knowledge that needs to be shared and integrated to implement the new system (both software and organizational processes) is embrained, embedded, encultured, embodied, and encoded (Blackler, 1995) in individuals and groups and in the various organizational (inter- and intraorganizational) systems, structures, and relational processes. In particular, I argue that attention to understanding the importance and accessibility of different types of knowledge is crucial for ensuring that successful knowledge integration is achieved throughout the adoption process. The TechCo case demonstrates the importance of building and using relationships that facilitate this successful knowledge sharing and integration. However, this analysis suggests that the focus of this relationship building effort will change over the different phases of the project, as different KM activities become more important. We consider this next as we analyze the case in relation to the different phases of the project. Specifically, our analysis demonstrates how different types of social networking during different phases of the ERP project appeared to be related to the different types of knowledge challenges faced during each phase.

Agenda Formation: Developing Common Understanding Within the Team

The project team comprised individuals with different backgrounds and expertise. The initial knowledge challenge faced by the team, then, was to make explicit some of the embrained knowledge (Blackler, 1995) within the team itself. Embained knowledge refers to an individual’s cognitive abilities and conceptual skills. The team needed literally to “pick the brains” of each other. This was not easy, though, because others in the team had to understand the knowledge that was being made explicit and, given the differences in backgrounds and cultures between team members, this typically involved a slow process of social exchange over an extended period.

The sharing of this knowledge possessed by each of the team members depended on the establishment of some
common knowledge. This, in turn, depended upon the development of strong ties (Granovetter, 1973) and a sense of a shared purpose among team members. As Granovetter indicates, encouraging the development of strong ties increases closeness and reciprocity between project members. The focus was thus on team bonding and the development of a closed network (Coleman, 1988) where trust was high. This allowed team members to develop some common or redundant knowledge (Nonaka, 1994) that was crucial for effective knowledge sharing (Grant, 1996). Nonaka (1994) argues that knowledge redundancy is necessary to ensure that individuals have sufficient shared understanding to engage in effective dialogue. This effort put into team building created a sense of shared destiny among the project members which led to internalized consummatory norms (Portes, 1998) based on a normative commitment to the project (Putman, 1993).

This analysis suggests that developing strong internal team bonds during this early phase is critical as it facilitates knowledge sharing and integration during later phases. Although the main emphasis during this phase is thus on bonding activity, creating a broader awareness of the project among the wider community who were to be affected by the ERP system did begin, but only in anticipation of the tasks that the team needed to perform during the design phase. This broader awareness was important because it meant that, when the wider community needed to be more actively involved during the design and implementation phases, the bridges (Coleman, 1988) between the project team and the wider community already existed.

**Design: Accessing Distributed Organizational Knowledge**

During the design phase, there was a need to build relationships between the team and individuals in the various BUs to understand existing processes and build involvement in, understanding of and commitment to the project to improve the chances that the various stakeholders would view the new ERP system positively. The project team expended considerable effort during this phase building bridges (Coleman, 1988) with a wider audience and developing a network structure that was more open, so that structural holes could facilitate wider information flow (Burt, 1997). Such bridging activity, using social capital to gather widely dispersed information (Sandefur & Lauman, 1998), thus appears to be particularly crucial during this phase. External parties provide needed information because they can see an instrumental return (Portes, 1998); in doing this, the ERP system would be more likely to meet their needs if they have had some influence in its design. The provision of this information gave the project team an understanding of existing legacy systems and organizational processes. Moreover, this networking activity also began the process of building user commitments to the new system (Markus & Keil, 1994).

Although picking the brains of team members and others in the organization proved very useful, it also became clear that in many instances no one in the company really knew completely what was involved in a particular practice or how a particular legacy system worked. This is because such knowledge becomes embodied (Blackler, 1995) in an organization. Embodied knowledge is action-oriented and will typically be largely tacit (Polanyi, 1966). Thus, even though individuals carried out a particular activity on a daily basis they were sometimes unable to describe what they did or why, or to put that activity in a broader, organizational context. The project team accessed this embodied knowledge by observing work practices to uncover knowledge about these work processes and the function of legacy systems supporting the activity. In some cases, the team had to start from scratch by conducting knowledge audits and identifying best practices.

Although talking to individuals and observing work practices was important, it was also clear that some knowledge could not be surfaced by either of these methods because of its collective nature and because it was deeply embedded in existing organizational routines and relationships. Embedded knowledge is the knowledge that resides in systematic routines, for example in technologies, in roles, in formal procedures and emergent routines (Nelson & Winter, 1982). This embedded knowledge is difficult to make explicit because in any complex practice, a variety of individuals will be involved. Each individual will know and understand their particular part of the practice, but they will often be unfamiliar with the whole (Tsoukas, 1996). Knowledge of a particular practice does not therefore form a complete and coherent body of knowledge that can be precisely documented or even articulated by a single individual. Rather, it is a form of knowing that exists only through the interaction among various collective actors (Gherardi & Nicolini, 2000). Making this knowledge explicit was, nevertheless, necessary in the design phase as current processes had to be defined as the precursor to introducing new ERP-supported processes. The ERP project team did this through bringing together key individuals who could discuss the different aspects of a complex organizational process, recognizing that no single individual possessed all the necessary knowledge.

Therefore, in this design episode accessing distributed knowledge that was embodied and embedded across the organization relied on a variety of social networking activities that all involved bridging with others across the organization.

**Implementation: Encouraging User Ownership**

During the adoption phase, a particular knowledge challenge that emerged stemmed from the fact that users wanted to compare the new system with the previous legacy systems. Thus, the concern about users preferring old procedures and not adapting to the new environment was prevalent (Soh et al., 2000). The team saw this as a technological constraint as well as a social issue from the perspective of changing of mindsets— or changing...
Encultured knowledge. On the other hand, the guarded response to the ERP system could also be due to the fact that the users were relying on relevant prior knowledge (i.e., what they knew of the legacy system) to try to make sense of their new knowledge (i.e., what they had learned about the new ERP system). To overcome this problem, the team put effort into making the ERP system look outwardly similar to the legacy systems. They did this by integrating knowledge through mapping of information, processes, and routines of the legacy systems into the ERP modules with the use of conversion templates.

Moreover, the team recognized the need to break down formal barriers and encourage knowledge sharing between functions and BUs, and so the focus of relationship building changed from a one-to-one-based focus within the team or between the team and individuals across the organization, to more of a community-based focus. The team therefore focused on encouraging interaction between dispersed individuals and groups so that they could learn from each other’s experiences. Those working in different units then started communicating directly with each other, rather than relying on the core project team, which was eventually going to be disbanded anyway.

The introduction of the participation policy, aimed at nurturing a common understanding and building trust among the users, helped significantly in achieving the breaking down of boundaries between the different departments and functions. Eventually, the bonds that became established between users as they engaged in discussions about particular aspects of the system, led to the creation of a number of user communities. These emerging “communities of practice” (Brown & Duguid, 1991; Lave & Wenger, 1991) provided a safe haven in which users could discuss problems and learn together how to most effectively use the new system. Through the encouragement and facilitation of these communities, the team managed to surface and disband anyway.

After the ERP system was implemented, the team realized that much tacit knowledge of business processes was now encoded within the newly created ERP system. Encoded knowledge refers to information that is conveyed by symbols and signs, either in traditional print form, or increasingly, as here, in electronic systems and documents (Blackler, 1995). Yet, to continue to develop and fully appropriate the ERP system, this encoded knowledge needed to be integrated with internal and external knowledge. This challenge was met in TechCo because in the postimplementation phase, those who had been consulted during the earlier phases began to form strategic groups to facilitate and enhance the value of their co-existence. In particular, they recognized the importance of sharing across the user communities that had emerged. They achieved this through the creation of a knowledge hub—the CSC.

This knowledge hub was able to encourage the sharing of expertise and insights in relation to the newly defined organizational routines to ensure that there was continuous innovation of the ERP system itself. Thus, the ERP system encoded the new organizational practices and processes. To ensure that these were appropriated in organizationally useful ways, to ensure that knowledge was a tool of knowing (Cook & Brown, 1999), however, these encoded processes needed to be integrated with user knowledge in the context of their everyday practice. The knowledge hub encouraged the sharing of knowledge and experience.

Hence, the knowledge hub was very useful in helping to develop and spread better ERP practices by connecting “communities” and facilitating processes, so that they became self-organizing, knowledge-sharing networks of collaborative learning communities. These informal communities were supported by the formal support structures provided by electronically based knowledge-sharing systems set up by the organization with the aim of encouraging formal knowledge sharing and a move towards systematic organizational memory accumulation.

In terms of the role of these communities, although useful in most situations, I identified through observation that, paradoxically, they actually both facilitated and inhibited knowledge integration in the postimplementation process. On the one hand, their establishment triggered “structural integration” that helped to create the needed innovation and flexibility (Kanter, 1988). This can be seen as the outcome of a successful process of knowledge integration during the
project. However, in the process of creating these enabling structures in the implementation and appropriation phases, they sometimes became barriers, which could actually hinder future cross-functional knowledge integration. This occurred because the new structures created boundaries around the various groups and boundary penetration became difficult, making the exchange of tacit knowledge almost impossible, without having developed prior personal relationships. Users in this organization were not very comfortable in using the electronic knowledge-sharing systems so that this created electronic boundaries around the communities, which prevented the smooth flow of knowledge—somewhat akin to the “electronic fences” notion posited by Newell, Swan, and Scarbrough (2001). The CSC was partially able to overcome these boundaries.

The main KM issues associated with the agenda formation, design, adoption, and appropriation phases of the ERP project are summarized in Table 2. Of course, in reality, the phases of the project are not as discrete as this table suggests, so that the KM issues that we identify here uniquely for each phase, are overlapping. Nevertheless, this simplification helps to identify the most important KM challenges that arose at different points in the project lifecycle.

### TABLE 2. Main KM issues found in various stages of ERP adoption.

<table>
<thead>
<tr>
<th>Life-Cycle</th>
<th>Features</th>
<th>Main KM issues</th>
<th>Key quotes</th>
</tr>
</thead>
</table>
| Agenda formation | When the original idea, to adopt ERP, is accepted, preparations were made (e.g. formation of project teams) to facilitate adoption | • Team members with different knowledge backgrounds and expertise faced a challenge to externalize the embrained knowledge within the team.  
• Developing strong internal team bonds during the early phase appeared critical in facilitating knowledge sharing and creation in later phases.  
• Broader awareness was encouraged as the wider community needed to be more actively involved during the design and adoption phases. | • “We need to have a multi-functional team comprising people with ERP adoption experience and also influential representatives from different business units.”  
• “We find it difficult to externalize our knowledge but the situation improved as we began to engage in team meetings.” |
| Design           | Involves understanding ERP and organizational processes and fashioning a mutual fit | • Team focused on accessing the embodied and embedded knowledge distributed in the wider organization to capture knowledge.  
• There was a need to build relationships between the team and other BUs members to understand the processes and improve chances that the various stakeholders would view the new ERP systems positively.  
• The project team accessed knowledge through developing a more open network structure that facilitated wider information flow.  
• Accessing distributed knowledge that was embodied and embedded across the organization relied on a variety of social networking activities that all involved bridging with others across the organization. | • “Team members face difficulties in understanding some of the complex business processes and legacy systems.”  
• “These (networking) efforts provided the team with better knowledge and appreciation of the organization which later become very useful for the team in implementing the ERP.”  
• “We found various differences are perceptional and have been ongoing between groups that we do not openly discuss.” |
| Implementation   | Involves configuring the IT system and introducing changes to organizational systems and processes | • Main challenge stemmed from need to change users’ knowledge and encourage them to share knowledge with each other  
• Team managed to surface and change some of the deeply embedded and encultured collective knowledge through social interactions to remove boundaries between the functions.  
• “After the enforcement of ‘participative policy,’ mistakes made were taken as ‘lessons learnt’ and viewed as opportunities for learning.”  
• “[A key problem was] users trying to Benchmark against the legacy systems” | continued |

DOI: 10.1002/asi
Conclusions: Implications for Theory and Research

In this article, an ERP adoption process in a particular case setting was examined to explore the KM challenges encountered. Although the inherent limitations of a single case are noted, the findings show that there can be significant knowledge impediments in the adoption process and that the process is strongly influenced by the sociotechnical, structural, and relational realities to be found in any organization. In particular, it was demonstrated that the management of different types of project-relevant knowledge (Desouza & Evaristo, 2004) is a key challenge in ERP adoption. We have highlighted ways in which the ERP adoption process, and the associated KM challenges, is best characterized as a social process of relationship building, with different types of relationship building becoming more or less important during different phases of the project, as depicted in Table 3. Of course, in reality these different foci of social network building are more iterative than Table 3 might suggest, just as it is clear that the project phases—or episodes—are not, in practice, undertaken in a linear way (Robertson et al., 1996).

Nevertheless, this framework provides a useful heuristic that can help managers think about the networking activities that are important over the lifecycle of an ERP project such as this. Indeed, this framework is a useful starting point for examining the important networking activities associated with any type of IT implementation project that involves a large number of stakeholders, dispersed geographically and functionally, across an organization (or indeed across multiple organizations) because such projects are likely to face the same kinds of knowledge sharing and knowledge integration challenges.

This study has focused on the importance of both the bridging and bonding aspects of social capital during different project phases. What is clear from this case is that social capital can have a positive impact on the adoption process. However, more bridges or bonds are not necessarily always a good thing (Hansen, 1999; Newell et al., 2001). Further research could usefully be undertaken to identify the advantages and disadvantages of social capital during such IT projects focusing on how these might change during the different project phases.

**Table 2.** (Continued)

<table>
<thead>
<tr>
<th>Life-Cycle</th>
<th>Features</th>
<th>Main KM issues</th>
<th>Key quotes</th>
</tr>
</thead>
</table>
| Appropriation | ERP system is fully embedded within the organization so that it is accepted as a routine | • Team integrated knowledge through mapping of information, processes and routines of the legacy systems into the ERP modules with the use of conversion templates.  
• Team managed to encourage users, using a participative policy, to identify tacit knowledge within their work processes through informal discussions and numerous brainstorming sessions.  
• Fostering social relationships among users was found to be crucial to the success of ERP implementation  
• A knowledge-based hub (CSC) was formed to codify some of the knowledge about ERP system use and encourage the sharing of knowledge and experience in facilitating the ERP process.  
• Knowledge-enabling structures contributed to the ERP systems in facilitating the development of organization memory and improving structural integration across the organization.  
• The integration of internal and external ERP processes may create new barriers that could hinder future cross-functional knowledge integration unless prior personal relationships are established.  
• We see no reason why we should not help each other in getting more business.”  
• “We found that members of the knowledge-based hubs provided valuable expertise and insights of how the global IS infrastructure functions.”  
• “CSC was introduced because the IT department did not have sufficient business expertise and ERP skill-sets to manage ERP.” | |

*Note. KM = Knowledge management; ERP = enterprise resource planning; CSC = centralized service center; IT = information technology.*
This study makes some novel contributions to ERP research. It extends the information systems adoption/implementation literature through the investigation of KM. Specifically, there are two main contributions. First, the perspective of knowledge integration (Grant, 1996) was introduced to examine an actual information systems adoption. Building on Soh et al.’s (2000) study, the knowledge-related barriers encountered in ERP adoption were addressed. Not previously considered (Lee & Lee, 2000 being an exception), this study offers a KM perspective that sees ERP adoption as a process of collective social construction (Berger & Luckmann, 1967) that can be influenced by internal and external participants. In particular, the findings provide insights into the nature and dynamics of various complex knowledge impediments that underlie ERP adoptions. Thus, this study’s findings can be seen as complementary to existing ERP studies, which have mostly taken the approach of exploring critical factors related to success and failure and those that have looked into ERP’s organizational effects. Future research can explore in detail how KM applies in interorganizational and intercultural contexts, as more and more organizations are engaging in interorganizational and transnational arrangements.

This study also contributes to information systems implementation studies by highlighting that many of the problems associated with KM come from the very nature of knowledge itself and its social embeddedness (Badaracco, 1991). Following on the work of Robey et al. (2002), I have shown how different types of knowledge created barriers to both reengineering (the assimilation knowledge barrier) and configuration (the configuration knowledge barrier). By focusing on the different types of knowledge and the social embeddedness of knowledge during the various adoption phases, it has been possible to identify the different types of relationship building that need to be put in place to overcome some of the barriers encountered. Specifically, different types of knowledge need to be surfaced, shared, and used during and after ERP implementation. Indeed, an important finding from this study is that the need for knowledge sharing continues even after adoption, if the system is to be appropriated fully. Future research could usefully examine this issue in more detail to improve our understanding about how

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**TABLE 3. Social capital and KM challenges during the ERP project lifecycle.**

<table>
<thead>
<tr>
<th>Adoption process</th>
<th>Agenda formation</th>
<th>Design</th>
<th>Implementation</th>
<th>Appropriation</th>
</tr>
</thead>
<tbody>
<tr>
<td>KM Challenges</td>
<td>Creating common knowledge among project team</td>
<td>Accessing distributed organizational knowledge</td>
<td>Encouraging change of users’ knowledge through creation of user communities</td>
<td>Continuous sharing of knowledge across different parts of organization—across communities</td>
</tr>
<tr>
<td>Type of knowledge</td>
<td>Embrained knowledge</td>
<td>Embedded and embodied knowledge</td>
<td>Encultured knowledge</td>
<td>Encoded knowledge</td>
</tr>
<tr>
<td>Emphasis</td>
<td>Bonding of project team</td>
<td>Bridging with users—formal and informal networking</td>
<td>Bonding of user groups—creation of user communities</td>
<td>Bridging across communities</td>
</tr>
<tr>
<td>Organizational activities</td>
<td>Team building exercises and familiarization efforts</td>
<td>Identification of process owners, yellow pages document, process mapping, knowledge audit</td>
<td>Participative policy and facilitation of user communities</td>
<td>Establishment of CSC</td>
</tr>
<tr>
<td>Effects</td>
<td>Knowledge sharing within team</td>
<td>Team gains access to broader knowledge and begins to gain user commitment</td>
<td>Ownership more widely dispersed across organization among users</td>
<td>Innovation embedded within organizational processes and routines but continuous learning encouraged</td>
</tr>
<tr>
<td>Type of social capital</td>
<td>Team building</td>
<td>Network building</td>
<td>Community building</td>
<td>Knowledge-based links building</td>
</tr>
</tbody>
</table>

*Note. KM = Knowledge management; ERP = enterprise resource planning; CSC = centralized service center.*
different types of embedded knowledge can best be managed in different IS project adoptions.

In conclusion, complex, interactive innovation projects, such as an ERP adoption, are heavily dependent on networking activity to meet the different KM challenges that are faced. Although both the bonding between project team members and the bridging across dispersed communities is continuously important over the whole of the process, these types of social capital become relatively more or less important during different phases. This is because of the effects of social capital are themselves more or less central during different project phases.

References


Appendix

Sample of Interview Questions

1. When did the company start? Some information about the company—Is it a subsidiary or does it have subsidiaries? Is it locally based? Annual turnover. Examples of partners/clients.
2. What was the company’s organizational structure—number of employees, number of departments?
3. What was the motivation for initiating this project? (What were the favorable and hindering factors; business value propositions for the project?)
4. How many members were chosen to be part of the project (from various BUs)?
5. Why were they chosen (e.g., for knowledge redundancy, communication skills, interpersonal skills)?
6. What was the project scope (business processes and business units and business process reengineering)?
7. What was the life-cycle of the project? The number of stages, examples of project life-cycles, and number of sites and project team members.
8. How much was the project budget? What about the amount spent and deadlines of the project adoption?
9. What were some of the social and technical adoption issues and post-adoption challenges?
10. What were some of the post-adoption organizational changes?