

Mobilizing Institutional Knowledge for International Projects

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| Collaboratory for Research on Global Projects

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About the Working Paper

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This paper is currently under review for a Special Issue of the Journal of Construction Engineering and Management. An early version of this paper with the same title, "[Mobilizing Institutional Knowledge for International Projects](#)" won the "Best Paper Award" at ASCE's LEAD Conference in October, 2008.

Your comments are welcome and appreciated – correspondence regarding this paper should be addressed to: Amy Javernick Will, Email: ajwill@stanford.edu (through 07/2009) or Amy.Javernick@Colorado.edu (starting 07/2009).

ABSTRACT

International engineering consultants, contractors and real estate developers work on projects in various countries, encountering many challenges that arise from cross-national differences. These projects frequently bring together diverse participants in an unfamiliar environment. In these situations, firms are exposed to different “institutions”—regulations, norms, and cognitive-cultural beliefs—that can increase misunderstandings, delays and costs. Knowledge of these institutional elements is critical to create a project that is both locally sustainable and profitable for the firm. Departing from institutional theory and the knowledge-based-view of the firm, we conduct exploratory research based on interviews from informants in fifteen firms to identify the methods that international real estate developers, contractors and engineers use to transfer and mobilize institutional knowledge for their global projects. We contribute to theory by adding to the developing literature that uses institutional theory to examine differences on global projects and by analyzing the specific methods firms use to transfer institutional knowledge within their firm. Ultimately, this research, combined with the work of others, can develop new processes for firms engaged in international projects to enhance their mobilization of knowledge, and thereby improve the outcomes of global projects.

KEYWORDS: Institutional differences; Institutional Knowledge; International Business; Knowledge Management; Organizations

INTRODUCTION

Demographers expect over a billion more inhabitants on earth in the next decade (Sachs 2005). This projected population growth will occur primarily in emerging market countries and will require over \$3 Trillion in infrastructure (Launch 2003) to provide for people’s basic needs, such as clean water supply, roads, power, telecommunications infrastructure, etc. These emerging market countries, however, often lack the capacity to administer infrastructure development and operation, let alone the tax revenues to finance it. In order to deliver this needed infrastructure, many of these countries require outside assistance from the international community, resulting in the international expansion of engineering, construction, and rich country governmental, multilateral and private real estate/infrastructure financiers and developers to meet these needs.

As international firms—defined in this paper as firms that derive at least 25% of their revenue from operations in countries outside their home market—continue to globalize to work on these projects, they encounter many differences that result from working with diverse participants in unfamiliar locations. To date, virtually all of the research on international firms and projects has focused on these differences, which add risks—and thus costs—when doing business abroad. For instance, Pennings (1994) found that differences in economic development, regulatory traditions, and political and social infrastructure all increase the risk involved in foreign expansion. Previous studies in construction also validate this finding, showing that international construction projects face a complex web of political, economic and cultural risks (Han and Diekmann 2001), create a greater chance of disputes from cultural differences (Ghoshal 1987), and often lead to confusion among the project’s participants, increasing both delays and costs (Flyvbjerg et al. 2003; Miller and Lessard 2000; Orr 2005).

Many of the risks and costs of internationalization are rooted in a lack of understanding or knowledge of the local institutions within the area. These institutions, which include laws, norms and cultural beliefs, are deeply rooted in a society through activities, social obligations, values and incentives that provide stability and meaning to everyday life (Scott 2001; Scott 2008). Deep knowledge of local institutions is believed to be of central importance to the global firm, as this knowledge affects decisions and guides actions during internationalization (Eriksson et al. 1997). Recognizing the importance of this local knowledge on global project outcomes (Khanna et al. 2005; Orr 2005), the issue of how firms mobilize knowledge of a local project area’s institutions becomes paramount for working in a foreign environment and increasing the success of global projects.

Using institutional theory as a lens for viewing various types of local knowledge, we build theory through exploratory case studies on the methods international firms use to integrate and transfer different types of institutional knowledge within the firm. It is part of a larger study aimed at (1) identifying and categorizing important knowledge for international projects (2) analyzing the methods and sources firms use to initially acquire this knowledge and (3) developing a theoretical framework to explain and predict how the importance, acquisition and transfer of knowledge varies by firm type, level of embeddedness and other differences. In this paper, we review our theoretical points of departure before discussing our research methodology. We then present results regarding the methods firms use to mobilize different types of

institutional knowledge; ending with a discussion on the benefits and limitations of different transfer methods.

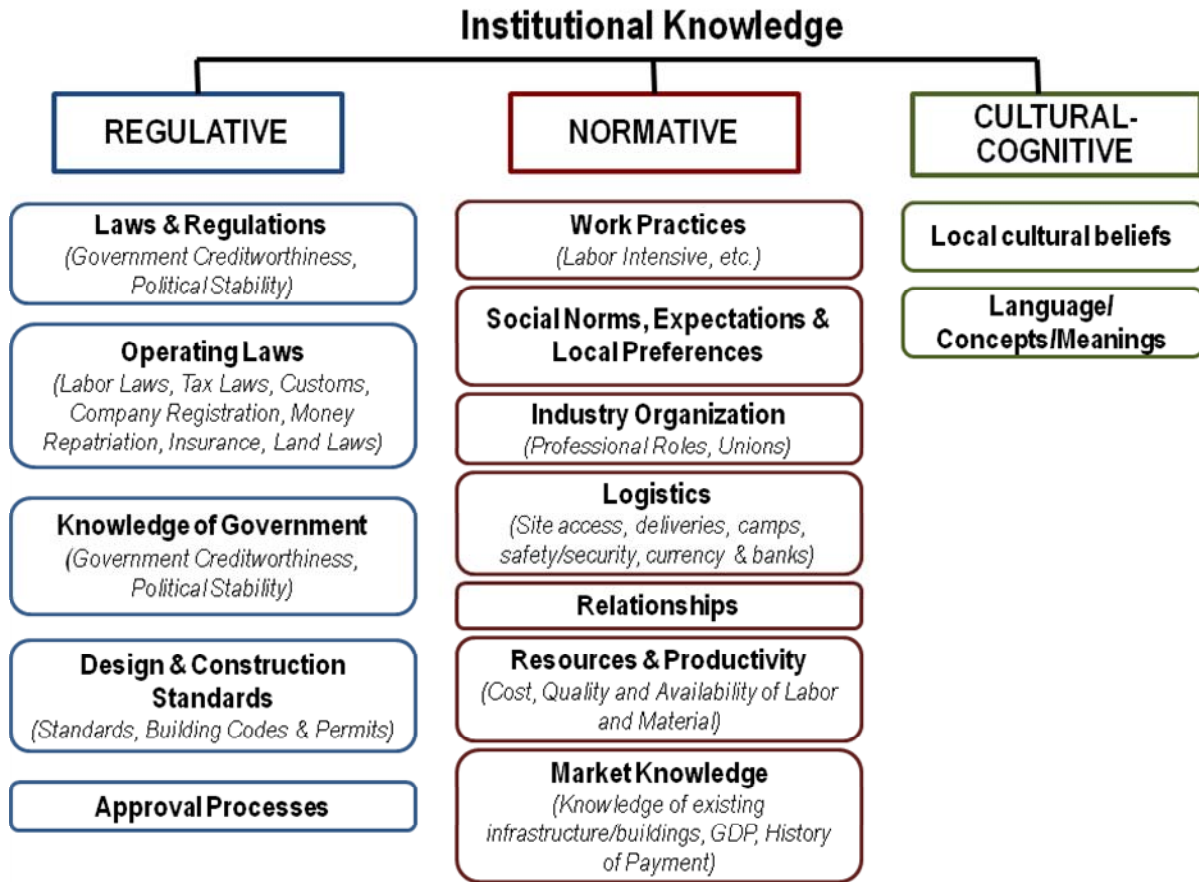
THEORETICAL POINTS OF DEPARTURE

Theoretically, we build on branches of organizational theory and strategy, namely: institutional theory, the knowledge-based-view of the firm, and knowledge management and organizational learning. The global project-based business literature, including internationalization theory, also underpins this research.

Institutional Theory

Recently, scholars have recognized institutional theory as a useful framework for identifying and analyzing differences encountered on international projects (Javernick-Will and Scott 2009; Mahalingam and Levitt 2007; Orr and Scott 2008). Mahalingam and Levitt (2007) demonstrate how institutional theory can describe cross-national challenges on global projects, Orr and Scott (2008) build on the framework to show how institutional exceptions arise on global projects and Javernick-Will and Scott (2009) use institutional theory to categorize important knowledge for international projects. This study draws particularly from Javernick-Will and Scott's work to analyze how important types of knowledge, categorized according to Scott's (2008) "institutional pillars" framework, are transferred within international firms. Refer to Figure 1 (presented in Javernick-Will and Scott (2009)) for categorized institutional knowledge on global projects.

Figure 1: Important Institutional Knowledge for AEC firms



Following Scott’s framework, we define institutions broadly as including “regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life” (Scott 2001, p.48). To elaborate and illustrate these distinctions in the context of global projects:

- *Regulative elements*, stressed particularly by economists, include the formal machinery of governance: laws, rules, surveillance machinery, sanctions and incentives. These tend to be more easily observed and explicit. Important regulative knowledge categories for Architecture-Engineering-Construction (AEC) firms include laws and regulations, operating laws, knowledge of government, design and construction standards and approval processes (Javernick-Will and Scott 2009).

- *Normative elements*, emphasized particularly by sociologists and historical institutionalists, focus primarily on the prescriptive, evaluative, and obligatory dimensions of social life. This category stresses shared values and norms, interpersonal expectations, and valued identities. On international projects, important normative knowledge includes work practices, social norms, expectations and local preferences, industry organization, logistics, relationships, available resources, productivity norms, and market knowledge (Javernick-Will and Scott 2009).
- *Cultural-cognitive elements*, a focus of cultural anthropologists, cross-cultural psychologists and organization scholars, tap into a deeper layer that includes widely-shared beliefs about the nature of the world (cultural frames and scripts) (Schank and Abelson 1977) and cause-effect relations (social logics). The beliefs are “cultural” because they are socially constructed symbolic representations; they are “cognitive” because they provide vital templates for framing individual perceptions and decisions. Hofstede (1991) identified a useful set of dimensions for assessing values, one of the key cognitive-cultural elements of Institutions. Important cultural-cognitive knowledge includes local cultural beliefs, concepts and meanings and cross-cultural disputes (Javernick-Will and Scott 2009).

Institutional knowledge entails understanding the regulative, normative and cultural frameworks that undergird social life and constitute the unnoticed background of social behavior. It is important to note that the categorization of these elements into regulative, normative and cultural-cognitive pillars is an analytical distinction. In the real world, these elements are found in complex combinations that underlie and influence each other.

Although institutional frameworks can include multiple, competing and conflicting elements with overlapping jurisdictions in a single context, transnational environments are even more complex. These situations involve multiple participants from diverse organizations and cultures working in unfamiliar locales, therefore, institutional differences loom large, and knowledge of the different institutions becomes of paramount importance.

Many scholars, particularly those focused on international business, recognize the central importance of local institutional knowledge during international expansion (Lord and Ranft 2000). In general, the prevailing argument is that the greater the emphasis a firm places on acquiring knowledge of institutions, the less uncertainty the firm will face regarding problems

and opportunities in a foreign market (Johanson and Vahlne 1977). The reduced uncertainty regarding a foreign market allows an international firm to have a more accurate view of the foreign market, thereby reducing unexpected difficulties and costs. Despite previous contributions to this area, little is known about how firms develop, manage and mobilize this knowledge (Chetty et al. 2006; Lord and Ranft 2000). Recognizing the importance of institutional knowledge for business, scholars have examined studies to elucidate the ways that particular institutional knowledge can be carried across organizations (Scott 2003) and summoned studies of how this knowledge can be carried within organizations (Nissen 2007). Our research focuses on knowledge transfer within a firm.

Knowledge-based theory of the firm

The knowledge-based theory of the firm has received wide acceptance and support. It states that organizational knowledge is a resource with at least the same level of importance as capital (Grant 1996) and is the key ingredient to sustaining competitive advantage (Spender 1996). In this view, the organization is a social community that transforms knowledge into economically rewarded products and services (Khanna et al. 2005). A global firm engaged in multiple projects throughout the world is therefore interested in using its collective knowledge to achieve higher performance (Ghoshal 1987; Zahra 2000).

During data collection, the first author witnessed many posters, brochures and websites highlighting the advantage of collective knowledge within the global firms studied. Illustrative statements include: *“We gain leverage with our combined know-how and make optimum use of it throughout the world”*, *“The individual and collective expertise of our global workforce... provides cost-effective, intelligent solutions in a timely manner”*, *“...we always have access to a global network. This Group-wide expertise is only a phone call away.”* At the same time, international firms also realize the need to obtain local legitimacy by possessing knowledge of the local area, as witnessed by one company’s brochure: *“Clients can not only benefit from the experience and expertise of the whole company, but from local understanding”*. This dual conundrum recognizes the common organizational trade-off between exploitation and exploration (March 1991). These statements suggest some of the perceived advantages that an effective international firm requires: an understanding of various local markets and project areas from which to gain new knowledge to achieve local legitimacy and the ability to collect and make this knowledge available as needed by others in the global firm.

In order for an organization's collective knowledge to add value, the knowledge needs to be accessible when and where it is needed. Unfortunately, most organizations "don't know what they know" and all organizations "know more than they can tell" (Polanyi 1967). If an organization lacks structured ways of learning and sharing, it can lose time and resources spent on repeating the same mistakes or "reinventing the wheel". This is particularly important in the AEC industry, where teams are project-based and temporary in nature (Whitley 2006). These teams disband and reorganize into new teams, frequently failing to capture and share knowledge gained from the last completed project across the organization. Because they operate in multiple institutional environments, capturing and transferring institutional knowledge can present an even greater challenge for international AEC firms. Observers suggest that it is time for scholars to focus attention in how global firms actually acquire, retain and transfer knowledge (Argote and Ingram 2000).

Knowledge Flow

To create a strategic advantage based on its global knowledge, an international firm operating in a project-based industry like construction must facilitate not only on the acquisition but also the flow of knowledge through the organization, whether between individuals, groups or successive cohorts of project participants (Nissen 2006). The reach of transfer multiplies the impact that knowledge can have on the overall organization. The theory of knowledge conversion (Nonaka 1994) assumes that an organization creates, converts, and transfers knowledge through a spiral process involving four steps:

- Socialization: the transfer of tacit knowledge through shared experiences such as mentoring and on-the-job training
- Combination: the transfer of explicit knowledge through mechanisms such as meetings, information processing and technology
- Externalization: the conversion and transfer of tacit knowledge to explicit knowledge through questioning and reconstruction of perspectives and decisions
- Internalization: the conversion and transfer of explicit knowledge to tacit knowledge through learning and the awareness of knowledge

Focusing specifically on the transfer of knowledge, there appear to be two categories of processes that companies use to transfer knowledge. Some prefer to use **formal processes** to

integrate and share knowledge, particularly explicit knowledge, employing procedures, manuals, standards, schedules, check-lists, templates, etc. These types of formal methods have been shown to facilitate knowledge flow across the corporation (Gupta and Govindarajan 2000). Information and communication technology (ICT) can aid the formal integration of explicit knowledge by simplifying the process of coding, communicating, assimilating, storing and retrieving the knowledge (Rockart and Short 1989). In fact, when questioned about knowledge management and organizational learning, many companies automatically limit their discussions to ICT and other formal processes. They tend to associate knowledge management with building information databases that enable the transfer of best practices systematically and routinely (Ball 2006). However, ICT is often insufficient as a knowledge management system because people, not technology, are central to the flow of tacit knowledge through mentoring, training, mimicry and other similar socialization processes (Nissen 2006; Polanyi 1967). Because of this, some companies prefer to use **social processes**—primarily informal, but some more formalized—to facilitate knowledge flow. This can include on-the-job training, meetings, transfer of personnel, and personal discussions and consultations to exchange knowledge. A study by Nonaka (1994) found that many individuals prefer these methods, seeking knowledge from individual experts on a personal basis. Perhaps this is because people are likely to be the most effective conduits of less codified, more tacit knowledge, as they are uniquely able to contextualize the knowledge to specific situations. However, if individuals have valuable tacit knowledge, the demand for their time can quickly exceed supply (Monteverde and Teece 1982). Hence, organizations need mechanisms to formalize and scale up the knowledge (Coff et al. 2006).

Drawing from this work, Hansen and colleagues (1999) reframe the previous distinction to identify two strategies organizations use to “manage” knowledge: codification and personalization. Codification relates to the combination of knowledge through formal processes and revolves heavily around the use of information technology tools and practices to connect people to reusable, explicit knowledge. Personalization relies on socialization and interaction techniques to link people so they can share tacit knowledge. Companies choosing the first strategy often invest more heavily in IT, while those emphasizing the second, invest more moderately in IT, choosing to emphasize personal interaction (Hansen et al. 1999).

Compared to other industries, the construction industry has been slow to embrace and implement knowledge management initiatives (Carrillo and Chinowsky 2006). However,

Carrillo and Chinowsky found that knowledge management is gaining ground within the US AEC sector. They found that relatively few companies within the US AEC sector chose an IT-centric strategy (involving “Codification”/formal processes) whereas five out of six of the companies included within their study relied on a people-centric strategy (“personalization/social processes) for managing knowledge flow.

Upon starting this research project, we began with the often used and well-known term of knowledge *management*. However, through the course of the research we began to believe that this term was not appropriate or adequate for the AEC industry. To begin, informants often associate the term with IT-centric platforms and dismiss the conception of “*managing*” knowledge. As Kreiner indicates:

“While gaining control and ownership are highly legitimate aims for managers, reducing knowledge management to merely a question of transforming knowledge into explicit and controllable forms would probably be a mistake. It would confound the issue of making knowledge resourceful to the organization with the issue of control through ownership” (Kreiner 2002).

In the AEC project-based industry, a more appropriate term seems to be “*mobilizing*” knowledge for the projects—getting the right knowledge within the organization to the right people and projects at the right time. This term elicits a different conception in people’s minds—actively obtaining the needed knowledge and information for projects through various methods.

Recognizing the tremendous benefit that can result if firms mobilize knowledge quickly for projects by taking advantage of the company’s collective knowledge and past lessons learned, our work builds upon studies related to knowledge flow in the AEC sector, but focuses specifically on the local institutional knowledge that is so important on international projects. We study various organizational processes, including formal and social methods, in order to uncover the mechanisms that facilitate the integration and transfer of institutional knowledge gained from infrastructure projects across global firms. We contribute to theory by identifying the carriers and methods currently used to transfer different types of institutional knowledge, an area that is understudied despite its identified importance. In addition, we add to the burgeoning studies that apply institutional theory to global projects. Finally, this study offers suggestions to practitioners who wish to develop organizational processes to facilitate the transfer of knowledge from their

international projects, discussing the benefits and limitations of the various transfer methods. This work, combined with the work of other scholars, can help increase the success of international projects.

RESEARCH METHODOLOGY

We use qualitative case studies for this research. This method provides a level of in-depth information that more general survey methods on large samples cannot attain, offering the prospect of rich, new insights (Eisenhardt 1989; Yin 2003). Recognizing that knowledge transfer is difficult to measure and predict, we elected to conduct interviews with participants within varying types of firms as to how they actually acquired and transferred different types of knowledge on the projects in which they were involved. We asked our informants to describe specific examples from their past experiences, providing us with insights into more effective *vs.* less effective methods that are currently used in practice.

The first author conducted case studies within fifteen companies distributed across three types of firms (engineering, contracting and real estate development) within the AEC sector. We selected companies that received at least 20% of their revenue from projects outside their home market. [Please refer to Table 1 for additional details of the case studies (company names are disguised to honor confidentiality agreements)]. Where possible, we selected companies that utilized varying knowledge management practices to increase the range of practices examined. The use of multiple cases within each type of firm allowed us to compare results across cases, helping to address internal validity concerns (Eisenhardt 1991). In order to focus on institutional knowledge, we selected informants within firms who had past or current experience on international projects or oversaw international offices or operations. We also included participants who were involved in knowledge management (if applicable) within their organization. These participants varied in title: including Executive, President, Country head, Knowledge manager, Project manager, and Project engineer.

Table 1 : Case Study Information

	Company (Coded)	# of Informants	# Countries with Offices
Real Estate Developers	Tottenham Court	6	19
	Holborn	4	16
	Goodge Street	5	2
	Southgate	2	1
Contractors	St Pauls	7	25
	Leicester Square	12	18
	Charing Cross	9	32
	Oxford Circus	9	12
	St James Park	5	21
Engineering Consultants	Hyde Park	27*	15
	Farringdon	8	28
	Angel	8	36
	Piccadilly Circus	4	26
	Fulham Broadway	4	11
	Paddington	3	29

**The five most substantive of these 27 interviews were coded for this analysis*

The first author conducted the case studies in company offices from September 2007 through August 2008. She also followed-up with subsequent phone interviews with informants in other office or project locations during this time. To increase the validity of the knowledge transfer methods multiple data collection methods were employed (Eisenhardt 1989) including: *collection of documents and secondary data* that was either available publicly or provided by the informants, and, where possible, *direct observation*. Using ethnographic interviewing techniques proposed by Spradley (1979), we asked descriptive, semi-structured but open-ended questions to informants within global firms. In total, we interviewed 113 informants, many of whom were interviewed more than once. We began with questions regarding what knowledge was important for and needed on global projects (reported in Javernick-Will and Scott (2009)). Then, from the participants' examples, we asked specific questions regarding how they obtained or shared the knowledge with others in their organization. This enabled us to gather information and insights from rich, detailed scenarios.

We recorded over 100 hours of audiotape which were transcribed and imported (along with other relevant documentation) into a qualitative software coding program, QSR NVivo®. Nvivo allows researchers to manage data and ideas and query the data to report results (Bazeley and Richards 2000). We then began a four-month process of “coding” the interviews and documents (Glaser and Strauss 1967; Strauss and Corbin 1990). We used “topic coding” to assign references within the transcripts to appropriate categories and then conducted dynamic, analytical coding to draw and verify conclusions from the data. To focus on the transfer of institutional knowledge, we coded categories of important knowledge into the three pillars of institutions—regulative, normative, and cross-cultural—and cross-tabulated the results with different types of transfer methods used. During data collection and analysis, we also coded references regarding the transfer of technical knowledge. [The ways that firms mobilize technical knowledge are not discussed in as much detail, but are presented as a basis of comparison.] We present the results in the following section.

THE INTRA-FIRM TRANSFER OF INSTITUTIONAL KNOWLEDGE

Organizations use various methods to encourage the transfer of knowledge within a firm. The methods used will depend on a combination of the organization’s historically established routines combined with their current focus and policies of current knowledge managers. Throughout the study, participants mentioned many different processes and procedures that they used to transfer specific types of knowledge within their organization. Some organizations rely primarily on social processes to facilitate knowledge transfer, while others use formal processes that typically transfer explicit knowledge. In every firm, although not across every knowledge type, a combination of social and formal processes was used for knowledge transfer.

Methods for Knowledge Transfer

Originally, we coded 48 different methods for transferring knowledge. These were then clustered into fourteen “parent” categories that include analogous or closely related “daughter” methods. For instance, the larger parent category “meetings” includes alignment sessions, informal meetings, project meetings, functional meetings, regional meetings, global meetings and lessons learned meetings. From the fourteen inclusive categories, nine methods accounted for transferring 85% or more of the coded references for different types of institutional knowledge. We focus primarily on these nine categories, which is in accordance with other

researchers who recommend narrowing the data by focusing on constructs that represent 80-90% of the data (Dunteman 1989; Taylor 2007a). We divided categories into two primary types of transfer methods: “Formal” and “Social”. We classified transfer methods as “Formal” when the processes relied on codified, explicit knowledge. Methods were classified as “Social” when they required personal interaction to transfer the knowledge. Finally, we treated one category, “Interactive Online”, as a separate type due to its unique ability to engage people in social interactions and transfer explicit knowledge, spanning the boundaries between the two categories. The five remaining categories, accounting for 15% or less of the coded references, were divided into two subtypes: Formal (Other), which includes IT automation systems and formal training, and Social (Other), which includes community groups, keeping project teams together across projects, and on-the-job training/mentoring.

Formal Processes

The procedures described produced four primary constructs to describe formal knowledge transfer methods: project databases, reports, procedures and processes, and the use of a general online system.

- **Project Databases** contain codified knowledge that typically provides comparable details or statistics of past projects. These databases may list the location, client, sector, project value, requests for information, financial transactions, etc. In addition, some organizations have databases listing the projects each employee worked on in the past and some maintain databases of the subcontractors that worked on each project. Many developers and owners also benchmark their projects with others in a given location and maintain this information in a project database.
- **Reports** transfer explicit knowledge in written form. One of the most recognized and used processes of knowledge transfer within the construction industry, post-project “lessons learned” or “close out” reports, are included in this category. The reports are typically the result of meetings where project staff record their experiences from the project and provide advice for future project teams. Reports sometimes include written accounts of what occurred at various project stages to maintain a historical record (and hence legal account) of why decisions were made and what processes were followed. Also included are memos regarding project or country information, for instance,

executive briefing reports, and internal publications that preserves knowledge from the company's experience.

- **Procedures and Processes** are formalized procedures that companies request (or in some cases require) their employees to use. Typically, these procedures and processes are the outcome of reviewing lessons learned from many projects. These can include standardized checklists of what risks to consider on projects or processes that employees are required to complete during each project stage. In some cases, organizations will record the procedures required to gain approval from particular governing bodies or jurisdictions, for example, the process for obtaining a building permit or purchasing land.
- The category **General Online System** refers to an intranet that contains static information within the company or provides links to external internet sites for building codes, sustainability information, and cost indexes. Within the confines of institutional knowledge, some provide links to external tools such as "GlobeSMART" that provides information on how to conduct business with people from various countries around the world. We also coded systems that store static plans, specifications and programs in this category.

Social Processes

Our research uncovered four primary categories of social processes for transferring knowledge: meetings or teleconferences, reviews, transfer of people between offices, and personal discussions.

- **Meetings/Teleconferences** include meetings between people within the organization. Board meetings, asset review meetings, project team meetings, functional meetings, annual conferences, topic meetings, and alignment process meetings (for example, if a company is sharing work amongst multiple offices) are included within this category.
- **Reviews** include diverse categories of examinations conducted at various levels. For instance, executive committees may conduct a country analysis, deciding whether the company should enter or remain in a given geographical location. Many also review investments and assets, operations, and audit information. Several companies also conduct project peer-reviews at various phases, reviewing current plans for design, schedule, budgets, and processes to identify key risks that may have been neglected by the project team.

- **Personnel Transfer** refers to the strategic transfer of employees among various divisions and locations in the company. This is used to facilitate knowledge exchange between individuals working on a specific project or other function. In many cases, organizations strategically place employees with experience in new geographical locations to transfer knowledge regarding company processes and procedures as well as existing organizational and technical knowledge to new employees in a region. They may also place employees with experience on a particular type of project or with a particular client on a similar project to transfer past knowledge to other employees. Previous studies show that deliberately moving members around the organization can be a powerful mechanism to transfer knowledge (Borgatti 2003).
- **Personal discussions** include references to person-to-person conversations that can occur over the phone, via email, or through direct in-person interaction. People often rely on personal discussions to receive contextual information that is applicable to a specific problem or project. This category is limited to situations where personal discussions were used acquire specific types of knowledge; it does not include references to the ways in which participants gain knowledge of referential data—an understanding of where to search or whom to contact for relevant knowledge and information (Borgatti 2003; Schreiber and Carley 2004). This method will be addressed in the discussion section.

Finally, *Interactive Online* was placed in a separate category due to its unique ability to engage people in social interactions and transfer explicit knowledge, spanning the boundaries between the two categories. Interactive Online platforms, as compared to the “General Online System” encourage social interaction through forum discussions and enable searches to locate people and explicit knowledge within the organization.

Transfer Methods based on Knowledge Type

How do the transfer methods described relate to differing types of institutional knowledge? We found that the methods used vary depending on the specific type of institutional knowledge—regulative, normative or cultural-cognitive—to be transferred. The relative frequency (or number of coded references citing the use of a transfer method) for each knowledge type is presented in Table 2. Table 3 sums the frequencies of formal and social transfer methods across knowledge types.

Table 2: Relative Frequency of Transfer Methods for different types of Institutional Knowledge (All Firms)

		KNOWLEDGE TYPES			
		INSTITUTIONAL			Technical
TRANSFER METHOD		Regulative	Normative	Cultural Cognitive	
FORMAL	Project Database	4%	4%	4%	4%
	Written Reports	22%	18%	8%	14%
	Procedures and Processes	11%	2%	8%	7%
	General Online System	3%	3%	4%	5%
	Formal (Other)	4%	4%	4%	3%
	Interactive Online	9%	13%	0%	25%
SOCIAL	Social (Other)	5%	8%	0%	5%
	Meetings/Teleconferences	5%	11%	23%	7%
	Reviews	14%	14%	8%	14%
	People Transfer	5%	7%	15%	3%
	Personal Discussions	18%	19%	27%	13%
<i>Column Totals</i>		100%	100%	100%	100%
<i>Total References per Knowledge Type</i>		<i>n=74</i>	<i>n=133</i>	<i>n=26</i>	<i>n=152</i>

Table 3: Formal vs. Informal Institutional Knowledge Transfer Methods (All Firms)

	KNOWLEDGE TYPES			
	INSTITUTIONAL			Technical
CATEGORIZED TRANSFER METHOD	Regulative	Normative	Cultural-Cognitive	
Formal	43%	30%	27%	42%
Interactive Online	9%	13%	0%	25%
Social	47%	57%	73%	33%

Social methods account for the majority (73%) of the transfer of cultural-cognitive knowledge. This is not surprising due to the tacit and taken-for-granted nature of this knowledge. It is often the most difficult type of institutional knowledge to understand and, as participants noted, tends to require contextual details modified to the particular recipient of the knowledge (based on their past experiences) or the project. The most frequently mentioned transfer method for cultural-cognitive knowledge was personal discussions, accounting for 27% of the coded references. One participant noted the need for personal interaction for transferring this knowledge:

In many cases [cultural knowledge] is going to be very contextualized. So, we really want to know: [Can we identify] the people [in the organization] who have the experience and can answer the more detailed questions that will never get documented?

In addition, some companies specifically did not want this knowledge recorded due to the risk of offending people of various cultures.

The movement of personnel is also important for transferring cultural-cognitive (15%) and normative (7%) knowledge. One company invited representatives from a country office to visit the office that was working on a proposal within the local region. This staff provided both cultural and normative knowledge regarding the region:

A representative from the China office came over to coach our people on how we should meet, greet and interact with the clients. They also told us social things you should do and avoid.

Some companies rely on transferring people to facilitate personal discussions as an important mechanism to transfer cultural cognitive (and normative) knowledge. One company sent representatives from the office that was working on a project to a local office within the project area to observe interactions and processes that took place. After their observations, they were sent back to their primary office to report and disseminate their findings through personal discussions:

We sent a local representative over to China to sit with the various vendors in the early parts of the contracts so that he could learn and share information a lot easier... that information was shared with other projects here through a network of people talking... and from follow-up discussions.

Meetings (23%) and sometimes reviews (8%) were also used to convey valuable cultural-cognitive knowledge regarding a region. If the expertise exists within the company, some companies will invite employees from a particular region to be part of a project meeting or review to provide valuable insights on local beliefs and requirements that may influence a project. Some informants also commented that they gained valuable knowledge from discussions in meetings across regions. For example, one informant was able to learn and apply knowledge on how to find good people to hire from another region in a “emerging markets” meeting.

Formal methods had about the same frequency of use for cultural-cognitive and normative methods; however, social transfer methods declined for normative knowledge from

73% to 57%. This is due to interactive online platforms replacing social methods for transferring normative knowledge. For instance, one contractor in the study had just begun an interactive online system. One of the first communities of practice formed was the “Mobilization Community”. This community enables its members to share knowledge through forum discussions and other interaction regarding various types of identified normative knowledge. For instance, they share knowledge regarding labor recruitment, logistics and camp designs, and unions and industry organization within the community. Another engineering company that has a well-known and established knowledge management system used the interactive portion of their online system to enable employees to search across the system or post a forum query. One employee discussed using this system to obtain information regarding suggested work practices in different regions:

[For instance], in Alaska we need to know that we should modularize because there is a lack of craft people in the area. Or, for example, I needed to know that in Sakhalin Island Russia, there is only a 3 month window where I could ship modules in, so if I miss the window I would have to wait a year. Very different construction techniques will be required based on constraints in different areas.

This same company developed “knowledge plans” for types of knowledge they hoped to capture on a project. The company provided us with an example of a plan for a project in the Middle East that included several types of knowledge the team planned to acquire and subsequently enter into the online system for future reference. This included the foreign county’s local labor force in addition to other institutional knowledge such as the country’s regulatory requirements and geographical information. Finally, an informant from a different engineering company commented that a community of practice was actively engaged in discussing differences between Public-Private-Partnership (PPP) projects in different countries. These discussions contained references to both normative knowledge regarding how these partnerships are organized differently in various countries as well as regulative knowledge regarding country laws.

As predicted, the frequency of use of social methods decreased as the knowledge became more explicit and more easily codified. Regulative elements, for instance, tended to be more public so that employees found it easier to capture and publish this knowledge in written form. As a result, the frequency of use of formal transfer methods increased to 43% of responses for regulative knowledge. There was a slight decrease in the use of the interactive features on an online system due to the ability to locate previously published documents; however, many

interactive online systems were able to combine static and interactive features. For instance, one informant commented on the use of their interactive online platform to provide knowledge of standards and directives within the European Union. He talked specifically about the “pressurized equipment directive,” which requires certain aspects of pressurized systems to be certified by particular bodies:

Now, we are aware of [the pressurized equipment directive] and know how to adhere to it in the UK, but we often have projects in Europe that may be bid and completed by our US offices. So, what we’ve done is create procedures on how to find and adhere to these directives which we’ve loaded into [the online system]. And, we’ve also identified individuals who have knowledge and experience of applying [these procedures] along with the dos and don’ts, and that is available to any project on [the online system]. So any offices that are executing projects in the European Union, be it from any location, are now aware and can access any information of what they need to do to ensure that they adhere to these new requirements.

The online system therefore allowed employees to search for the explicit components of regulative knowledge, for instance, the specific procedures and requirements, and, at the same time, access the more tacit lessons learned regarding the application of the procedure. In addition, it contained contact information for these experienced peers to allow additional follow up.

The most widely used transfer method for regulative knowledge was written reports (22%). For instance, many companies write and maintain reports regarding specific countries. These reports are initially produced for the company boards, but are also used for projects within the area. They contain information regarding laws and regulations, political stability, the organization of the government, etc. In addition, some organizations continually maintain and update country profiles to list the completed projects in each geographic region or area. Finally, although not available to all employees, many organizations write reports regarding any litigation they have encountered in the country.

Another common method to transfer regulative knowledge is through the dissemination of processes and procedures (11%). For instance, some companies record the process of obtaining approval for land entitlement or a building permit. In order to keep the knowledge up to date, many companies will lead employees directly to the government’s website which lists their procedures; however, they also try to record additional details of important “lessons learned” from their past experience of going through the process.

Overall, companies used social methods most frequently across all knowledge types. The use of social interaction declined, however, as the knowledge became more explicit, making it easier to identify and provide in written form. As a result, regulative knowledge was nearly equally distributed across both formal and social methods.

DISCUSSION

Throughout our study, we not only analyzed what methods international AEC organizations were actually using to transfer different types of knowledge, but also noted the benefits and limitations of these methods.

Benefits and Limitations of Methods

Formal Processes

Many of the formal processes for transferring knowledge had similar benefits and limitations due to the written format of these methods. Companies can benefit from formal processes because they require the companies to focus attention on the “externalization” process mentioned in Nonaka’s knowledge conversion steps (Nonaka 1994). Employees are required to focus on realizing, capturing and writing down their individual and group knowledge to make it available to the entire organization. The externalized and written nature of formal transfer methods also enables companies to better compare data, and in some cases, statistics, across multiple projects and regions. Companies that consciously collect, compare and analyze this data are likely to be better able to learn from their past histories. One participant indicated the value that comes from having this data available to compare across the organization:

Last year, we decided that [each function leader] should go through project audit checks and collect the ten most frequent findings that would benefit all projects. So, every function leader collected these ten top findings and we jointly, in a meeting, prioritized these findings for corrective action. Interestingly, the top three or four findings were similar in many of the functions. So now, we are teaching everybody in the organization via updated procedures and awareness of these items. We are also developing a training module to cover these findings.

At the same time, there are limitations to formal transfer methods. If the written material is not updated on a regular basis, the knowledge may become outdated and irrelevant. If employees continue to find outdated information in published knowledge sources, they may be dissuaded from utilizing them. This requires companies to continually monitor and maintain this knowledge to ensure that it is usable and up-to-date. In addition, formal methods tend to

generalize knowledge. If the knowledge does not contain a personal contact for additional follow up, the knowledge cannot be contextualized to the situation facing the person requesting the knowledge. This is particularly important for the transfer of knowledge within global firms, where the socially—and institutionally—embedded nature of knowledge can amplify complexity and impede cross-border knowledge transfer (Argote and Ingram 2000).

Multiple informants also mentioned their reluctance to write down and formalize mistakes or other items or processes that went poorly on their projects. Instead, the publicized nature of reports made them gloss over their true “lessons learned” and highlight project successes instead. One person commented:

Lessons learned ... have a sort of political dimension to them... Not everybody wants to be scrupulously honest about what went wrong.

An informant from a different company indicated, “*people don’t want to confess their mistakes in a public form*”. Companies are also reluctant to publicize data in reports that contain confidential information or may implicate their liability for a problem on a project.

Finally, the reach of this knowledge, and thus the impact that the knowledge can have within the organization, is limited to the availability and knowledge of the written data throughout the organization. For instance, in one organization, the project close-out reports were stored in printed binders in a centralized library. These were only accessible to employees who were at a manager level or above and were located at headquarters. Thus, the reach of the project reports was limited by both geography and status.

Social Methods

Many companies rely on social methods to transfer knowledge, particularly institutional knowledge. As noted, this was the most common transfer method across all institutional knowledge types. One of the primary benefits of this transfer method is that it allows all types of knowledge to be shared. In contrast to formal methods, socialization allows employees to contextualize their knowledge to the requestor’s specific situation and personal experience, allowing the knowledge to have richer meaning and applicability. This is particularly important for cultural-cognitive knowledge, which is difficult to generalize. In fact, real estate developers and owners relied exclusively on social methods to transfer cultural-cognitive knowledge. Also in contrast to the other methods, interviews revealed that employees felt more at ease to share certain types of knowledge that would not be “stamped in stone” with their names. Many were

uncomfortable documenting knowledge that was sensitive or that others might interpret negatively in the organization; however, they did feel comfortable sharing knowledge with people they know. One participant described the importance of socialization methods due to the comfort level associated with interacting with trusted peers:

You are much more likely to engage with somebody you are comfortable with socially who you've talked to ... who you've been to a conference with, who you've worked on a project with, maybe you've had a drink together after work. You can sit down and ... disclose things in a way that real understanding is going to get across in an environment where people feel safe.

Social methods, such as the movement of people, meetings and reviews, also enable employees to gain intimate knowledge of “who knows what” in the organization. Employees are able to meet, interact and work with peers to gain an understanding of other’s past experiences and areas of expertise in order to later call upon the person when they need knowledge that this person might possess. One Senior Director described the process of knowing his peer’s experiences and projects through regularly scheduled phone calls:

We have biweekly calls for the whole world... And so you hear a lot of what's going on, and there's a lot of the information exchange...you can hear the good, the bad and the ugly of each of the project ... and apply the learnings to your own project.

Often, these phone calls resulted in follow-up phone calls when one of the meeting members encountered a similar problem described by a colleague in a past meeting. Informants also touted the benefits of project peer reviews. These reviews not only allow participants to gain an understanding of other employees past experiences; they also enable the project team to apply their peer’s knowledge immediately. In contrast to learning something in a conference that an employee may have no opportunity to apply, this form enables the knowledge to be utilized right away due to its applicability to the immediate project.

Although social methods allow employees to gain an understanding of referential knowledge, or “who knows what”, these methods have their limitations. The most obvious is that the reach of the knowledge is limited to each individual’s knowledge and the known experiences of the peers they have encountered through social interactions in meetings, reviews, etc. This is particularly a challenge for international firms. These companies tend to have many employees who work across the globe, increasing both the cost of providing social interactions and amplifying the complexity of knowledge transfer.

To gain an understanding of how employees gain referential data to facilitate personal interaction in the company, we posed the question, “If a new person was to join your company tomorrow, how would she know “who knows what”? The companies relying almost exclusively on socialization techniques replied that she would talk to her boss and then work her way up the chain until an upper level manager could put her in touch with the correct person. Unfortunately, this process can be time intensive, slowing the process of getting the needed knowledge to the right person at the right time. In addition, it can place a burden on upper level managers who constantly need to act as social brokers. Interestingly, many of these social brokers seemed to enjoy the control that their power of connecting people gives them. In some cases, it seems that these brokers were able to maintain their positions in the company primarily by maintaining this referential data.

Interactive Online

Interactive online platforms are established primarily to promote knowledge transfer within organizations. Due to the slow pace of many companies within the AEC industry in adopting online systems for knowledge management, only a few have interactive platforms. In our study, two engineering firms had interactive platforms that were well established and widely used. One engineering firm was readjusting their knowledge management system to increase the interactive nature and use of this system, and one contractor was in the early stages of implementing a system. These companies obtained many benefits from the system, which changed the way employees shared knowledge within a firm. Please refer to Table 4 for the comparison of transfer methods according to knowledge type for the four firms using this system. Including only the two engineering firms with well-established interactive online systems increases the frequency of sharing knowledge through this system to 63% for regulative knowledge, 30% for normative knowledge, and 67% for technical knowledge.

Table 4: Relative Frequency of Transfer Methods for different types of Knowledge
(Firms with Interactive Online System)

		KNOWLEDGE TYPES			
		Institutional			Technical
TRANSFER METHOD		Regulative	Normative	Cultural Cognitive	
FORMAL	Project Database	0%	0%	7%	0%
	Written Reports	24%	18%	0%	12%
	Procedures and Processes	8%	2%	14%	0%
	General Online System	4%	7%	7%	0%
	Formal (Other)	0%	3%	7%	2%
	Interactive Online	28%	28%	0%	58%
SOCIAL	Social (Other)	8%	5%	0%	7%
	Meetings/Teleconferences	8%	10%	14%	7%
	Reviews	4%	3%	0%	3%
	People Transfer	4%	7%	14%	2%
	Personal Discussions	12%	17%	36%	10%
<i>Column Totals</i>		100%	100%	100%	100%
<i>Total References per Knowledge Type</i>		25	60	14	60

The greatest benefit of online platforms, particularly for large international companies, is the ability to achieve global reach and connectivity amongst members. This magnifies the impact of each person's knowledge for the overall organization. In addition, this method allows new members without a wealth of prior experience and social networks within an organization to access much of the organization's knowledge easily. Companies with an interactive online platform typically have a portion of the online system dedicated to capturing knowledge in written form, allowing the employees to search for needed knowledge. This enables new employees to search through explicit data to answer questions quickly and, at the same time, search for members who have technical expertise or experience on particular projects or within a given area. Employees can, therefore, learn from the experience of the organization without having to bother others or climb an organizational chart, decreasing the time to receive a response. In addition, whereas upper level employees control or limit the knowledge transferred in other methods, the interactive system is democratic, allowing everyone's voice to be heard and experience to count. In many systems, this attributes the knowledge to a particular employee, allowing superiors as well as peers to recognize the contributions of each employee to the

organization's collective knowledge. Participants continually lauded the benefits of this attribution, feeling that they received credit for the knowledge they added, whereas in other systems, their contributions could be misattributed to others, and could easily be appropriated by the social brokers previously described.

Interactive online platforms also enabled employees to ask questions via forums within a community. In international companies, these forums make it possible for employees to receive advice and experience from peers around the world, not just through their specific social network or "around the water cooler". This increases employee's referential knowledge of who knows what in an organization and leads to additional social interaction. For instance, the results highlight that cultural-cognitive knowledge is not transferred on the interactive online system. This is due to the coding scheme in data analysis—we coded the specific method used to transfer types of knowledge that informants gave through examples. For companies with interactive online systems, many employees first located the appropriate person to communicate with through the system, and then contacted them directly, particularly for sensitive cultural-cognitive methods, which lead us to code this as a "Personal Discussion". One informant discussed the importance of engaging social interaction from the online system:

A lot of [knowledge] is captured. It is documented to a certain level (I don't want to claim that everything is in [the online system] and in many cases it is going to be very contextualized), but it is documented in such a way that we know who to go to. So we really want to know: Do we know the people who have the experience and can answer the more detailed questions that will never get documented in the [online system]?

This highlights the fact that not all knowledge can be shared, either due to contextual, legal or sensitivity issues; however, it attempts to foster the person-to-person connections to engage people in social interaction, allowing this knowledge to be shared. To address some of these issues, one company established a few communities that required approval for participation. In these communities, strategic knowledge, such as the future growth and direction of the firm, could be shared amongst selected participants who were actively engaged in the leadership or strategy of the firm, thereby protecting the knowledge from being disseminated too broadly.

Despite these benefits, there are also limitations of interactive online system. This method is only as beneficial as the extent of use and acceptance by the company. If it is limited to certain regions or groups, the reach of the knowledge will be limited. In addition, as noted, the uploaded

knowledge often requires additional context. Similar to formal methods, employees must maintain the documented knowledge to ensure it is up-to-date. Although we did not study the costs associated with different methods, the upfront investment and maintenance of the system is clearly significant. Therefore, a company must decide if this transfer method would benefit the organization as a whole enough to justify its cost. This will depend on the type of knowledge that is important to the company (see Javernick-Will and Scott (2009) for important institutional knowledge for each type of company), the number of employees and geographical spread of offices, and the growth of the company. For example, it is not surprising that the engineering companies in the study were the first to embrace these systems due to the number of countries they operate in (refer to Table 1), large number of employees, and the ability to exchange technical knowledge.

Easily configurable “Web 2.0” social networking tools like Facebook or Google Groups allow users to create private online communities and host shared documents that anyone in the group can edit. Off-the-shelf Wiki tools such as PB Wiki or JotSpot afford similar capabilities. This greatly reduces the cost of developing interactive online forums. And younger employees are both comfortable and skillful at using these media. At the same time, it must be noted that you cannot “plug and play” online systems and expect them to work instantly in a company. Like most organizational processes, these systems require adjustment to the particular company’s culture. Additional analysis of the critical factors resulting in increased acceptance and use of knowledge management systems can be found in Javernick-Will (2008).

CONCLUSION

International firms face a complex web of knowledge regarding different institutions—regulations, norms and cognitive-cultural beliefs—that they need to learn in order to operate in multiple regions and societies. Knowledge of these institutions is critically important for these firms to achieve legitimacy by developing, designing and constructing a locally accepted and sustainable project. The overarching premise within the international business community is that the more institutional knowledge a firm has of various markets, the fewer unexpected problems the firm will face within those markets. Therefore, collecting and making this knowledge available throughout the organization is of central importance to international firms.

We answer calls for additional research to be carried out in this area by using exploratory case studies to uncover the various organizational processes international AEC firms use to mobilize different types of institutional knowledge for their international projects. We identified nine primary constructs that cover the transfer of 85% or more of institutional knowledge within the firm and divided these into three larger categories: formal processes, social processes, and the use of an interactive online platform. The resulting data show that social processes were the primary method used to transfer institutional knowledge across firms; however, formal processes became more prevalent for regulative knowledge, which is more explicit in nature. In addition, we discussed the benefits and limitations of the three overarching categories.

We contribute to organization theory by adding to studies that apply institutional theory to global projects, and by uncovering the specific processes international firms use to mobilize institutional knowledge within their firms—an area that has been largely under-studied despite its importance. For practitioners, we offer insights regarding methods that work to mobilize different types of knowledge within the firm. Of particular importance is the discussion of the benefits and limitations of different processes. Our data also show that different kinds of global AEC firms need different types of knowledge. Therefore, careful attention must be paid to the particular type of knowledge firms need to mobilize, the size and geographical spread of the firm, and the firm's focus within knowledge management.

Although our sample was substantial for case study research of this type, we had practical limitations that restricted the number of firms in the study. We interviewed people with various positions in each firm to obtain a representative sample; however, the qualitative nature of this research limited the number of employees we could question within each firm. Therefore, this research did not analyze the overall frequency of use of various systems for the firm and was instead limited to the frequency of use of systems by the particular participants interviewed. Finally, this study did not gather data on the cost of various processes firms used to mobilize their institutional knowledge.

Future studies can address these limitations by documenting the cost to initiate and maintain the various transfer methods. In addition, it can extend the confidence and generality of our findings by collecting data regarding the frequency of use of various methods within entire firms. The benefits and limitations of each of the methods can also be extended to account for project type, firm type, participant levels and other differences.

Overall, this study is intended to increase the success of international projects by drawing attention to the importance of institutional knowledge on global projects. In addition, it highlights methods that firms can use to mobilize this knowledge. By using these methods, firms can draw from the organization's global collective knowledge, thereby reducing uncertainties and repeated mistakes, and increasing the success of projects within the organization.

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