

Who Needs to Know What? Institutional Knowledge and Global Projects

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Abstract: Projections for future demand in infrastructure and buildings indicate that there will be increasing opportunities for firms to engage in construction projects around the world. However, international construction projects also face numerous uncertainties. Foreign firms engaged on these projects must work in unfamiliar environments, with differing regulations, norms, and cultural beliefs. This can increase misunderstandings and risks for the entrant firm. To reduce these risks, successful international firms strategically increase their understanding of the local area by collecting knowledge that is important for a given foreign project. This study compiles and analyzes data from 15 case studies of three types of international firms (developers, contractors, and engineers) engaged in international infrastructure development to identify the types of institutional knowledge that informants indicate are important for their international projects. Using institutional theory, we categorize the kinds of knowledge about foreign country operations that managers deem to be important, expanding prior studies by attending to normative knowledge in addition to regulative and cultural knowledge. Finally, we analyze the importance of different categories of knowledge according to firm type. This analysis provides entrant firms a tool to help identify important types of institutional knowledge to collect as they undertake international projects.

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Introduction

Projections of increased population growth (Sachs 2005), urbanization, and sorely needed civil and social infrastructure worldwide point to increased demand for global projects, even in a time of global economic downturn, and affords attractive opportunities for firms within the architecture-engineering-construction (AEC) sector to expand internationally. According to Morgan Stanley's predictions, emerging market countries will spend \$22 trillion on infrastructure in the next 10 years alone (Economist 2008). Many firms are responding to these opportunities and have enjoyed increasing revenues. For example, the revenues of the top 225 international contractors increased 18.5% from 2005 to 2006 for projects outside their home markets (Reina and Tulacz 2007).

As exciting as the projections and opportunities appear, international construction projects also involve many uncertainties and risks not found on domestic projects. All projects confront various technical and financial challenges and risks, but international construction projects face another special set of problems. These projects involve diverse participants from differing backgrounds

and cultures who work together in unfamiliar locations. Projects conducted in countries other than one's own also confront differences in rules and political systems, differences in norms and customs, differences in values and beliefs. We refer to these kinds of challenges as "institutional" differences. Scholars such as Zaheer (1995) label firms who lack knowledge of such differences as suffering from a "liability of foreignness" (Zaheer 1995). This liability of foreignness increases misunderstandings and escalates the risks and costs of doing business in new locations abroad (Flyvbjerg et al. 2003; Orr and Scott 2008). Therefore, an entrant firm engaged on an international project faces a knowledge gap—the difference between the institutional knowledge that is needed to work on an international project and the knowledge the entrant firm possesses (Petersen et al. 2008). Firms wishing to reduce these sources of uncertainty and risk can recognize and seek to diminish the knowledge gap by understanding the differences and nuances in the host country where they plan to work, thereby increasing the success of their international projects. As Lord and Ranft (2000) noted, acquiring local knowledge is of central importance when planning to enter new countries. Despite the importance of local knowledge for firms entering foreign environments, gaps remain regarding the types of knowledge needed for international infrastructure projects. This paper attempts to fill this void through qualitative case studies of 15 international firms in the AEC industry, taking a wide-ranging view of the knowledge needed for international projects. Our study aims to: (1) identify the kinds of institutional knowledge that are important for firms working on international projects; (2) analyze and classify these important knowledge types for international projects using a conceptual framework widely employed in institutional theory; and (3) analyze differences in the knowledge needed according to firm type.

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In this manner, this study allows managers within AEC firms to identify systematically the important institutional knowledge gaps that exist on international projects to help reduce their liability of foreignness. In addition, because the important knowledge identified is broad, it is difficult for firms to disseminate these findings easily to various project teams. The categorization of important knowledge therefore provides an initial road map of the local knowledge firms need in order to reduce knowledge gaps and uncertainties. Other papers address (1) the sources and methods firms use to acquire this knowledge initially (Javernick-Will 2009) and (2) the transfer methods firms use to disseminate each of these different kinds of knowledge across their organizations (Javernick-Will and Levitt 2010).

We begin by reviewing and discussing the literature that guides this research before discussing the research methodology. Next, we present the types of knowledge that managers perceive to be important and categorize them into the three pillars of institutional theory—regulative, normative, and cultural cognitive (Scott 2001, 2008). Finally, we analyze and discuss the differences according to firm type. We contribute to the international project management literature by identifying important knowledge for firms in the AEC industry to collect for their international projects and by applying institutional theory as a framework to recognize and reduce knowledge gaps. By doing this, the research directs new attention to the “normative” and “cultural-cognitive” differences and risks, in addition to “regulative” (political, economic, and legal) differences and risks that others have discussed (Baloi and Price 2003; Bing et al. 1999; Chan and Tse 2003; Gunhan and Arditi 2005; Han and Diekmann 2001; Ofori 2003; Shou Qing et al. 1999). Our final contribution attends to differences in important institutional knowledge based on firm type.

Points of Departure

This study departs from the international business and project management literatures to identify the distinct types of knowledge that different kinds of firms (developers, engineering consultants, and contractors) within the AEC industry consider important when working on projects abroad. We employ institutional theory as a framework to categorize important types of knowledge to acquire. The extant literature on international project management and its relation to institutional theory are discussed next.

International Project Management Literature

Much of the international business literature focuses on the challenges and risks associated with conducting 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. The international project management literature is no different—the majority of international project research in the AEC literature focuses on the additional risks and challenges that affect contractors engaged in international projects. Studies have identified several critical factors and risks in international work. These include risks associated with projects within a particular country (Bing et al. 1999; Shou Qing et al. 1999), issues and risks in contractual arrangements (Bing et al. 1999; Chan and Tse 2003), opportunities and profit-influencing factors (Gunhan and Arditi 2005; Han and Diekmann 2001), and threats and cross-national challenges (Gunhan and Arditi 2005; Mahalingam and Levitt 2007).

The international factors discussed arise from a variety of differences between the host country and the entrant firm. These differences can result in misjudgments, misunderstandings, and conflicts, leading to increased project costs, schedule delays, and damaged reputations (Orr and Scott 2008). In other words, international differences result in increased risks and costs when conducting work abroad. One of the three strategies that Orr (2005) identified to decrease misunderstandings and risks abroad is to increase knowledge of the local project area. This strategy is in line with conclusions from prior studies on internationalization and learning (Eriksson et al. 1997; Johanson and Vahlne 1977). However, a firm must first identify the specific kinds of knowledge that are important to acquire for its particular business model. Prior studies within the international business literature tend to generalize and aggregate knowledge and learning across industry groups, making this knowledge less relevant and applicable to firms within a given industry. This study builds upon the theory that local project knowledge is important to reduce knowledge gaps and thus risks, but focuses specifically on the different types of firms conducting international work within the AEC industry.

Institutional Theory

The international project management literature has begun to recognize institutional theory as a useful framework for identifying and analyzing differences encountered on international projects (Mahalingam and Levitt 2007; Orr and Scott 2008). Recognizing the ability of the institutional framework to describe and analyze differences between settings beyond the widely cited differences in beliefs and values espoused by Hofstede (1991) and House (2004), we applied institutional theory to categorize the types of knowledge that are important for international projects.

By following Scott, 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, 2008). To elaborate and illustrate these distinctions in the context of international projects:

- *Regulative elements*, stressed particularly by economists, include the formal machinery of governance: laws, rules, surveillance machinery, sanctions, and incentives. These are relatively easily observed and readily manipulated; and hence, they are easier to recognize;
- *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. The corporate culture of participating companies, conventional professional roles, and work practices enforced by occupational communities, professional standards, and state-of-the-art practices are salient examples of normative elements at work in international projects; and
- *Cultural-cognitive elements*, a focus of cultural anthropologists, cross-cultural psychologists, ethnomethodologists, 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 (institutional logics). The beliefs are “cultural” because they are widely shared, 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.

It should be noted that the categorization of these elements into regulative, normative, and cultural-cognitive pillars is an analytical distinction. In the real world, these elements overlap and influence each other, providing complex combinations. The cultural-cognitive category is the most basic of the three. It can operate alone, but these elements also underlie, and can motivate the other two categories. For instance, cultural-cognitive elements include widely shared beliefs. These beliefs underpin normative elements specifying how things “should” work and trigger obligations for social life. In turn, beliefs and social obligations can motivate actors to construct laws and regulations to enforce this compliance. We acknowledge the complexity and interdependence of these elements, but nevertheless attempt to identify what appears to be the dominant element at work.

Institutional learning requires obtaining knowledge of the social and cultural frameworks that undergird social life. In a familiar, local context, these frameworks constitute the unnoticed background of social behavior and are already well understood. Institutional frameworks in a single foreign context can include multiple, competing, and conflicting elements with overlapping jurisdictions and can, therefore, be quite challenging to document and understand. Transnational environments involving multiple participants from diverse organizations and cultures working in unfamiliar locales are even more complex, so that institutional differences loom large, and institutional learning becomes of paramount importance. As noted, regulative elements are easier to discern: they are more visible and explicit and so more easily captured in published information or available from consultants. More difficult are the normative elements, which are encoded into the behavior of individuals and groups in the local context and in the social features of companies and work groups. Cultural-cognitive elements, elements which are more likely to be tacit and taken-for-granted by all parties, are most difficult to discern. Learning about these elements requires self-conscious and disciplined attention to allow differences in cultural beliefs and mental models to surface.

Most research in the international project literature that attends to institutional differences focuses on the regulative risks (political, economic, and legal) affecting contractors in international work (Baloi and Price 2003; Bing et al. 1999; Chan and Tse 2003; Gunhan and Arditi 2005; Han and Diekmann 2001; Ofori 2003; Shou Qing et al. 1999). Normative and cognitive-cultural factors, where studied, tend to play a secondary role and are often described in general terms and placed in one category, i.e., “Social, cultural, and religious beliefs” (Bing et al. 1999) [also see Chan and Tse (2003); Gunhan and Arditi (2005), and Han and Diekmann (2001)]. In addition, research methods that these studies adopted often rely on prior literature reviews and surveys to assess these risks, employing limited choices that restrict the respondent’s opportunity to describe novel risks and institutional differences. A notable exception is Mahalingam and Levitt (2007), which used a qualitative case study with a global real estate developer to compare and identify broader risks encountered on international projects, including some of the more normative or social factors.

Recognizing the important work of these scholars, this study complements prior work by building upon and expanding the focus from regulatory and technical risks to include additional details of the normative and social factors affecting international construction. In addition, it attempts to shift the center of attention from discussing “risks” to focus on identifying important

kinds of knowledge needed to reduce these risks. To do this, we employed qualitative methods with open-ended questions to allow managers to describe any type of knowledge they perceived to be important or institutional differences they encountered on international projects in the past. This method did not constrain the interviewee’s responses and thus allowed us to expand our understanding of the types of knowledge needed. In addition, we compared responses based on the firm type to begin to draw attention to differences in the knowledge required by different firms. The application of institutional theory to the results provides a framework that firms can use to strategically identify important knowledge to collect in order to reduce knowledge gaps and misunderstandings.

Research Methodology

This research uses a qualitative case-based methodology to build theory on important types of knowledge for multinational firms to collect on their international projects. This methodology uses interviewee’s responses to open-ended questions, allowing them to respond without constraints and enabling them to provide additional detail and context that standard survey questions do not allow. As a result, it provides a level of in-depth analysis that more general survey methods on larger samples cannot attain, and thus offers the prospect of rich new insights (Eisenhardt 1989; Yin 2003).

Our data were derived from participant responses to our interview questions and the supplementary materials provided by our informants. Examples of documentation include reports, books, country risk analysis reports, risk checklists, presentations, memos on postproject lessons learned, and other company information. Employing multiple data collection methods increases the validity of the identified constructs (Eisenhardt 1989).

The knowledge constructs from the interviews and documents are embedded in and linked to the type of firm employing the participant that provided the information. We conducted interviews with 113 informants within 15 companies from three types of firms—engineering consultant firms, contractors and real estate developers/owners—in the AEC sector. The use of multiple case studies addresses internal construct validity concerns by allowing the results to be replicated across cases (Eisenhardt 1991). Varying firm type allowed us to expand on prior literature to include engineering consultants and developers and to build theory on how knowledge importance varies by firm type. To insure that international projects were a significant component of a firm’s strategy, we selected for study only those companies that obtained at least 20% of their revenue from projects outside their home market. Table 1 provides additional details on the case studies (company names are disguised to honor confidentiality agreements).

The first writer conducted interviews in company offices from September 2007 through August 2008. She also conducted subsequent phone interviews with informants in other office or project locations during this time. Using ethnographic interviewing techniques proposed by Spradley (1979), she asked descriptive, semi-structured but open-ended questions of the 113 participants within the global firms. The selected participants worked at various levels in the project organizations and had past or current experience on international projects. They were involved in shaping the overall strategy of the firm, or had participated in a corporate or project-based knowledge management initiative. We began with general questions to gauge the person’s experience, and later pro-

Table 1. Case Study Information

	Company (coded)	Main office headquarters	Number of informants	Number of countries with offices
<i>Real estate developers</i>	A	United States	6	19
	B	United States	4	16
	C	U.K.	5	2
	D	Norway	2	1
<i>Contractors</i>	E	Sweden	7	25
	F	India	12	18
	G	Greece	9	32
	H	Japan	9	12
	I	Japan	5	21
<i>Engineering consultants</i>	J	Canada	27 ^a	15
	K	United States	8	28
	L	U.K.	8	36
	M	United States	4	26
	N	Finland	4	11
	O	Finland	3	29

^aThe five most substantive of these 27 interviews were coded for this analysis.

gressed to detailed questions that were applicable to their experience and past projects. Some examples of questions included, “Can you tell me some of the challenges you have experienced on international projects?” and “Can you walk me through the process of starting a project in a new region?” More specific detailed questions followed such as: “What kinds of knowledge are most important to understand on your international projects?” By engaging informants and encouraging them to describe their projects, firms, and how they obtained knowledge on a daily basis for their international projects, we gathered information from rich detailed scenarios based on participants’ experience.

We recorded over 100 h of audiotape which were transcribed and imported (along with other relevant documentation) into a qualitative software coding program, QSR NVivo. NVivo was selected because it allows researchers to manage and query the data (Bazeley and Richards 2000). We then began a 4-month process of “coding” the interviews and documents (Glaser and Strauss 1967; Strauss and Corbin 1990). The first writer coded references within the transcripts and documentation to appropriate topics or categories, allowing both expected and unexpected categories to emerge. Throughout this process, she kept detailed records for reliability checks. These records enabled her to go back through the transcripts to verify that added topics were covered. During the analytical coding process, she discussed the features and examples of each of the coded categories with an advisory group to interpret and reflect on the data. After formalizing the categories, she used NVivo queries and checked each category more than once to make sure that the references were coded appropriately. This analytical coding process enabled us to draw and verify conclusions from the data. Ultimately, we arrived at the constructs we present in this article, reaching the point where we triangulated the findings across the cases to ensure that the results accurately reflected the data. We then used NVivo to calculate the relative frequency of the findings to build theory on the types of institutional knowledge that are important to firms when working internationally.

Important Types of Institutional Knowledge on International Projects

We began with the question, “What types of knowledge gaps exist that are important for firms to understand on international

projects?” Although information was collected on the acquisition of other types of knowledge, such as technical and financial matters and company processes and policies, because of our interest in the distinctive problems confronted by companies working in foreign environments, we restrict attention here to institutional knowledge. To determine important knowledge for international projects, we coded (1) knowledge that managers indicated was important; (2) difficulties that the firm experienced in the past from differences encountered on their international projects; or (3) knowledge that the organization systematically collects through processes and procedures, indicating that it is important to the organization.

Originally, there were 939 total references within the subcategories of institutional knowledge types (references are portions of the original transcribed material); however, after cross tabulating the results with knowledge categorized as “important,” 469 total coded references remained. The results from this analysis indicate that the relative frequency, or percentage of references made to each subcategory of important knowledge, varied between 2 and 10% (see Table 2).

During the analysis, we wanted to create typologies of knowledge with subcategories that companies can use to collect and disseminate knowledge for their international projects. After analyzing the resulting subcategories, we felt that distinctions developed by institutional theorists would best categorize the important knowledge. We grouped the subcategories or “daughter nodes” into larger “tree nodes”—the three pillars of institutional knowledge: differences in regulations, norms, and cognitive-cultural beliefs, acknowledging, as noted earlier, that many forms are comprised of multiple elements (Scott 2001, 2008). Please refer to Fig. 1 for the classification of knowledge types into institutional pillars. Using this coding scheme, the relative frequency of important institutional knowledge based on responses from all informants was found to be: (1) normative (50%); (2) regulative (38%); and (3) cultural-cognitive (12%). We present examples from our data collection and analysis below for each institutional knowledge type.

It should be noted that our methodology allowed us to expand attention to include additional types of important knowledge for international projects, but the knowledge identified is not assumed to be all-inclusive. Specifically, informants may not have recalled or mentioned all knowledge types that are important or needed for

Table 2. Relative Frequency of Important Institutional Knowledge Mentioned by Informants for International Projects

Subcategories of knowledge types	References			
	All		Cross coded as important	
	Number	Relative frequency (%)	Number	Relative frequency (%)
Approval processes	90	10	45	10
Language, concepts, and meanings	50	5	37	8
Cultural beliefs	34	4	21	4
Design construction standards and permit	105	11	42	9
Industry organization	58	6	43	9
Knowledge of government	57	6	30	6
Laws and regulations	70	7	25	5
Logistics	71	8	37	8
Market knowledge	41	4	10	2
Material and labor available, productivity, quality, \$	94	10	45	10
Operating laws	83	9	37	8
Relationships	34	4	8	2
Social norms, expectations, and preferences	80	9	46	10
Work practices	72	8	43	9
Total references:	939	100	469	100

international projects. In addition, many types of knowledge, including technical knowledge, are interwoven with institutional knowledge types. For instance, the technical environment in a given area affects design and construction standards, work practices, and the logistics in a given area. These types of knowledge can be classified as both technical and institutional, but have only been analyzed as institutional knowledge types for the purposes of this paper. Future work can expand and elaborate on these types of knowledge and their complex relationship with one another.

Regulative

Regulative knowledge includes the rules of formal governance structures and legal processes within a given society. Obviously, it is important for companies within the AEC industry to understand the rules and laws, and how they are enforced, within the local project area in order to operate in accordance with these man-

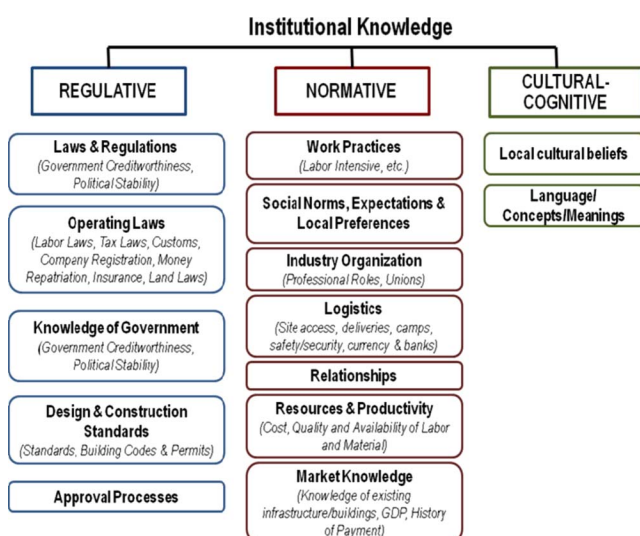
dates. This knowledge tends to be highly formalized and explicit and thus is more easily learned. As coded, this category also includes knowledge required to secure approvals, which can be much more informal and tacit. Using examples from our interviews, we describe the subcategories of regulative knowledge: operating laws, other laws and regulations, design and construction standards, knowledge of government, and approval processes next.

Operating Laws

The category “Operating laws” consists of multiple daughter codes, including labor laws, customs, company registration, tax laws, money repatriation, insurance policies, land laws, and contractual differences. It is important for the firm to understand these types of laws in order to set up and operate their business during the development, construction, and operation of the project. The most salient of these laws, particularly for contractors, were labor laws. Labor laws focus on the requirements to hire local labor, the ability to mobilize international labor (which often addresses which nationalities are allowed to work in the project location), and the availability of work permits. For example, South Africa’s Black Economic Empowerment regulation requires subcontracting a portion of the work to black South Africans. One contractor described how local labor requirements and immigration restrictions could significantly affect the cost and duration of a project:

The immigration policy for workers [is one of the most important types of knowledge to understand] because construction is still quite people intensive, it has changed some, but people are still required. So we need to determine if the [project and country] will allow a free flow of people to come in and out, or if they require that we use only locals. This makes a big difference. If they insist that you use only local people and the work culture is not conducive to using local labor [due to resource constraints or unskilled manpower], we are in trouble.

In other regions, such as the Persian Gulf, the tremendous amount of ongoing construction projects overwhelms the amount

**Fig. 1.** Important types of institutional knowledge

of locally available human resources. Therefore, some of the countries and projects recognize the need to import labor. In many of these cases however, the governments still impose requirements for diverse labor pools to ensure that contractors are not exploiting only the cheapest labor available in the world. These operating laws require companies to have a disciplined focus on the detailed requirements for the project and country that affect the overall project, often requiring proof that the company complies with these laws.

Laws and Regulations (Other)

The category of Laws and regulations included all other laws or regulations not included in the subcategories of Operating laws or Design and construction standards and permits. Important knowledge in this category primarily revolved around basic country laws, contractual documents, and the dispute system. One developer described the challenge of dealing with the laws and regulations in multiple countries when working internationally. He indicated that these differences constrain the company's ability to share and transfer contractual best practices:

What is challenging internationally is the fact that... the legal systems are different, so southern Europe is under Roman law, northern Europe is under Anglo-Saxon law, German law is based very heavily on case law, etc. So a loan agreement in Germany might be eight pages because so much of it is in case law, whereas that exact same loan agreement in Italy might be 108 pages. Therefore, not only the way deals and contracts are structured but the way they are documented is very different across countries.

Not surprisingly, many of the participants from the United States, U.K. or India indicated that it was easier to understand laws in other locations that were former British colonies. At the same time, many participants indicated the importance in understanding the dispute system and place of arbitration. One participant noted that a major decision factor for the firm when deciding to enter a country or contract for a project was the place of arbitration. Another common discussion regarded the frequency of lawsuits and litigations—this was particularly a challenge for firms who entered the United States.

Knowledge of Government

The “Knowledge of government” category includes understanding the local country government's creditworthiness, political stability and the types of control that public authorities exercise over projects. This type of knowledge is particularly important for projects that are contentious, run the risk of expropriation due to political changes or disputes, or are state run. Project developers, particularly developers of infrastructure projects, talked about this category most frequently. They discussed the importance of understanding the history of payment, supply-demand balance, and management within a country. If these are stable and the government is run predictably, the company has more confidence that they will comply with existing laws and the infrastructure agreement.

Participants also discussed challenges when they entered countries where the government exerts control and ownership through the entire development, construction, and operations process (this was particularly the case in China during the 1980s):

You had to acquire land under a lease agreement which was dictated by the Chinese, the contractor was Chinese,

the financing was guaranteed by the Bank of China and to put frosting on the cake, they could determine who would lease the building.

Government controls and stipulations like this can increase project risks and therefore decrease the desire for firms to enter the country. Understanding government operations is therefore critical for firms, particularly when deciding whether to enter a country.

Design and Construction Standards

In order to adhere to local requirements, companies need to understand design and construction standards within the area. Since these types of standards are often developed and promulgated by industry bodies and professional associations, they constitute an intermediate category between regulative and normative structures—“soft regulation” (Djelic and Sahlin-Andersson 2006). For instance, professional bodies create standards and accreditation titles that often become requirements that are enforced by the municipality granting building permits. This type of knowledge tends to be most critical for engineers who are designing the project; however, contractors need to understand the standards of practice and developers are concerned with ensuring that the overall project meets existing guidelines and principles. There was some discussion of the differences and problems resulting from metric versus imperial units in design and construction, but most discussions revolved around regional standards. For instance, one person talked about the different technical standards for concrete in the U.K. versus Hong Kong:

The local tweaks on technical requirements [are important to understand]. For instance, for some bizarre reason concrete shrinks more in Hong Kong than it does in U.K.—No, it doesn't! But [Hong Kong] has within their local codes of practices and regulations a higher value for shrinkage of concrete than the British standards.

Although this type of knowledge is important, it is often explicit and publicly available in codes and standards documents.

Approval Processes

Approval processes are often intertwined with other regulatory processes; however, although the process can be explicitly laid out, gaining approvals and understanding the intimate nuances of systems is often tacit and not available in public documents. For this reason, this type of knowledge spans across regulative and normative knowledge. Often, the actual process of getting approvals for building permits, certificates of occupancy or land titles is not transparent and requires prior experience or intimate knowledge of the authorities granting approval. Some developers talked about the difficulties of operating in China in the late 1990s because the “rule book” was still being written. During this time, a project could require up to 200 approvals, and the approvals required changed on a day-to-day basis. Others talked about the challenge of acquiring clean land to build property on and the unique processes for acquiring land entitlements in different areas. For instance, in Prague, developers were confronted with claims of land ownership existing prior to the Nazi invasion in World War II. One informant described a similar challenge in India:

In new developments, the biggest challenge has been finding land with clean title. This forced us to partner with locals who own land and who can prove that they have a clean title to a piece of land, have gone through the gov-

ernment approval process and who have been sanctioned for a specific buildable area... This is something that we knew was difficult but had no idea how difficult it really was.

Another informant described his frustration in attempting to discern and deal with unfamiliar approval processes—and even the challenge of understanding the meaning of receiving approval. In the following example, he talks about having permission from the planning commission in the U.K., but still needing approvals from other city and regional departments that increased the expected cost and complicated the approval process.

Sometimes this leads to frustration... clearly, even if you've done some analysis when you are acquiring a site you may not be aware of the different hurdles or requirements for gaining approvals in that country and you can become stuck because it means that the project could be delayed, face additional cost, or create problems to deal with. No one likes surprises.

Understanding the approval processes is therefore critical to the overall cost and duration of the project, but it is often incredibly difficult to anticipate and acquire.

Normative

Of the three institutional categories, 48% of knowledge coded as important pertained to understanding the applicable norms and values. This type of knowledge specifies how things should be done, including adopting socially accepted practices and processes and fulfilling expectations for roles. Unlike regulative knowledge, which is legally sanctioned, this type of knowledge is morally governed (Scott 2001, 2008). As such; this type of knowledge may not be explicit and must often be inferred from observing the behavior of others.

Work Practices

Understanding local work practices is important to be able to create and execute a buildable design. Work practices are heavily dependent on a number of things, including technology, the climate and conditions, and labor within an area. This type of knowledge was particularly important for engineers and contractors. One engineer described how issues such as reinforcement specifications and designs could become an issue on projects. He indicated that relying on typical design practices from a participant's home country, such as optimizing reinforcement by specifying the use of high quality machines for reinforcement bending, are often impossible in areas that do not employ the same work practices (for instance, relying on labor instead of machines).

Another engineer described the need to adjust the design and construction plan for different countries based on differences in the cost of labor:

We tend to design things a little bit more for field installation [in South Africa] because field labor installation is quite cheap. So there is a subtle difference to how we design projects [in South Africa] than how they would design them in Perth where field installation is very expensive.

Creating a buildable design, accurate schedule, and reasonable budget for a project requires knowledge of the work practices typically used in the project location.

Social Norms, Expectations, and Preferences

Social norms, expectations, and preferences guide how one is expected to act in the local context. This can include a host of aspects that range from how to behave in meetings to preferences for office design and layout. Obviously, mindfulness of such expectations can have a tremendous impact on the perception of the company within the local community and the success of the project. This category was particularly important to developers, as their success and financial return ultimately depends on the local interest and acceptance of the project. For example, this category includes references from informants regarding typical floor plan adjustments (German employees, for example, have a legal right to natural light, which will reduce the typical floor plan), ceiling heights (European ceiling heights are often higher than in the United States), operable windows, and toilet partition sizing. One developer with extensive international experience discussed the importance of this category:

Even though you may have built zillions of buildings when you go to France or to Germany or to Bombay or wherever it is, you will very quickly find out... that they don't want a 50 story building because they don't like height or they don't like big floors because, for instance in Europe every secretary... has to be right next to a glass window on the outside. So, automatically, social mores start to create a design of a product. So even though you knew what to build in Chicago in New York, i.e., big floors or tall buildings, you have to adjust your product to fit what the market wants.

For these reasons, social norms and local preferences greatly influence the perceptions and legitimacy of a project and entrant firm in an area.

Industry Organization

Professional roles and the organization of the industry fall within the normative category but border on the cultural-cognitive category. Different societies establish different norms regarding roles for specified positions—for example, the scope of responsibilities of designers on projects. Roles and relations can also become defined over time through a conflux of interacting parties and systems; for instance, to define how the industry is collectively organized and structured. The work by Taylor addresses the latter, describing the ease or lack of diffusion of innovations based upon the division of labor that has evolved in different countries (Taylor 2007). Ultimately, we categorized this type of knowledge as normative because it has binding expectations as a basis of order specifying how things should be done in a given location.

References coded to this category ranged from reports about dealing with unions to respondents describing their confusion regarding variations in expectations for role behavior. An example of the latter was a misunderstanding regarding level of work detail required, as exemplified by this response:

The contractor was expecting a much higher level of drawings than we indicated we would do. And there was a misunderstanding—we said we'd do our normal standard drawings but the [contractor] coming over thought they would receive full shop drawings with minute details of how to form false work, etc.

The different definitions of roles, standard inclusions and the way that the local industry is organized can cause misunderstandings leading to increased costs and delays. It is therefore impor-

tant that companies consciously pay attention to these differences and explicitly account for them in their contracts, budgets, and schedules.

Logistics

Understanding the logistics for a project, including site access, the shipment and transportation of resources, mobilization of labor, payment of subcontractors and employees through the banking system, and the safety, security, and camp set up for workers, is particularly important for contractors. This type of knowledge intertwines country knowledge with project-specific knowledge. Most of the time, this knowledge is collected prior to starting the project or entering the country as this knowledge affects the bid and plan. One contractor described the many logistical factors they need to decide when beginning a project in a new country:

We need to find a place to live... figure out how to set up a camp for workers... figure out deals with airlines because we'll have masses of people coming in (we are talking about project that at peak will have approximately 50% expatriates coming from overseas which can be 1,000 or more people)... figure out how to bank and deal with money in the country-pay labor, etc.

Logistics significantly affect the schedule, organization, and cost of the project.

Relationships

Informants also discussed the importance of understanding relationships either between the local host country and their home country, or relationships within the local area. One contractor relied upon their home country embassy to provide information on governmental relationships and their "friendliness" toward business from the country. Another contractor provided a publication on important lessons learned through the years. A common theme within the publication was on the perils of not being local, particularly regarding relationships:

There are many problems if you aren't local... Relationships in business are always important... The local competitor has a range of advantages: a relationship with the customer, knowledge of and relationships with the local authorities, long relationships with local subcontractors and suppliers, and... [relationships with] local labor.

Relationships are still a major influencing factor in the AEC industry. Therefore, understanding the existing relationships and establishing beneficial relationships is critical to gain cooperation on projects. The increasing interest in social networking analysis (Chinowsky et al. 2008) may help companies be able to map and understand these complicated relationships, particularly governmental and regulatory relationships.

Resources and Productivity

In any project, it is necessary to understand the cost, quality, and availability of labor, materials, and parts within an area. Operating laws and project requirements will often determine the amount of labor and equipment required from the local area. If the requirement for local sourcing exists, the importance of this category increases. This category is particularly important for contractors who bid, schedule, and execute the work. It includes the availability of equipment and parts, as one informant discussed on a project in Botswana:

We couldn't get our standard construction equipment in the country and operate it efficiently because there was a lack of spare parts. Even though our construction equipment was made by Caterpillar, the equipment is made to different standards in different regions and the spare parts would not fit.

It also includes knowledge of the cost, quality, and productivity of local labor, which changes depending on each location:

Productivity norms are very different around the world. If you are accustomed to American welders, you might have a rule of thumb that a welder can do X flanges of 6-in. pipes in half an hour. Well, in Azerbaijan, the same scope of work might take an hour and a half. You have to be really careful and understand these differences in productivity norms... it affects all parts of your project.

This knowledge changes according to region and over time; however, gaining an understanding of the local resources and productivity is critical to estimate the budget and schedule accurately for the project while ensuring quality and safety requirements.

Market Knowledge

The final subcategory coded within Normative knowledge is Market knowledge. This includes knowledge of existing infrastructure and buildings and an understanding of the end user's history of payment (i.e., payment for water or rent) and price point capacity. This category is particularly important for infrastructure and building developers who have a long-term commitment to an area and rely on these payments to fulfill financial expectations for the project. One building developer talked about a formalized benchmarking process they engage in to develop information on the market and opportunities for entrance and growth:

We will literally go to all the offices of our competitors and we'll get as much information as we can about their buildings (specifications, BTU per SF, cooling system, curtain wall, etc.) and the market... then, we sit down and start looking at what projects are considered the best in that particular area and decide what we want to do to differentiate ourselves... We have a very deep database for the different projects—and it's a different database for each city and market we are in.

Collecting market knowledge influences both the design and the likelihood of reaching financial expectations.

Cognitive-Cultural

Cognitive-cultural knowledge includes common beliefs and shared conceptions and meanings. These types of knowledge rely on "preconscious, taken-for-granted understandings" (Scott 2001, p. 61) that represent the nature of social reality. As a result, this knowledge is often tacit, although some ideas and beliefs can be quite explicit. Whereas normative knowledge is morally governed and regulative knowledge is legally sanctioned, cultural-cognitive behavior occurs because "other types of behavior would be inconceivable and unrecognizable" (Scott 2001, 2008). From the interviews, we recognized two subcategories within this type of knowledge: cultural beliefs and language, concepts, and meanings.

Cultural Beliefs

The need to understand the local area's culture and beliefs came up in some way in almost every interview. Sometimes differences

in cultural beliefs arose between the company and locals from the project area, sometimes within contractual relationships with other international companies, and many times, this category was important when interacting with other employees in the same company. One contractor discussed problems with value engineering due to cognitive cultural mental models when he worked in a foreign market:

In [country] I ran into a problem with saving face. The [country nationals] believe that once they put something on paper its sacrosanct. So the concept of value engineering can't exist because nothing could be better than what is on the paper because it's sacrosanct. You can get kind of crazy trying to deal with saving face, particularly if something really won't work.

An engineer discussed the increasing need to understand a local area's culture in order to create a locally accepted and environmentally and socially sustainable project:

In Australia, our environmental team recently spent a long time trying to locate a route for a new road through Aboriginal land. They spent a lot of time talking to the Aborigines to find out... the different meanings and ancient cultural importance of the land... in order to come up with a route alignment that avoids all the aboriginal sites and is therefore acceptable to the local people with minimal objection to the project going forward.

To minimize project objections and decrease misunderstandings between project participants, companies must attempt to identify cultural beliefs in the project area and within the project team. This will play an important role in site selection and project design and aid in meeting project requirements.

Language, Concepts, and Meanings

Language, concepts, and meanings are also important to understand to be able to communicate with other project team members and understand the mindset of customers. For instance, developers usually need to develop sales and marketing strategies and contractors may need to communicate concepts with a local worker who is not familiar with the term. A developer talked about issues trying to lease space in buildings due to a lack of common understanding of what is included in rentable square feet:

The United States has a very sophisticated formula [for determining rentable square footage], so when one building says you have 21,000 sq. ft. of usable space of our building by BOMA (Building Owner's and Manager's Association) standards, you can go to any other building and ask them what their usable square footage on their floor is per BOMA and they'll tell you, and the numbers mean something, you can compare them. In India, that doesn't exist. In India, developers literally just tell you what you're renting, what your rentable area is and you have no idea what that means. There's no transparency as to how they came up with that number, what the number relates to or what's included or not included in that number.

The concept of time also arose frequently in interviews with all types of companies. Frequently, this was an issue within the company or project team. Many participants from the United States and U.K. were particularly frustrated with the concept of time and its relation to risk and risk tolerance on projects. They

indicated that certain regions have a much more elastic perception of time than the literal perception of time they are accustomed to.

As already noted, we regard cognitive-cultural elements to be both more fundamental and less recognized than regulative or normative elements. They are fundamental in that they provide the substrata—the concepts, distinctions, assumptions—on which the other elements build. And they are less easily recognized because they often implicit and taken-for-granted. Informants underestimate their ubiquity and their importance.

Differences among Types of Firms

The AEC industry differs from many other sectors. Infrastructure projects and buildings, in general, are constructed to last for many years. These projects are deeply embedded in the local environment during the development, design, and construction of a project, and need to be locally accepted and valued to achieve use and revenue over the long term. In contrast, products that other industries produce, such as computers, clothing or coffee, have a short shelf life. These products can be tested and adjusted over time to suit customer tastes. The long-term and embedded nature of infrastructure projects and buildings makes the need for institutional knowledge even greater. However, just as it is a fallacy to assume that all industries are alike in their need for institutional knowledge, it is also misleading to assume that all types of companies within each industry value different types of institutional knowledge equally.

We noted similarities and differences between firm types. According to the larger institutional categories, normative knowledge was most frequently mentioned type of important institutional knowledge for informants in all types of firms, followed by regulative and then cultural-cognitive knowledge. Nevertheless, each firm type had different levels of importance as measured by on relative frequency of responses for each institutional knowledge subcategory. Table 3 shows a comparison of the relative frequencies of each knowledge subcategory and overall institutional category for each type of firm.

Many of the differences in levels of importance result from varying time-horizon commitments and sources of revenue for each type of firm. For example, the top three most frequently mentioned types of important knowledge for developers include social norms, expectations and preferences (18%), concepts and meanings (12%), and approval processes (9%). Developers obtain revenue from rent (or, in the case of infrastructure owners, cost of water, etc.). In order to rent space in a building, local customers have to value the location and features of the building. This requires developers to understand customer preferences as well as be able to communicate with them in a meaningful way. In addition, developers typically operate in a given area over a long time horizon; thus the perception of the company and its project not only affects current profits but also future opportunities. They are therefore heavily committed to the local area and project and need to understand approval processes and other regulative requirements that extend far beyond the time of initial approval of the project.

Contractors, on the other hand, are committed to fulfilling a specific scope of work that is outlined in a contract with the owner/developer. The contractor typically agrees to complete a particular project for a certain price and within a definitive schedule. To achieve their profit margins, they must accurately estimate and complete the project according to this agreement. The types of knowledge contractors needed on international projects were

Table 3. Relative Frequency of Important Knowledge Type Mentioned by Informants for International Projects according to Company Type

Knowledge types		Company types			
		All	Developers	Contractors	Engineers
Regulative	Laws and regulations	5.3%	6.2%	5.3%	4.8%
	Operating laws	7.9%	4.1%	13.0%	3.6%
	Knowledge of government	6.4%	7.2%	9.2%	2.4%
	Design construction standards and permit	9.0%	8.2%	6.3%	12.7%
	Approval processes	9.6%	9.3%	9.2%	10.3%
Normative	Work practices	9.2%	3.1%	7.7%	14.5%
	Social norms, expectations, and preferences	9.8%	18.6%	6.3%	9.1%
	Industry organization	9.2%	6.2%	10.1%	9.7%
	Logistics	7.9%	3.1%	11.1%	6.7%
	Relationships	1.7%	5.2%	1.4%	0.0%
	Material and labor available, productivity, quality, \$	9.6%	5.2%	11.1%	10.3%
	Market knowledge	2.1%	7.2%	1.4%	0.0%
Cultural-cognitive	Cultural beliefs	4.5%	4.1%	3.4%	6.1%
	Language, concepts, and meanings	7.9%	12.4%	4.3%	9.7%
	Total:	100%	100%	100%	100%
Total references:		<i>n</i> =485	<i>n</i> =97	<i>n</i> =207	<i>n</i> =165
Regulative		38.2%	35.1%	43.0%	33.9%
Normative		49.5%	48.5%	49.3%	50.3%
Cultural-cognitive		12.4%	16.5%	7.7%	15.8%
Total:		100.0%	100.0%	100.0%	100.0%

more varied; however, the top three most frequently mentioned categories included operating laws (13%), logistics (11%), and the cost, quality, availability, and productivity of labor and materials (11%). These knowledge types relate to everyday working operations, the ability to hire and locate labor and material, and the need to ensure timely delivery of products to the site. All three of these knowledge types affect the cost and duration of a project and therefore affect their profit margins. Their concerns are highly location and project specific and are limited to the scope and duration of time set forth in the contract.

Work practices (14%), design and construction standards (12%), approval processes (10%), and the cost, quality, and availability of material and labor (10%) were the most frequently mentioned types of important institutional knowledge for engineers. Like contractors, engineers achieve revenue for the design of a project according to contract terms. Engineer's contracts can vary significantly based on project type and scope requirements. This variance can also affect the importance level of different types of knowledge. In general, however, engineers need to understand local design standards to ensure their design adheres to local requirements and they need to understand approval processes to receive local approval for their design. Savvy engineers are also interested in understanding work practices and material and labor availability so that they can design a buildable, cost-efficient, and locally legitimate project for the area. This is particularly important for design/build contracts, but less important for engineers who supply designs for specific and relatively standard equipment such as boilers.

Differences between AEC companies appear to be rooted primarily in the different sources of revenue and commitment time horizons. However, almost all types of identified institutional knowledge were important to the different firms to some degree. Exceptions included the lack of response from engineers regarding the importance of relationships and market knowledge. However, it is important to emphasize that each company must decide the importance level it places on the types of knowledge accord-

ing to contract terms and commitments, project type and other factors.

Discussion and Conclusions

The growth of international construction work, combined with the difficulties firms face when expanding internationally, dictates the need to identify important institutional knowledge to acquire in order to reduce knowledge gaps and decrease a firm's liability of foreignness. Because international projects bring together participants from multiple societies, participants are exposed to different beliefs, norms, and regulations. AEC scholars have primarily concentrated on the regulatory risks confronting international projects, broadly referencing social and cultural differences. Our research examines a wide range of cross-national differences, and hence, needed knowledge, for international projects. We asked open-ended questions of managers engaged in international work about what knowledge they perceive to be important. We coded knowledge as important if: (1) the interviewee experienced difficulties due to the lack of knowledge; (2) the organization strategically collects the knowledge; or (3) the interviewee specifically mentioned it was important. After cross coding the knowledge types with the attribute of importance, we analyzed the relative frequency of responses to determine knowledge that was most frequently mentioned as being important. This qualitative research method allowed us to broaden our conception of the types of knowledge company participants regarded as important to collect to alleviate risks and knowledge gaps on international projects.

In addition, we employed a framework drawn from institutional theory as a tool to categorize the knowledge identified as important into the three clusters identified by Scott (2001, 2008)—regulative, normative, and cultural-cognitive elements. Employing this schema, we identified normative knowledge, a

largely understudied area, as the most frequently mentioned type of knowledge participants regarded as important for firms to acquire. We also built on past literature to identify subcategories of regulative and cultural-cognitive knowledge. Finally, recognizing that not all firms are alike, we attended to differences in the level of importance of subcategories of institutional knowledge according to participants within develop companies, contractors, and engineer consulting firms. Differences resulted primarily due to each type of firm's source of revenue and commitment time horizon.

This study endeavors to add to the theoretical knowledge within the international project-based literature, but also refocuses attention from identifying risks to identifying important knowledge to collect for international projects. This allows firms to take a strategic view and actively engage in collecting knowledge to reduce the number and magnitude of critical knowledge gaps encountered. In addition, we employed a research method designed to obtain knowledge that is often implicit and tacit from informants. Analyzing the data through the research process converted the knowledge into an explicit generalizable form. Categorizing this now explicit knowledge and applying institutional theory provides a framework that firms can use as a tool in order to identify, prioritize, collect, and transfer the knowledge they will need for international projects. Strategically focusing on this knowledge should help firms decrease misunderstandings and thus increase the success rate of international work.

Although our research allowed us to expand types of important knowledge for international projects and propose differences based on company type, the study has several limitations and areas that future work can address. We were limited to the responses provided by the participants and had to rely on their perceptions of important knowledge based on their recollections of past projects. Although written reports and other sources often backed up these statements, perceptions are limited to each individual's experience and are thus necessarily incomplete. Specifically, not all types of important knowledge likely surfaced. In addition, informants may not have realized the importance of certain types of knowledge that are tacit, in particular regarding the deeper cognitive cultural influences on their international projects. We were not surprised that this category was the least often mentioned as it is often the least recognized aspect of institutions. Many of our basic assumptions and beliefs are core to our thought process; as a result, we frequently do not recognize that we even hold them. Consequently, we believe that this category may be more important than the results indicate.

In addition, we used the relative frequency of responses combined with the coding attribute of importance to rank and compare knowledge. Although this serves as a basis to build theory related to the importance of various types of knowledge for firms, future work can validate and refine our findings and propositions by asking participants to rank the level of importance of these identified types of knowledge. Additionally, even though a committee checked the results, one individual coded the transcripts. Random coding checks of the original transcripts would increase the reliability of the results.

Although our sample was relatively large for case study research of this type, the practical limitations of qualitative case studies—the time and resources to travel, interview, collect, transcribe, and analyze our results—restricted the number of participants and firms in the study. Future work can improve our results through additional case studies or surveys to increase the number of participants involved. Future work should also expand differences in company type, project type, scope, project location, and

contractual requirements when evaluating important knowledge to collect. Knowledge types can be analyzed according to the project phase in which they are needed. Finally, additional work should focus on the sources, processes, and methods used to acquire this knowledge initially and then transfer the knowledge within the firm.

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