Who Needs to Know What?: Institutional Knowledge and International Projects

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The Collaboratory for Research on Global Projects at Stanford University is a multidisciplinary center that supports research, education and industry outreach to improve the sustainability of large infrastructure investment projects that involve participants from multiple institutional backgrounds. Its studies have examined public-private partnerships, infrastructure investment funds, stakeholder mapping and engagement strategies, comparative forms of project governance, and social, political, and institutional risk management.

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This paper is currently under review for the Journal of Construction Engineering and Management. An early version of this paper, entitled, "Acquiring Local Knowledge for International Projects" was submitted to ASCE's CRC conference, which will be held in Seattle in April, 2009.

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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 fifteen case studies of three types of international firms (developers, contractors and engineers) engaged in international infrastructure development to identify the types of knowledge that are most 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 and analyzing differences according to firm type. This provides entrant firms a tool to help recognize important knowledge to collect for their international projects.

KEYWORDS: Construction; Engineering; International Business; International Development; Institutional Knowledge; Institutional Theory; Knowledge Management

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 US$22 Trillion on infrastructure in the next ten 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. These projects involve diverse participants from differing backgrounds and cultures who work together in unfamiliar locations. Due to the lack of familiarity with the local environment, firms who enter foreign markets are at a disadvantage or have a 'liability of foreignness' (Zaheer 1995). This 'liability of foreignness' with the project location and participants increases misunderstandings and therefore 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 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 uncertainty and risks 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) note, acquiring local market knowledge is of central importance when planning to enter new countries. Despite the importance of local knowledge for firms entering foreign environments, previous research has not adequately identified and categorized the specific types of knowledge involved to be successful in international infrastructure projects. This paper attempts to fill this void through qualitative case studies of fifteen 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 knowledge that are important for firms working on international projects (2) analyze and classify these important knowledge types for international projects using the framework of institutional theory and (3) analyze differences according to firm type.

This study therefore allows managers within AEC firms to identify systematically the important knowledge gaps that exist on international projects to 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. Subsequent papers will address (1) the sources and methods firms use to acquire this knowledge initially and (2) the transfer methods firms use to disseminate each of these different kinds of knowledge across their organizations.

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). Finally, we analyze and discuss 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 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" (Scott 2001) 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).

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. Institutional theory and its relation to the extant literature on international project management are discussed below.

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).

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The international factors discussed arise from a variety of differences and expectations between the host country and 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.

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; Scott 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 learn.

- *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 permitting practices are obvious examples of normative elements at work in international projects.

- *Cultural-cognitive elements,* a focus of cultural anthropologists, cross-cultural psychologists, enthnomethodologists, 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.

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 can also motivate the other two categories. For instance, cultural-cognitive elements include widely shared beliefs. These beliefs underlie normative elements of how things should work and trigger obligations for social life. In turn, these beliefs and social obligations can trigger the establishment of laws and regulations to enforce this compliance. We recognize the complexity, variation and relation of these elements, but nevertheless attempt to identify what appears to be the dominant element in practice to separate and analyze these types of knowledge into three distinct institutional pillars.

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 learn: 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 more 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 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; 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. See Table 1 for a summary of the literature and research methods in this area.

Table 1: Selected International Risk Literature in the AEC Industry

Reference	International Factors/Risks Discussed	Primary Institutional Category	Secondary Categories	Method
Shou Qing, W., Robert, L., Seng Kiong, T., and David, A. (1999)	Unique or Critical Risks: Change in law, Corruption, Delays in approval, Expropriation, Reliability and creditworthiness of Chinese entities, Force majeure, Exchange rate and convertibility, Financial closing, Dispatch and transmission constraint, Tariff adjustment	Regulative (legal, political, government, economic)		Surveys
Bing, L., Tiong, R., Fan, W., and Chew, D. (1999)	25 Risks associated with project specific characteristics, external and internal groups. External factors included: Inconsistency in policies, laws and regulations, economy fluctuation, exchange rate, force majeure and social disorder, inflation, restrictions on fund repatriation, import restriction, security problems, language barrier, different social, culture and religious beliefs, pollution	Regulative (legal, economic, operating laws)	General "Social, Cultural and Religious beliefs" and Other (environmental, language)	International Survey of Contractors
Han, S. and Diekmann, J. (2001)	Risks identified from literature review: Main Factors: Political Risk; Economic Risk; Cultural/Legal; Tech/Construction; Other.	Regulative	General "Cultural/Legal" and Other (Technical) risks	Literature Review; Pilot Case study of model
Baloi, D., and Price, A. (2003)	Main groups of global risk factors included: Fraudulent practices related, construction related, economic related, political related; estimator related; design related; level of competition related	Regulative (legal, economic, political)	Other (estimator, design, construction)	Literature review & prelim. discussions w/contractors
Ofori, G. (2003)	Problems and risks relevant to international construction include: political instability, economic and financial instability, price discrimination, exclusion of foreign firms, etc.	Regulative (political, economic, operating laws)		Literature Review
Chan, E., and Tse, R. (2003)	Most significant factors contributing to disputes on international projects: contractual arrangements are not appropriate and cultural clashes	Cultural		Surveys
Gunhan, S., and Arditi, D. (2005)	Threats in order of significance: Loss of key employees; Shortage of Project Owners' Financial Resources; Inflation and Currency Fluctuations; Interest Rate Increases; Foreign Competitors in Host Country; Cultural Differences; Bribery.	Regulative (economic, political)	General "Cultural Differences" and Other general threats to company	Surveys
Han, S., Asce, M., Park, S., Kim, D., Kim, H., and Kang, Y.(2007)	Top 20% Risk Variables: Leadership/competence of PM, Project planning and management, owners funding capability, adequacy of contract duration, reflection of host country's conditions, field engineers' technical and managerial skill, accuracy of competitor analysis, accuracy of cost estimation, excessive request of owner, sufficiency of estimation time, owners' payment delays, capability of local subs, reflection of owner's requirements	Other (Firm factors and accuracy)	Normative (Capability of local subs)	Profitability trends, case surveys with Korean global contractors
Mahalingam, A., and Levitt, R. (2007)	Identification of cross-national challenges on global projects from single case study across three project phases: Problems due to: different information gathering techniques, differences in building codes, differences in available building materials; Delays due to: conflicting aesthetic views, differences in contracting practices and regulations.	All (Regulative, Normative, Cultural Cognitive)		Single Case Study; Application of Institutional Theory to Global Projects
Kim, D., Han, S. , Asce, M., and Kim, H. (2008)	Used 64 cost-influencing variables identified from previous work which are classified into five overall categories: Condition of Host Country and Project Owner, Bidding Process, Project Characteristics and Contractual conditions, Characteristics of Organization and Participants and the Contractors ability	Other (Project/Firm conditions)	Regulative	Survey

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. 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 used a qualitative case-based methodology because 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). In addition, we wanted to ask semi-structured but open-ended questions that would allow informants to respond without constraints and enable them to provide additional detail beyond that which they could provide in structured survey questions.

We conducted case studies within fifteen companies 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). In order to remain focused on the AEC industry, the study included participants from three types of firms: engineering consultant firms, contractors and real estate developers/owners. Varying firm type allowed us to expand on prior literature to include engineering consultants and developers. 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. [Please refer to Table 2 for additional details of the case studies (company names are disguised to honor confidentiality agreements)].

Table 2: Case Study Information

	Company (Coded*)	# of Informants	# Countries w/ 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
	Picadilly 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 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. To increase the validity of the identified constructs (important types of knowledge), multiple data collection methods were employed (Eisenhardt 1989) including: *interviews* with informants, *collection of documents and secondary data* that were either available publicly or provided by the informants, and, where possible, *direct observation.* Examples of documentation include reports, books, country risk analysis reports, risk checklists, presentations, memos on post-project lessons learned, and other company information. 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 (several informants were interviewed more than once) who worked at various levels in the project organizations, and who had past or current

experience on international projects, were involved in the overall strategy of the firm, or were involved in a corporate or project-based knowledge management initiative. We began with general questions to gauge the person's experience, and later progressed 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?", "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 getting 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 that the participants actually experienced.

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). First, we used "topic coding" to assign references within the transcripts and documentation to appropriate topics or categories, allowing both expected and unexpected categories to emerge. We then conducted dynamic, analytical coding. This involved interpreting and reflecting on the data to draw and verify conclusions. 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.

IMPORTANT TYPES OF 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?"   To answer this, we coded types of knowledge and important knowledge for international projects and cross-tabulated the results. To determine important knowledge for international projects, we coded (a) knowledge that managers indicated was important, (b) difficulties that the firm experienced in the past from differences encountered on their international projects, or (c) 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 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 two to ten percent (see Table 3).

Table 3: Important Knowledge for International Projects
(by Relative Frequency of References)

Subcategories of Knowledge Types	References			
	ALL		Cross-Coded as Important	
	Number	Relative Frequency	Number	Relative Frequency
Approval Processes	90	10%	45	10%
Language, Concepts & Meanings	50	5%	37	8%
Cultural Beliefs	34	4%	21	4%
Design Const Standards & Permit	105	11%	42	9%
Industry Organization	58	6%	43	9%
Knowledge of Government	57	6%	30	6%
Laws & Regulations	70	7%	25	5%
Logistics	71	8%	37	8%
Market Knowledge	41	4%	10	2%
Mtl & Labor Avail., Prod., Qual., $	94	10%	45	10%
Operating Laws	83	9%	37	8%
Relationships	34	4%	8	2%
Social Norms, Expectations & Preferences	80	9%	46	10%
Work Practices	72	8%	43	9%
Total References:	**939**	**100%**	**469**	**100%**

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 applying institutional theory would best categorize the important knowledge. This eventually lead us to group the subcategories or "daughter nodes" into larger "tree nodes"—the three pillars of institutional knowledge: differences in regulations, norms, and cognitive-cultural beliefs, and an "other" category. Please

note that although we categorized this knowledge, Scott states that many institutional forms are comprised of multiple elements and recognizes that the distinction of pillars is analytic in nature (Scott 2001; Scott 2008). Please refer to Figure 1 for the classification of knowledge types into institutional pillars. Using this coding scheme, the order of importance of institutional knowledge according to relative frequency for all references of important knowledge is: (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. (During analysis, we also coded other types of important knowledge, including climate and conditions, technical knowledge and knowledge of company processes and procedures but do not analyze these categories within the paper.)
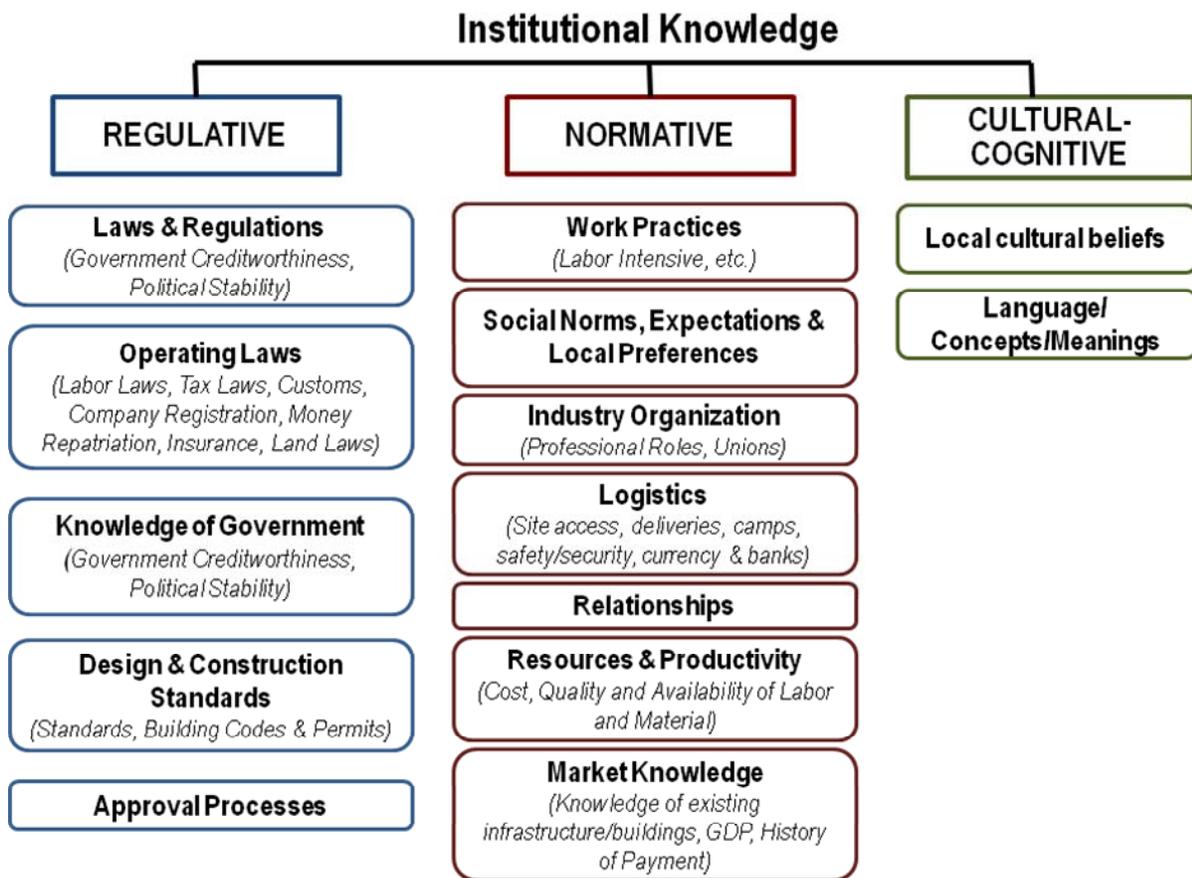
Figure 1: Knowledge Categorized into Institutional Pillars

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 mandates. This knowledge tends to be highly formalized and explicit and thus 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 below.

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 (BEE) 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 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 8 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 USA, UK 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 US.

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 1980's):

> *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 UK vs. 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 UK—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 available publically 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 1990's 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 government 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 example below, he talks about having permission from the planning commission in the UK, 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; Scott 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.   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 participants home county, 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 you are expected to act in the local context. This can include a host of aspects that range from how you should act at meetings to preferences for office design and layout. Obviously, this 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.   If the local community does not like the development, it will be a failure due to a lack of interest and leasing opportunities. 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 US), 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 local 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. Work by Taylor addresses the latter, describing the ease or lack of diffusion of innovations based upon the industry organization in different countries (Taylor 2007b). Ultimately, we categorized this type of knowledge as normative because it has binding expectations as a basis of order and specifies how things should be done and pursued in a given location.

References coded to this category ranged from reports about encountering and dealing with unions to respondents describing their confusion regarding fluctuations in practices for different roles' typical responsibilities on a project. A number of participants mentioned problems that developed due to different expectations regarding the level of design the engineer's would produce, 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 important 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 1000 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" towards 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" 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; Scott 2008). From the interviews, we recognized two subcategories within this type of knowledge: cultural beliefs and concepts / 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 Korea:

> *In Korea I ran into a problem with saving face. The Koreans 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 Manger'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 US and UK 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.

DISCUSSION

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.

Differences among types of firms

We noted similarities and differences between firm types. According to the larger institutional categories, normative knowledge was most important for informants in all types of firms, followed by regulative and then cultural-cognitive knowledge. Of course, because it deals with basic underlying beliefs and assumptions, cultural-cognitive knowledge differences underpin both regulative and normative forms of knowledge, but are less likely to be recognized or acknowledged by respondents. Nevertheless, each firm type had different levels of importance (based on relative frequency) for each institutional knowledge sub-category. Table 4 shows a comparison of the relative frequencies of each knowledge subcategory and overall institutional category for each type of firm.

Table 4: Relative Frequency of Important Knowledge Type References by Company Type

	KNOWLEDGE TYPES	All	Developers	Contractors	Engineers
			COMPANY TYPES		
Regulative	Laws & 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 Const 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 & 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%
	Mtl & Labor Avail., Prod., Qual., $	9.6%	5.2%	11.1%	10.3%
	Market Knowledge	2.1%	7.2%	1.4%	0.0%
Cult.-Cog	Cultural Beliefs	4.5%	4.1%	3.4%	6.1%
	Language, Concepts & Meanings	7.9%	12.4%	4.3%	9.7%
	Total :	*100%*	*100%*	*100%*	*100%*
	Total References:	n=485	n=97	n=207	n=165

	All	Developers	Contractors	Engineers
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%

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 types of important types of knowledge for developers include social norms, expectations and preferences (18.6%), concepts and meanings (12.4%) and approval processes (9.3%). 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 affect 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 knowledge far beyond the time of initial approval of the project.

Contractors, on the other hand, are committed to fulfilling a specific scope 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 was more distributed; however, the top three categories included operating laws (13.0%), logistics (11.1%) and the cost, quality, availability and productivity of labor and materials (11.1%). 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 set forth in the contract.

Work practices (14.5%), design and construction standards (12.7%), approval processes (10.3%) and the cost, quality and availability of material and labor (10.3%) were the most important types of 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 outlined scope requirements. This variance can also adjust 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 not 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 references to the importance of "Other" institutional knowledge—the climate and conditions or language—by developers, and the lack of response from engineers regarding the importance of relationships and market knowledge. Even though these company

types did not mention the knowledge to be important directly, the lack of references does not indicate that it is not at all important. Instead, each company will need to decide the importance level it places on the types of knowledge according to contract terms and commitments, project type and other factors.

CONCLUSION

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 of international projects, broadly categorizing 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, through both differences and difficulties encountered, or knowledge they strategically collect or specifically mentioned 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 expand on knowledge that was important to collect to alleviate risks and knowledge gaps on international projects.

In addition, we employed institutional theory as a tool to categorize the knowledge identified as important into the three pillars of institutions identified by Scott (2001)—regulative, normative, and cultural cognitive. From this, we identified that normative knowledge, a largely understudied area, was the most frequently mentioned type of knowledge that was important for all firms to acquire. We were also able to expand on past literature to identify additional 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 developers, contractors and engineers. Differences resulted primarily due to each type of firm's source of revenue and commitment time horizon.

This study not only adds 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, and thus risks and uncertainties likely to be encountered. In addition, the research method allowed knowledge that was often implicit and tacit to emerge from informants during the interview process. 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 to decrease misunderstandings and thus increase the success rate of international work.

Although our sample was substantial for case study research of this type, we were still limited to the responses provided by the participants from firms who agreed to participate in the research. We also had practical limitations—the time and resources to travel, interview, collect, transcribe and analyze our results—that restricted the number of firms in the study. In addition, we had to rely on managers' perceptions and experience of important knowledge and recollections of past occurrences on their 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, 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.

This research has begun to untangle the complex web of knowledge on international projects, but leaves many gaps that future work can fill. Although we coded knowledge with the attribute of importance, our results are based on the relative frequency of responses and are supplemented with interview quotes. Future research can validate and refine our findings and propositions by asking participants to rate the importance of these identified types of knowledge

and by expanding the number of participants and companies included in the data collection. Future work should also expand differences in company type, project type, scope, and contractual requirements when evaluating important knowledge to collect. Knowledge types can also 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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