Mobilizing Knowledge for International Projects

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CRGP | **Collaboratory for Research on Global Projects**

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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ABSTRACT

The knowledge-based-view of the firm identifies knowledge as a resource with at least as much importance as capital (Grant 1996). Many have argued that a key asset for global firms is the knowledge they are able to gain from the diversity of environments in which they operate (Bartlett 1987; Ghoshal 1987). However, previous research has also identified the additional challenges that global firms and global projects encounter. These projects frequently bring together diverse participants in an unfamiliar environment. In these situations, firms are exposed to different "institutions" (regulations, norms and cultural beliefs) that can increase project costs and durations and damage reputations and relations (Orr 2005; Orr and Scott). Recognizing that challenges exist for firms who operate globally due to these differences, we are conducting exploratory research on the types of knowledge that global real estate developers, contractors and engineers feel are important for global projects and how they are able to mobilize this knowledge for their global projects. In future work we plan to elaborate and expand this research to account further for knowledge type, firm type and project phase. Ultimately, this research, combined with the work of others, can develop new processes for firms engaged in international projects to enhance their mobilization of knowledge, and thereby improve the outcomes of global projects.

KEYWORDS: Organizations; Knowledge-based Systems; Knowledge Management; International Business; Institutions; Institutional differences.

INTRODUCTION

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

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

Many of these costs of globalization are rooted in a lack of understanding or knowledge of the local institutions. These institutions, which include laws, norms and cultural beliefs, are deeply rooted in a society through activities, social obligations, values and incentives to provide

stability and meaning to everyday life (Scott 2001). Deep knowledge of local institutions is therefore believed to be of central importance to the global firm, as this knowledge affects decisions and guides actions during internationalization (Eriksson et al. 1997). Recognizing the importance of this local knowledge on global project outcomes (Khanna et al. 2005; Orr 2005), the issue of how firms acquire this knowledge to learn to work in a foreign environment becomes paramount for influencing the success of global projects and global firms.

Our ongoing exploratory research seeks to understand how international engineering, construction and real estate/infrastructure development firms are able to acquire and mobilize the needed local knowledge within the firm. Using institutional theory as a lens for viewing various types of local knowledge, our aim is to build theory through exploratory case studies on the importance of institutional knowledge and the methods for acquiring, integrating and transferring this knowledge throughout a global firm. In this paper, we provide a brief review of our theoretical points of departure before discussing our research methodology. We then present some of our initial findings related to the types of knowledge that are important on global projects and the methods that firms use to mobilize this knowledge from within their firm.

THEORETICAL POINTS OF DEPARTURE

Theoretically we build on branches of organizational theory and strategy, namely: Institutional Theory, Knowledge Management and Organizational Learning, and the Knowledge-Based-View of the firm. The global project-based business literature, including Internationalization Theory, also underpins this research.

Institutional Theory

Recent research by Mahalingam and others within the Collaboratory for Research on Global Projects has identified institutional theory as a useful framework for identifying and analyzing differences encountered on global projects (Mahalingam and Levitt 2007). 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). To elaborate and illustrate these distinctions in the context of global projects:

- *Regulative elements*, stressed particularly by economists, include the formal machinery of governance: laws, rules, surveillance machinery, sanctions and incentives. These 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. Shared values and norms, interpersonal expectations, and valued identities are stressed. The corporate culture of participating companies, conventional work practices enforced by occupational communities, professional standards and permitting practices are obvious examples of normative elements at work in global projects.
- *Cultural-cognitive elements,* a focus of cultural anthropologists, cross-cultural psychologists and organization scholars, tap into a deeper layer that includes widely-shared beliefs about the nature of the world (cultural frames and scripts) (Schank and Abelson 1977) and cause-effect relations (social logics). The beliefs are "cultural" because they are socially constructed symbolic representations; they are "cognitive" because they provide vital templates for framing individual perceptions and decisions.

Hofstede has identified a useful set of dimensions for assessing values, one of the key cognitive-cultural elements of Institutions (Hofstede 1991).

Institutional learning concerns knowledge of the social and cultural frameworks that undergird social life. In a single context, these frameworks vary little and constitute the unnoticed background of social behavior. However, in situations involving multiple participants from diverse organizations and cultures working in unfamiliar locales, institutional differences loom large, and institutional learning becomes of paramount importance. As noted, regulative elements are more easily learned: they are more visible and more easily captured in published information or available from consultants. More difficult are the normative elements, which are encoded into the behavior of the people in the local context and in the cultural features of companies and work groups. Most difficult are the cultural-cognitive elements —elements which are more likely to be tacit and taken-for-granted by all parties — requiring self-conscious and disciplined attention to differences.

Knowledge-based theory of the firm

The knowledge-based theory of the firm has received wide acceptance and support. It states that organizational knowledge is a resource with at least the same level of importance as capital (Grant 1996). In this view, the organization is seen as a social community that transforms knowledge into economically rewarded products and services (Khanna et al. 2005). Intuitively (and in line with previous studies) we can infer that a global firm engaged in multiple projects across the world is interested in using its collective knowledge to achieve higher performance (Ghoshal 1987; Zahra 2000). During our data collection from global firms, the first author witnessed many posters, brochures and websites highlighting this advantage. For example, the following statements were observed:

- *"We gain leverage with our combined know-how and make optimum use of it throughout the world" [Company A]*
- *"The individual and collective expertise of our global workforce... provides cost-effective, intelligent solutions in a timely manner" [Company B]*
- *" ...we always have access to a global network. This Group-wide expertise is only a phone call away." [Company C]*

At the same time, they realize the need to obtain local legitimacy by having a local presence which helps them to understand local practices thoroughly:

- *"Local presence, global knowledge" [Company A]*
- *"Company C's operations are based on local business units. They are all firmly established in their local markets" [Company C]*
- *"At each of these centres of excellence clients can not only benefit from local understanding, but the experience and expertise of the whole company"*

This dual conundrum recognizes the common organizational trade-off between exploitation and exploration. These statements verbalize the perceived advantages that a global firm can offer: both by having global collective knowledge from which to draw and, at the same time, presence in various local markets from which to gain new knowledge and information and achieve local legitimacy. However, in order for knowledge to impact and add value to an organization, the knowledge needs to be accessible when and where it is needed. Unfortunately, most organizations "don't know what they know" and all organizations "know more than they can tell" (Polanyi 1967). It is all too common for employees to have individual pools of knowledge

that do not flow together into a common knowledge reservoir from which everyone within the organization can draw. If an organization lacks structured ways of learning and sharing, it can lose time and resources spent on repeating the same mistakes continually or "reinventing the wheel". As Argote argues, more effort has gone into identifying knowledge as the basis of competitive advantage than in explaining how organizations can acquire, retain and transfer that knowledge (Argote and Ingram 2000).

Knowledge Flow

To create a strategic advantage based on its global knowledge, a global firm must care not only about the availability of knowledge, but also about the flow of this knowledge throughout its organization . The flow of knowledge not only requires firms to focus on the transfer of knowledge, but also on the reach of the transfer, whether between individuals, groups or the organization as a whole (Nissen 2006) as this multiplies the impact that knowledge can have on the overall organization. The theory of knowledge conversion (Nonaka 1994) assumes that knowledge is created, converted and flows through a spiral-like process involving four steps:

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

Drawing from this work, two strategies have been identified to "manage" this knowledge: codification and personalization (Hansen et al. 1999). Codification is linked to combination and revolves heavily around the use of information technology tools and practices to connect people to reusable, explicit knowledge. Personalization relies on socialization techniques to link people so they can share tacit knowledge. Companies choosing a strategy thus often invest more heavily in IT if they choose the codification strategy while those emphasizing personalization invest more moderately in IT, choosing to emphasize personal interaction (Hansen et al. 1999).

Compared to other industries, the construction industry is slow to embrace and implement knowledge management initiatives. However, Carrillo and Chinowsky found that knowledge management is gaining ground within the US AEC sector (Carrillo and Chinowsky 2006). They identified two strategies from which companies within the US AEC sector choose: IT-centric (similar to combination/codification) and people-centric (similar to personalization/socialization). Five out of six of the companies included within their study relied on a people-centric strategy for managing knowledge flow. Our work intends to expand on this and other prior work on knowledge flow related to the AEC sector, but to focus specifically on the local institutional knowledge that is so important on international projects.

RESEARCH METHODOLOGY

We selected a case-based methodology because it provides a level of in-depth analysis that more general survey methods on larger samples neglect, and thus offers the prospect of rich, new insights (Eisenhardt 1989; Yin 2003) for this early stage of research in this area. In addition,

this method responds to the question of "How" which will allow us to focus on the organizational and institutional processes that occur naturally. We choose three types of companies within the AEC sector for case studies: engineers, contractors and developers/owners. We have conducted (or will conduct) case studies with at least three companies for each type of firm. To ensure that international projects are a basis of their strategy and structure, companies were selected that obtain at least 25% of their revenue from projects outside their home market. Please refer Table 1 below for a description of case studies and interviews.

	Company (Coded)	Home Market	Primary location of interviews	# of Informants to date	# Countries with Offices
Real Estate Developers	Tottenham Court	USA	UK	4*	13
	Holborn	USA	UK	3*	15
	Goodge Street	UK	USA	5	2
	Southgate	Norway	Norway	2	1
Contractors	St Pauls	Sweden	Sweden / UK	7	25
	Leicester Square	India	India	12	18
	Charing Cross	Greece	Greece	9	32
	Oxford Circus	Japan	Japan	0*	12
	St James Park	Japan	Japan	0*	21
Engineering Consultants	Hyde Park	Canda	South Africa	27	15
	Farringdon	USA	USA	8	28
	Angel	UK	UK/ USA	6	36
	Picadilly Circus	USA	UK / USA	4*	26
	Fulham Broadway	Finland	Finland	3*	11
	Paddington	Finland	Finland / Thailand	3	29

* Data Collection for case studies in progress or not yet started at time of writing

Table 1 : Case Study Companies

All case studies are primarily conducted in company offices with subsequent follow-up phone interviews and largely involve (a) *interviews* with key informants, but also (b) *observations* of the firm and its employees and (c) collection of *documents and secondary data.* Using ethnographic interviewing techniques proposed by Spradley (1979), we ask descriptive, semi-structured but open questions to informants within global firms who have either past or current experience on global projects, are involved in the overall strategy of the firm, or are involved in a knowledge management initiative (Spradley 1979). By engaging informants and getting them to describe their projects, firms, and how they obtain and share knowledge on a daily basis within the projects and across the firm, we are gathering information from rich, detailed and real-life scenarios to build theory on how institutional knowledge is acquired and transferred. Previous studies have shown that ethnographies are an excellent means to develop grounded theory via coding and analysis of the descriptive responses to these questions (Glaser 1967).

PRELIMINARY FINDINGS

These findings are part of an ongoing research project that seeks to understand knowledge acquisition and transfer through global firms. For the purposes of this conference, we will discuss two components of the findings, beginning with the types of knowledge firms identified

as important on global projects and then discussing the mobilization of this knowledge on global projects. It should be noted that case study data collection is ongoing and analysis is in its early stages (currently we have over 90 hours of audiotaped interviews, approximately 20% of these have been coded for analysis), thus the insights presented below are preliminary in nature.

Important Knowledge on Global Projects

In addition to the standard knowledge needed for any construction project, working outside a company's home market requires additional knowledge of the local project environment. From the interviews conducted and analyzed, we have begun to identify the types of knowledge that managers perceive as important when working on international projects. Planned future research will elaborate on the importance of these different types of knowledge according to project phase as well as company type. We have attempted to categorize some of the different types of knowledge according to the three pillars of institutions in **Error! Reference source not found.** below, however, please note that institutional knowledge is difficult to untangle completely into the three pillars. The different pillars can significantly influence each other and it is therefore difficult to apply a crisp designation and category to each type of knowledge.
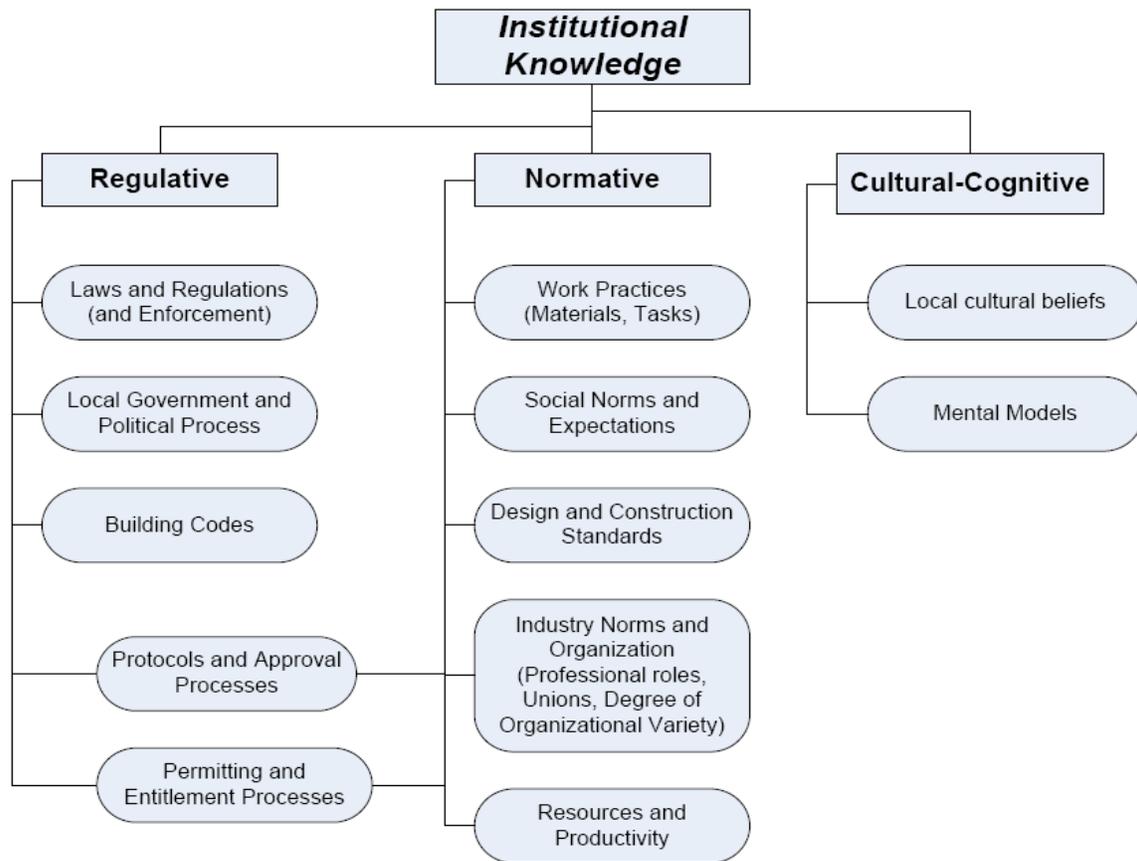

Figure 1 : Institutional Knowledge Types

Regulative
Participants indicated that one of the first steps when deciding whether to bid on a project or enter a new market is to gather information and knowledge about the local area's government and political system. This type of knowledge includes information on political stability, the

availability of funding opportunities within the area, the creditworthiness of these sources, corruption within the area, and the local government's relationship with the host market country. These types of knowledge are particularly important for the owners of assets within a foreign country, whether it be a building or privatized infrastructure. This knowledge is also important, however, for contractors and engineers doing work on a government funded or sponsored project. Furthermore, the stability of the government and the threat of war or insurrection are typically analyzed from a safety standpoint for manpower mobilization. This type of knowledge is generally collected very early and is typically done through detailed country studies. One owner commented:

> And so to decide [whether to enter a country], we do a general kind of country profile that outlines the country on a macroeconomic basis and their general growth curves for economic growth and correlated with that, [infrastructure, etc] growth…. We focus in on the ones that have the greatest need for power, are the most stable economically and have a history of fulfilling legal obligations and paying their bills.

Another commented on the significance of this knowledge for the decision makers on the board to enter a country:

> [We do] a country profile, which will go over everything in the country that you need to educate the board about, especially if we've never done a board paper for the country or country profile. It helps the board to understand the country GDP, the history of the political situation, the history of the economic situation, the specific business sector, and what industries are important in the country.

Knowledge about laws and regulations, and their degrees and methods of enforcement, is also important, particularly as it relates to contracts, the legal system, taxes, money transfer and laws regarding immigration and repatriation of workers. As an owner of privatized infrastructure commented:

> …each market has its own specific nuances and laws that regulate the market differently than other countries.

Contractors and engineers were often concerned about the mobilization of skilled manpower and resources, particularly in these times of a worldwide resource shortage. Therefore, the government's and project's regulations regarding immigration were particularly important. Many informants, particularly contractors and engineers, indicated that building codes were less important as these codes often were dictated by the client in the initial tendering documents. Furthermore, many indicated that international standards and codes were often used; however, in certain locations local codes still need to be obtained and addressed. One engineer commented:

> A lot of times the clients will tell us what codes we should use. The geopolitical environment is different. In some cases to get permits, you have to use certain codes and standards. In other places, it is up to negotiation.

Normative

Processes and protocols for getting permitting and entitlement approvals lean towards the normative pillar, although they are often associated with the regulative pillar. Although these procedures and processes are deemed to be important, a few informants indicated that they could

generally be worked through, and therefore they were a bit less important than other aspects that might cause more significant delays; however, more analysis and coding need to be done before this can be confirmed.

The normative pillar also contains information on work practices, including the means and methods of construction, the availability, productivity and cost of local resources, and the environmental constraints on work practices. This is generally very important for the contractors and often an important consideration during design for the engineers.   One contractor commented on the differences in labor practices :

> In India, the concrete pours are done with baskets of concrete. There is so much available labor that you have lines of people like a fire brigade handling the concrete.

Another indicated that the environmental conditions, combined with the local labor pool will determine the means and methods:

> A lot is related to the weather of course, cold weather, the altitude. You will also see that it is based on the labor pool. If we are going into Alaska we will most often modularize because we just aren't going to have many craft people in the area. Or Sakhalin Island, Russia, which is an interesting one, because you only have a 3 month window where you can ship modules in, so if you miss the window you have to wait a year. It is very, very schedule focused on a project like that.   You will see very different construction techniques depending on where the project is physically located.

The organization of the industry in a given area is also important, particularly in regards to the scope of professional roles and the diffusion of innovative techniques or means and methods in a given area. Although many engineers and contractors indicated that their roles were laid out in their contract with their client, a few discussed the differences in requirements for work practices in different locations. In addition, some discussed the implications of industry organization in their design.   This falls in line with previous work by Taylor that found differences in the diffusion of technology innovations according to the boundaries, professional roles and definitions and the fragmentation of the industry within a given society (Taylor 2005).   One managing director of an engineering firm showed visible frustration on his face when he described working on one of their first projects in the US:

> In America, we came and struck out early on because we were proposing construction methods which were much more efficient and used elsewhere but they were against labor laws in America. The labor laws insisted that you put [certain components] in a particular way, the [other components] in a particular way and therefore some of the innovative techniques that we developed [elsewhere] were a no, no for America, because of labor laws. We were absolutely aghast, "What??!! These guys must be nuts!" No, that's the way it is.

Again, this scenario is a combination of industry organization around craft vs. industrial unions or no unions, and the labor laws resulting from these societal norms. Almost all of the companies, however, indicated that they typically impose their home country's safety norms in the given environment. As one informant commented:

[We are] trying to embed the culture of safety into each of the projects. In some countries, hard soled boots are not the norm. In some countries, people show up in anything. Typically with safety, we impose our norms, which are more stringent than the local countries norms, because we really value health and safety.

Finally, cultural-cognitive knowledge is important, although many indicated that it was not as important as the other types of knowledge. Typically, informants discussed cultural issues related to understanding mind-sets of other people and, for contractors, trying to achieve peace within their construction camps. The owners of privatized assets were generally more concerned with this type of knowledge; however, one engineering company commented that this type of knowledge was critical for building sustainable projects:

[Knowledge of the local cultures] is becoming more and more important. And sustainability which we very much believe is essential for all design going forward … means something that is kind to the environment, uses minimum amount of raw materials, has a minimum or positive social impact and is also an economic benefit to the area. So clearly the cultural impact and social impact is essential.

As we continue coding we expect to expand and generalize our findings and also analyze knowledge according to project phase to benefit practitioners and future researchers alike.

The Mobilization of Knowledge on Global Projects

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

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

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

There is tremendous benefit if this knowledge can be quickly mobilized for the next project while taking advantage of the company's past lessons learned. This will therefore lead us to focus and elaborate on Nonaka's and Nissen's previous work on the flow of knowledge through the firm to identify how these companies are currently mobilizing the needed institutional knowledge for a project.

Going back to Nonaka's SECI model, knowledge can be transferred either through combination of explicit knowledge (following the codification or IT-centric strategy) or socialization of tacit knowledge (following the personalization or people-centric strategy). For

the purposes of this paper we will focus on the internal sources of this knowledge within an organization.

We have found that the transfer of previous experience and knowledge of the local area occurs through a combination of these methods. The companies that do not have an IT platform in place rely almost exclusively on socialization methods; however, delivering the knowledge to the right person and place can often be achieved for a greater number of employees and projects for certain types of knowledge through the use of an IT platform. The IT platform is particularly beneficial for new members of an organization who do not have a wealth of previous experience within the organization to know about past projects and experiences, or to know which employees hold that knowledge, and could thus be a resource to share their knowledge.

Of the types of institutional knowledge, companies indicate that they are able to share the more regulative knowledge on their IT systems: laws and regulations, standards and codes and previously documented country reports. This knowledge is often already explicit and in written format and can be uploaded easily onto the system. In addition, companies can record processes and working conditions that they believe could be valuable for future projects and bids. One firm in particular has a very well-known and awarded online knowledge system. The quotes below indicate the types of knowledge that employees in this form are able to exchange on their IT platform.

One informant indicated:

Sometimes you are doing a project where you are using European Standards over US standards….. or the Russian Standard for codes. If you have an office that isn't used to that or isn't experienced in it, it isn't necessarily a problem, but you need to have that awareness and ensure that you share that expertise. We use the [online system] to share that knowledge internally.

Another said:

The overall knowledge of the standards and specs is shared through [the online system]. We have access to various codes, standards and institutes through [the online system]. Our engineers can log into [the online system] to access these. They can also access [Farringdon's] practices and procedures. And then any lessons that we learn or updated changes, observations of how best to apply them would be uploaded into our [online system], plus contact information for our experts.

And finally, a third described an example of using the online system:

One of [the recent EU directives] that has recently come out is the pressure equipment directive … this requires certification by certain bodies of certain aspects of pressurized systems. Now, we are aware and know we have to adhere to it in the UK, but we often have projects in Europe which may be done by our US offices. And we are going through the process of bidding some work right now from our US offices. So, what we've done is create procedures on how to find and adhere to these directives which we've loaded into [the online system]. And we've also identified individuals who have knowledge and experience of applying that along with the dos and don'ts, and that is available to any project on [the online system]. So any offices that are executing projects in the European

Union, be it from any location, are now aware and can access any information of what they need to do to ensure that they adhere to these new requirements.

In fact, this same company also has managers develop "knowledge plans" for the types of knowledge they hope to capture on a project. We were provided with an example of a plan that included several types of new knowledge that the project team planned to document and upload onto the online system. This included, but was not limited to, the foreign country's regulatory requirements and geographical information, the local labor force, and other technical knowledge.

As noted in the above quotes, much of this knowledge is available through the online system and available through the Combination/Codification/IT-centric knowledge transfer method. But, equally as important, this online platform contains the contact name and numbers from which additional knowledge can be gleaned through socialization/personalization/people-centric approaches. This was described by one informant:

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

Finding the person who has worked or had experience in a given location often leads to phone calls, meetings, or the transfer of people in order to transfer this knowledge.

I'm frequently asked to provide a phone call, or a presentation, or even have an individual come to [country] for a couple of days to see what we've done here. This is typically done on a person to person basis.

These examples provide evidence that the IT system can provide explicit regulatory information and some of the processes to comply with the foreign entities' norms. In addition, it can also contain contact information indicating who has prior experience in the area. This allows for the more tacit knowledge of norms and cultural-cognitive beliefs to be transferred by connecting people to more knowledgeable peers.

Companies that don't have a formalized IT platform typically rely on person-to-person connections to transfer the knowledge and experience for all types of institutional knowledge. Employees typically rely upon their in-company knowledge and network to identify the appropriate person to seek knowledge from. Often this knowledge of past projects and employees' experiences comes from discussions during regularly scheduled meetings, phone calls or formal project evaluations. During these meetings, projects are discussed and reviewed to bring awareness of the projects and issues faced as well as identify people's past and present experiences. These formal processes, however, include primarily upper-level managers and directors, and therefore require new employees who do not have this awareness to rely upon upper management for advice about whom to talk to. After identifying the appropriate person, the knowledge is then typically transferred through phone calls, emails and in-person meetings. One high level manager described the way his firm does early stage project evaluations:

I'll prepare what I think is reasonable. But then we go through an internal process of others reading it and shooting holes in it and asking questions, and also a local person will have an input into how reasonable those assumptions are and if we're interpreting things correctly, etc.

Another Senior Director described the process of knowing his peer's experiences and projects through regularly scheduled phone calls:

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

We often posed the question, "If a new person were to join your company tomorrow, how would she know whom to go to, or, in other words, "who knows what?". The companies relying almost exclusively on socialization techniques replied that she would work her way up the chain until an upper level manager could put her in touch with the correct person. Many began explaining that personal experience and in-company networks put you only a few phone calls away from the appropriate person:

> [You figure out whom to talk to from] personal experience and in-company calling —they say that you are at most three calls from the person you need to talk to who will be able to provide the needed information or knowledge.

Firms relying on IT methods indicated that an employee would first consult the online systems to see if they could identify the right person and then, as a second step, seek guidance from their superior.

Drawing from these responses, we begin to see that some firms choose to rely almost exclusively on socialization methods —phone calls, the transfer of people, meetings, etc.— to transfer institutional knowledge, while others rely on IT platforms to share the more explicit institutional knowledge —the regulations and the normative processes— and to identify appropriate contacts through whom socialization measures can be used to transfer the more tacit normative and cultural-cognitive knowledge (see Figure 2 below). When relying on in-company experience, institutional knowledge can therefore either be transferred through socialization means —but at a risk of not reaching the entire organization— or partially transferred through IT platforms with the remaining transfer through socialization.
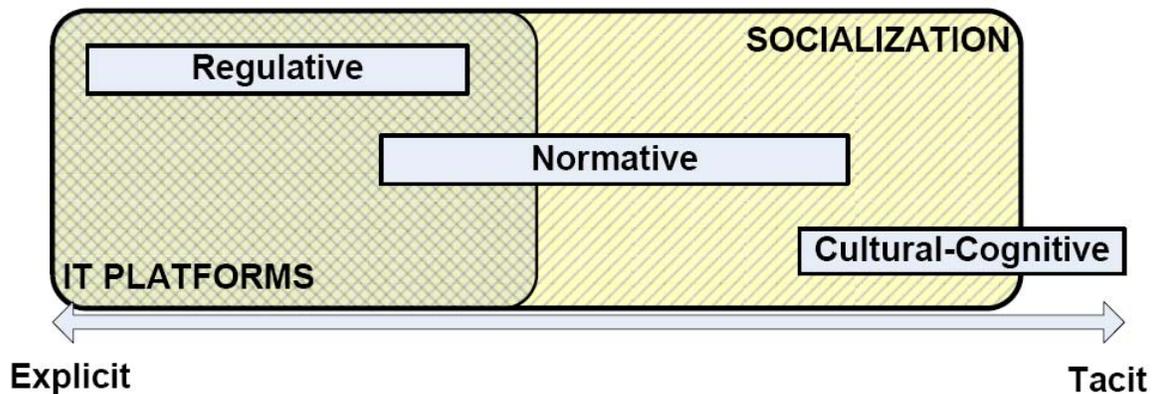

Figure 2 : Methods for sharing Institutional Knowledge

CONCLUSION

This paper describes part of an ongoing, exploratory research project that attempts to identify (1) firms' perceptions of important types of knowledge on global projects; (2) how they acquire this knowledge to align the project to the local environment; and (3) the methods used to mobilize this knowledge within the firm. From our interviews, the informants provided examples and perceptions of some of the types of knowledge that they perceived to be important on global projects. We then loosely categorized these responses into the three pillars of institutions indentified by Scott: regulative, normative and cultural cognitive. From this categorization, we discussed how firms are currently mobilizing these different types of knowledge for their global projects. To do this, we applied and extended past work regarding knowledge flow to identify the methods firms are using to internally transfer this knowledge.

We found that IT platforms allow codified institutional knowledge to be transferred (namely regulations, standards, codes, and reports on labor productivity and availability, climate conditions, and lessons learned) and that socialization methods are used to share the more tacit and subtle components of normative and cultural cognitive knowledge.

In order to be able to transfer this knowledge through socialization, the appropriate people within the firm who have working experience within the area need to be identified. Firms with an IT platform either used the online system or their personal networks to identify these experts quickly and easily, while firms relying purely on socialization methods identified the experts through their (or their managers) knowledge and social networks. Because the extent of knowledge that is available to draw from will be limited to personal experiences and the known experiences of peers within their in-company network, relying on socialization methods can limit the reach and thus the impact of beneficial knowledge within the organization.

Our ongoing research will expand these findings with additional coding and analysis from the interviews and attend to the differences between these methods using contingency theory. This work can help firms working internationally to realize the types of knowledge that are important to mobilize for these projects, as well as the means and methods through which they can most effectively and efficiently mobilize this knowledge. Ultimately, we believe that this awareness can lead to the decline of repeated mistakes and repeated reinventions of processes to create a more sustainable built environment around the world.

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