



Center for Integrated Facility Engineering
SEED RESEARCH PROPOSAL

This Presentation was given to CIFE members for the Proposal on *"Understanding Knowledge Acquisition and Transfer by Global Organizations engaged in Global Projects"*. The proposal was accepted and received \$20,000 of funding for the 2007-2008 academic year. **Note: Some slides are action oriented and do not print appropriately.*

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Comments regarding the presentation or the research are welcomed and appreciated. Correspondence concerning this paper should be addressed to:

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Center for Integrated Facility Engineering
SEED RESEARCH PROPOSAL

Understanding Knowledge Acquisition and
Transfer by Global Organizations engaged in
Global Projects

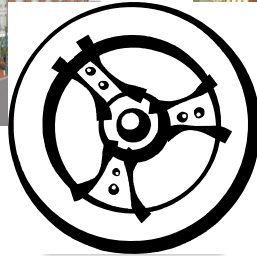
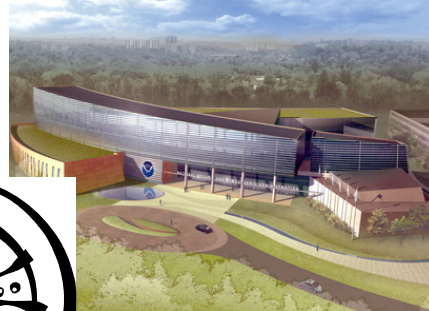
Raymond Levitt
W. Richard Scott
Amy Javernick Will

Reinventing the Wheel

Colorado



Maryland



Amy



Jeff

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Construction, Development & Engineering Projects:

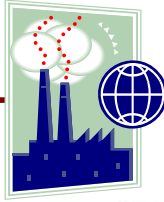
Capital & Time Intensive, requiring significant investment to gain knowledge and lessons

Projects globally distributed, increasing the difficulty in communication and sharing amongst teams

Many examples of learning & knowledge sharing that each of us have experienced.

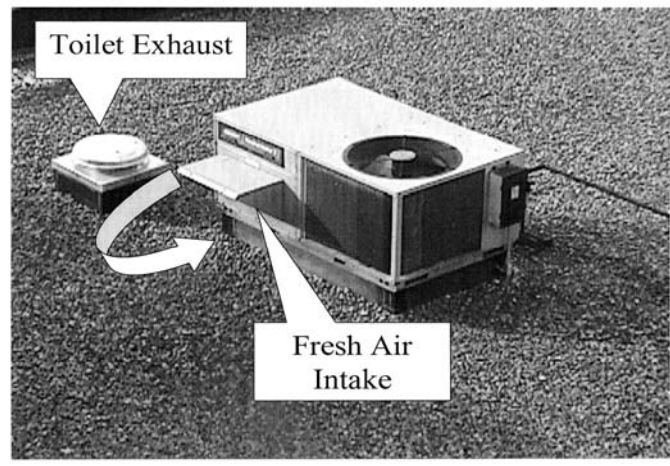
A common phenomena is the significant amounts of time & money invested in “reinventing the wheel”.

Prior to my current life as a PhD Student at Stanford, I was a Project Manager on the EPA Region 8 Headquarters. I spent significant amounts of time researching green roof products that would be acceptable to meet my company’s requirements as well as developing specifications for bidding and creating documentation for permit offices. Unfortunately, my colleague was unaware of my work and recreated a similar analysis that was only a phone call or “click” away.



Repeated Problem

Indoor Air Quality Problem



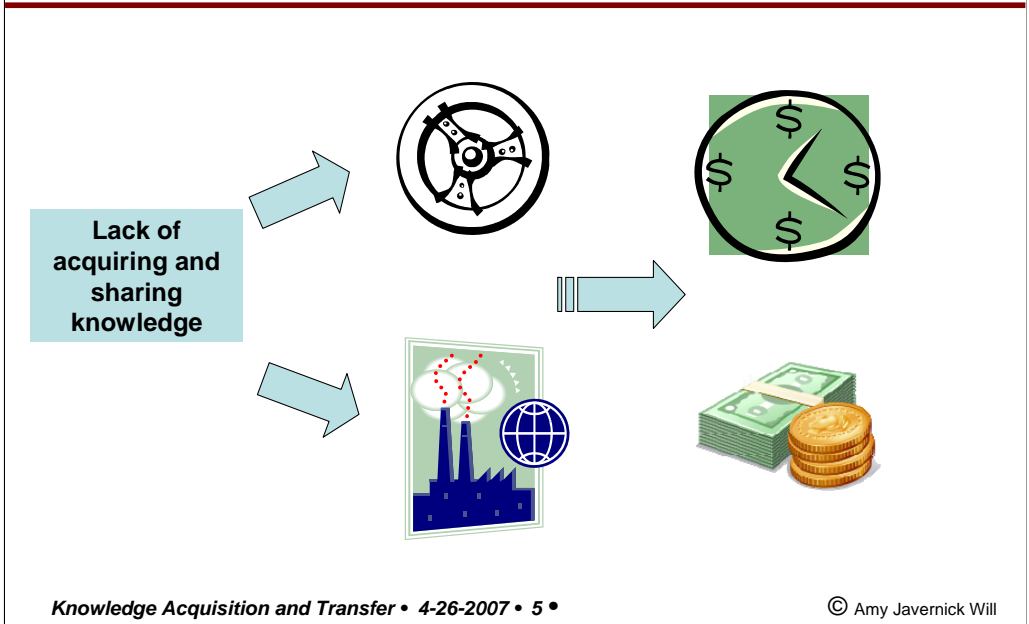
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Another common problem is the lack of sharing our mistakes and lessons learned within a company. We commonly repeat past mistakes as information is not shared.

One example is the “stinky” problem that was encountered at my last company. This problem was repeated on several projects before a property manager shared the problem in a meeting setting with the Design-Build project managers of common problems to avoid, or lessons to think about in the next design.


Observed Problem




Based on my intuition and practical experiences that many have shared with me, I depart from the observed problem that a lack of both acquiring and sharing knowledge leads to reinventing the wheel and repeating past mistakes. Both of these relate directly to the CIFE GOALS of reducing schedule durations and improving cost performance on buildings.

Problem	Objectives	POD	Method	Schedule
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Compounded Problem on a Global Scale




Repeated Project Failures



Opportunities!!



(Culture)²



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As we globalize (another CIFE agenda item), this problem is further exasperated on global projects!!!

We see multitudes of repeated project failures (Failure of 42% of 1,000 Infrastructure Contractual Agreements failed in Latin America (Guasch, 2004)

Additionally, we face the challenge of (Culture)², meaning the adjustment to different organizational, national/institutional cultures. In these instances, we especially need to capitalize on lessons learned- be it process lessons such as Fluor capturing knowledge of how to set up in a new environment (From Kodak China they took lessons of how to import/export goods, what the local infrastructure was like) to be reused; or it could be the case of Disney- learning how to “learn” a culture & their needs. (The case of Japan’s success versus Europe’s failure)

Global Projects undoubtedly seem daunting in light of all these challenges, however, firms that are able to successfully learn how to operate in these environments and share lessons from these intensive endeavors among their firm will have tremendous opportunities in the future.

Problem	Objectives	POD	Method	Schedule
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Objectives

Why are some organizations better at acquiring and sharing knowledge?

ACQUISITION

TRANSFER

- *Current Practice?*
- *Mechanisms, structures, etc.?*
- *Effectiveness of Approaches?*

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I aim to:

- Enhance understanding of how institutional differences lead to new knowledge creation
- Identify conditions and social structures that facilitate or inhibit knowledge sharing on global projects
- Explore the ways global developers, engineers and contractors currently *acquire, store and transfer* knowledge by examining organizational infrastructure, information technologies and managerial policies and practices
- Examine the effectiveness of these alternative approaches in diffusing knowledge across a firm's projects and global supply chain

Recognizing that institutional factors affecting project success are both numerous and complex, we propose exploratory research through case studies to allow us to identify varying practices among companies. We will focus on the different (1) phases of knowledge flow, (2) mechanisms of knowledge management; and (3) types of knowledge to examine which mechanisms and approaches are more or less useful for managing different types of knowledge at different phases in the knowledge flow. Doing this will require an examination of various levels: Organization, Project and Examples.

Theoretical Points of Departure:

- Institutional Theory
- Organizational Learning & knowledge Management
- Global Business Literature

Institutional Theory

Theory of socially-constructed determinants of human behavior.

Regulative

Rules, Laws, Sanctions, Incentives



Formal,
explicit

Normative

*Social Norms, Values, Expectations,
Roles, Work Practices*



Cognitive-Cultural

*Beliefs about the world,
Cause-effect relations*



Informal,
tacit,
taken for
granted

In the context of global projects:

Regulative elements include the formal machinery of governance: laws, rules, surveillance, sanctions and incentives. These elements are more easily observed, coded and more readily manipulated; and hence, they are easier to learn.

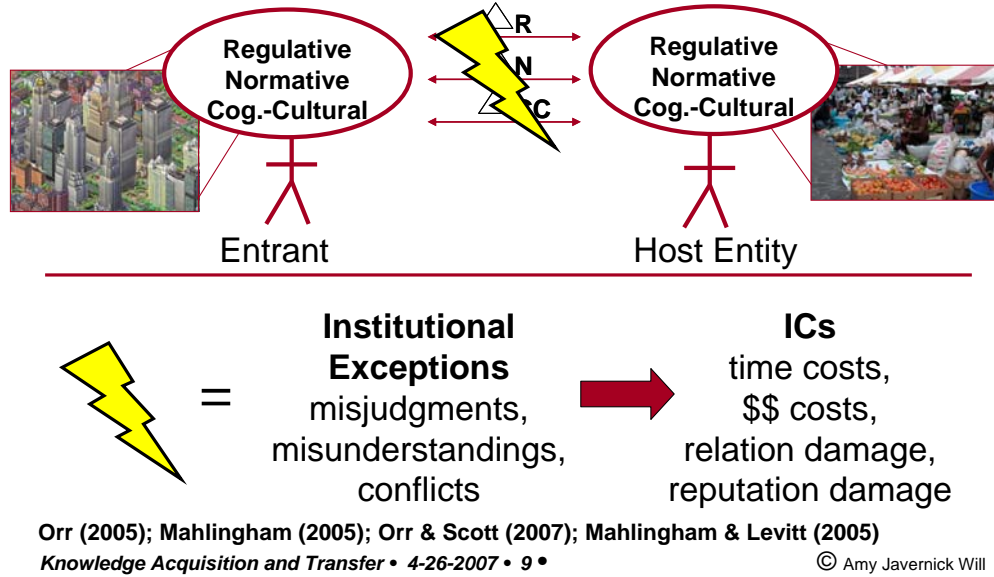
Normative elements : obligatory dimensions of social life and stress shared values and norms and interpersonal expectations. Corporate cultures, conventional work practices and professional standards are examples of normative elements in global projects.

Cultural-cognitive elements tap into a deeper layer that includes widely-shared, socially constructed beliefs that provide templates for framing individual perceptions and decisions. Hofstede (1991)

Regulative elements are more easily learned: they are more visible and more easily captured in published information and available from consultants. Normative elements are more difficult to learn, as they are encoded into the behavior of the people in the local context and in the cultural features of companies and work groups. Only sustained, interpersonal exchanges and prolonged exposure can uncover these differences. Most difficult are the cultural-cognitive elements—elements which more likely to be tacit and taken-for-granted by all parties—requiring self-conscious and disciplined attention to differences.

Previous Institutional Studies : Focus on Costs

Slide courtesy of Dr. Ryan Orr

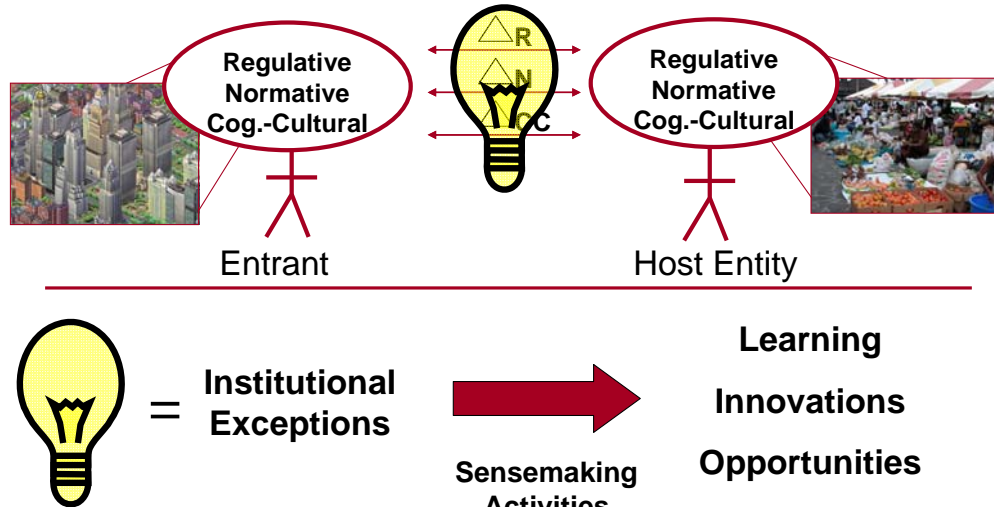


Institutional learning concerns knowledge of the social and cultural frameworks that undergird social life. Frameworks vary little and constitute the unnoticed background of social behavior.

Global Projects however involve multiple people from diverse organizations and countries working in unfamiliar locales. In these situation institutional differences loom large. Previous CIFE & CRGP studies (as well as others) indicate that institutional exceptions are created, causing misjudgments, misunderstandings and conflicts.

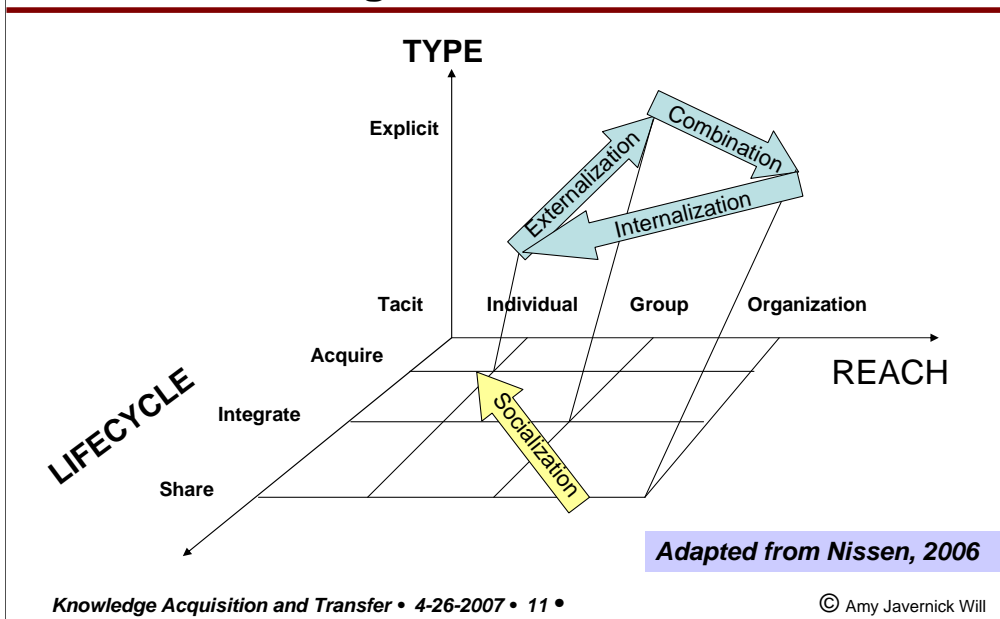
Institutional Exceptions (Spirit in the Waterfall, Failed understanding of contractual meanings in a local jurisdiction) have been shown to produce “Institutional Costs”, costs that cause time & cost overruns and damage to reputations & relations.

This time... Institutional Exceptions: Focus on Learning, Ideas and Knowledge



I'm hoping to be the silver lining of the dark cloud. As these differences arise, they are not ignored or suppressed but become the object of attention and become the subject of sense-making activities and active learning efforts. Institutional learning can become critical to project success (Disney case) and can create opportunities for participants to take away new knowledge to apply to different projects (Example: Sustainable technologies in Europe being applied to the US; Labor-intensive methods being learned in developing countries that can be implemented to revitalize the economy after a major disaster).

Knowledge Flow Visualization



Building on previous work by Nissen (and Nonaka) I hope to examine the mechanisms that are used for various types of knowledge through their lifecycle.

X Axis: “Reach” of Knowledge as it moves from individual to project team and beyond to the Organization and its supply chain

Y Axis: “Type” of Knowledge (ranging from the more “sticky” Tacit knowledge that is difficult to codify and understand to the more explicit knowledge that is codified).

Z Axis: “Lifecycle” of Knowledge (Acquisition- Integration – Sharing/Diffusion)

Simple Example: Individual acquires knowledge while working with a group on a project. This is ingrained within their actions & activities until they “externalize” this action, perhaps through a “post project mortem” to make this knowledge explicit (and codified) for other individuals to use.

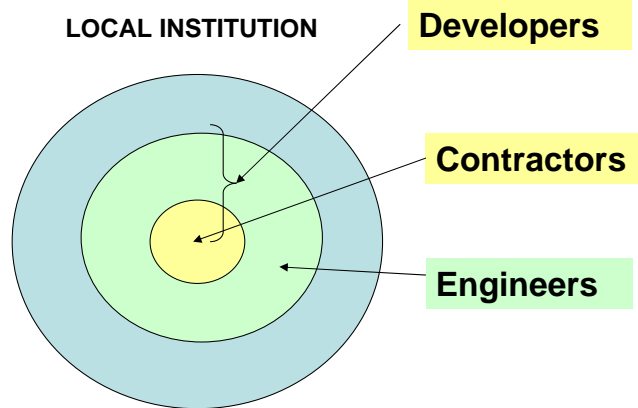
This information can then be coded into an IT platform and integration through “combination” to include the knowledge of many, amplifying its reach

An individual then can “internalize” this knowledge by knowing that the information exists and where to find it to apply it to other projects.

In a less formal case, an organization may have relied strictly on growing people through mentorship programs and networking. This can be costly, but a valuable way of transferring “sticky” knowledge.

I plan to study which mechanisms are more or less useful to facilitate flows of knowledge according to the type of knowledge (emphasizing institutional knowledge) and the lifecycle of the knowledge on a global project

LEVELS OF EMBEDDEDNESS



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Selecting Cases for the Studies:

-Three types of companies engaged in global projects: Developers, Construction Co.'s and Engineers of global projects

-Observe & Understand how different organizational structures and roles across a project's lifecycle enable different types of knowledge flows

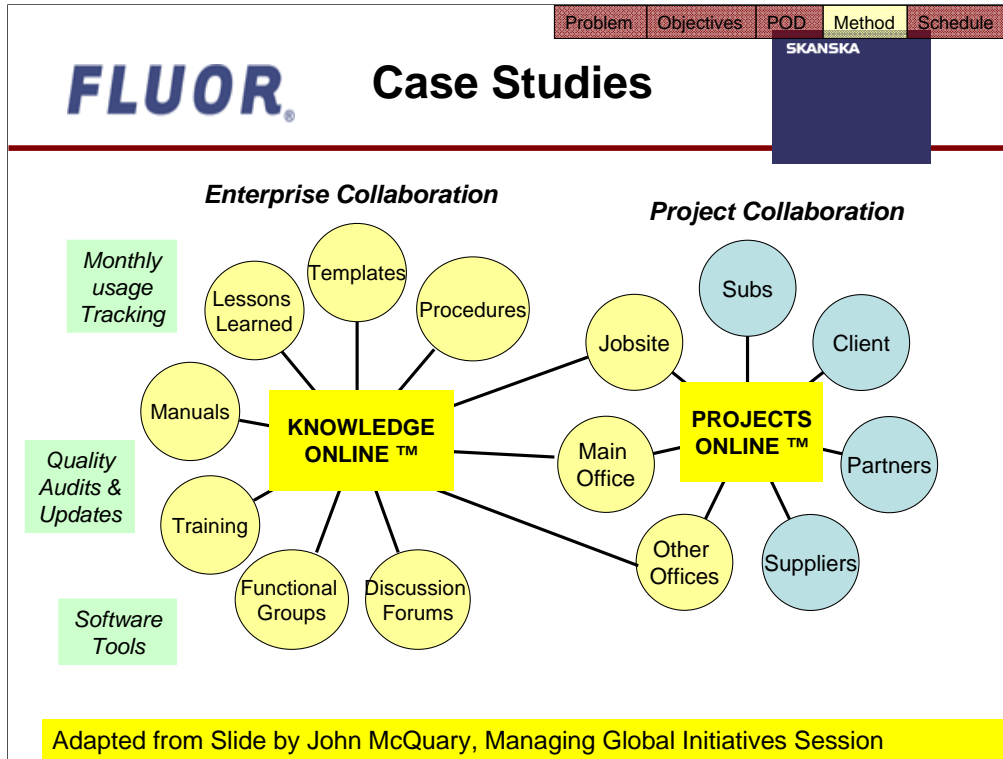
-Observe their differing levels of "embeddedness" within the local institution

- Developers: Varying levels of embeddedness: entire project life-cycle, engagement with locals, decentralized decisions but large investments working out of a local (but not on site office)
- Contractors commit teams and resources to a project full time throughout the construction of the project, reside at project location
- Project Consultants (Engineers): advisory capacity, multiple projects at once (from firms offices), carriers

• Theoretically, multiple companies of each type will help to replicate the findings and provide for literal replication.

• I also am seeking companies who have known differences in formal vs. informal procedures.

-Obtain at least 30% of their revenue from international work (based on ENR data): Global Projects are a Focus



Currently developing the list of companies participating and endorsing my work. Currently, all companies solicited have endorsed & agreed to provide access for my work:

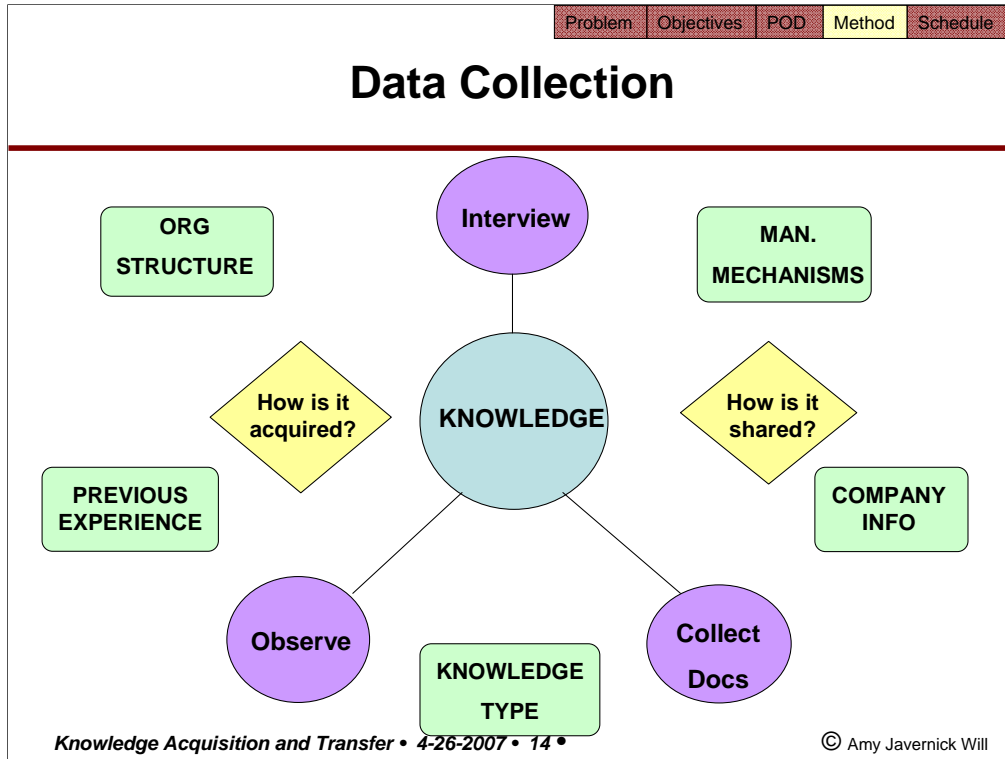
Fluor, Skanska, Hatch, Arup, Globeleq,

I'm seeking additional companies who meet the criteria, so please let me know!!

These companies are all global, have a diverse array of involvement in the project's lifecycle and have known differences in formal versus informal approaches.

For instance, Fluor is an extreme case of a well-known (and awarded!) knowledge management system. Through correspondence and attending a talk by John McQuarry, I learned of their extensive KM system that integrates collaboration on the project (Projects Online) within their overall organization system (Knowledge Online). They provide incentives for people to use and contribute to these systems through monthly usage tracking and attend to the knowledge through quality audits and updates. This formal online community has tracked successful knowledge sharing that has reduced time & money on projects.

In another instance, through a preliminary interview with Skanska, I learned that they primarily rely on social interface and networks. Respected members within the organization know of the various projects that are occurring and facilitate the links and connections among people to share this specific knowledge with each other. They use mentoring, meetings, connections, and awards (stealing innovations from other regions) to facilitate knowledge sharing.



Collect Data through:

interviews with key informants

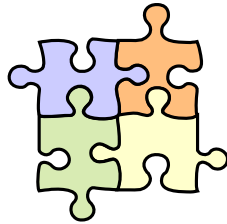
observations of collaboration and company

collection of *documents and secondary data*: Including Specific examples: including specific knowledge type, and the structure, incentives and format in place to allow for the sharing of this knowledge, company structure, experience

Attentive to:

Type of knowledge gained, managerial mechanisms, organizational structure, size of company, length of time and previous experience in foreign markets and the global realm.

Case Analysis



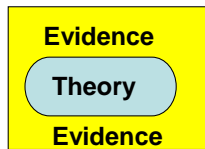
Comparative Case Studies

Qualitative Comparative Analysis
(Charles Ragin)

Causes → Knowledge Acquisition
Causes → Knowledge Sharing



Grounded Theory

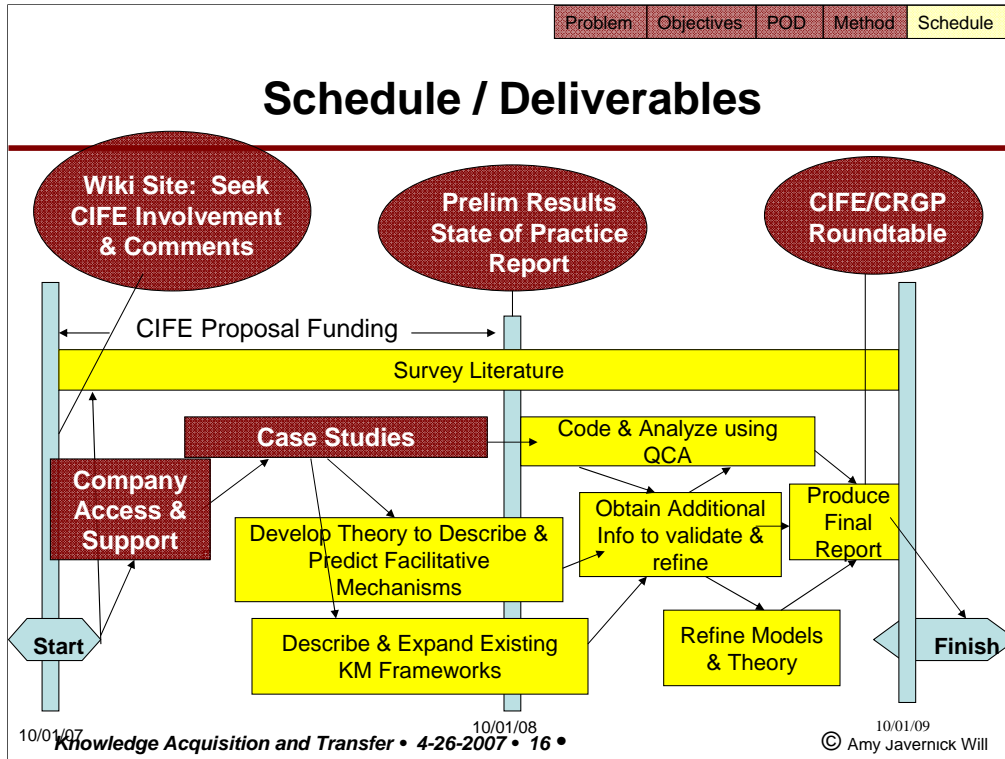


We will have limited but rich cases- traditional statistical analysis techniques such as regression or structured equation modeling are unlikely to yield useful insights.

Therefore, we plan to use Qualitative Comparative Analysis (QCA), a novel technique for analyzing qualitative case-based data by testing and discerning patterns using Boolean algebra to compare macro social phenomena. We believe that using QCA to analyze this set of cases can help to address and integrate many aspects of the cases to examine how the contextual pieces work together to produce specific outcomes (Ragin, 1987, 2000).

By coding the many elements of the specific examples of knowledge acquisition and transfer (or lack thereof) (i.e. type of knowledge, structure, incentives, etc.) we hope to identify causal conditions that facilitate or produce successful outcomes (**I**nsufficient by itself but a **N**ecessary component of causal combinations that are **U**nnecessary (because of multiple paths) but **S**ufficient to produce the outcome)

Creating Grounded Theory based on the validation of the results.



We are currently seeking CIFE funding for year one of the study, which will entail conducting the majority of the case studies and beginning to develop theory and expand existing org. learning & KM frameworks. We hope to seek CIFE involvement through the company access & support and involvement in case studies. Additionally, we plan to set up a Wiki site to receive feedback, advice and information to contribute to the research interactively. The deliverable at the end of Year 1 will be a “State of Practice” report synthesizing some of the found results that will be expanded on in year 2.

Questions? / Comments
