[Article title] Emergence of Common Tacit Knowledge in an International IT Project: A Case Study between Japan and Singapore

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Structured Abstract:

Purpose – *The study examines knowledge processes in an international IT outsourcing project between two countries when knowledge is transferred from one country to the other due to business situations. A theoretical model is presented regarding knowledge processes in international projects which explains emergence of international common understanding as one of the solutions for knowledge-related challenges in international projects.*

Design/methodology/approach – *The empirical study was conducted at the headquarters of a chemical company in Japan and its subsidiary in Singapore. The study employed a qualitative analysis method. Interviews were conducted in these companies and the results were analyzed according to grounded theory.*

Findings – *We propose ARC Model of Knowledge Management in International IT Outsourcing Projects, which is a new theoretical model of project knowledge management in international settings, with a view of localization into knowledge*

processes. International common understanding will emerge from an understanding of thinking of each locale that brings a project to a successful conclusion.

Research limitations/implications – *This research might be subject to limitations regarding the data and results. Data were collected from particular companies, thus reducing the ability to generalize the results. Further research is required to verify the model with an additional empirical study.*

Practical implications – *Project managers and other managers utilize the theoretical model as a base theory for the implementation of high quality localization that is managed by the locals themselves with common knowledge.*

Originality/value – *The study proposes the theoretical model with the empirical analysis of the international project, which synthesizes project knowledge management and cross-cultural knowledge management in a novel way and expands the role of knowledge management.*

Keywords: *International Project, IT Outsourcing, Localization, Knowledge Management, Cross-Cultural, Common Understanding*

Article Classification: *Research Paper*

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Running Heads:

Emergence of Common Tacit Knowledge in an International IT Project: A Case Study between Japan and Singapore

1 Introduction

The commercial use of the Internet caused a significant change in culture and business environments in the 1990s along with the process of globalization. This trend caused rapid societal changes in the 1990s, which was accelerated in the 2000s. Currently, knowledge management in cross-cultural projects is one of the key factors for achieving a competitive advantage. Therefore, cross-cultural projects are regarded as fields of knowledge creation and emergence. However, the management of knowledge-related factors has been reported to be difficult, especially when the projects are undertaken in cross-cultural settings, according to a report of the Japan Ministry of Internal Affairs and Communications (2007). To overcome this challenge, the study of project knowledge management in cross-cultural settings is necessary. The purpose of this paper is to present a theoretical model regarding knowledge processes in international outsourcing projects. To support the model, a concept that embraces project knowledge management from the perspective of cross-cultural settings is proposed to synthesize project knowledge management and cross-cultural knowledge management in a novel way.

2 Theoretical Background

In the following review of related literature, unexplored areas in present research on knowledge management for international projects are proposed. Each proposition is presented according to the results.

2.1 Knowledge management theories concerning international projects

The current definition of knowledge is "valuable systematized information such as experiences, values, and contextual information which lead to action" (Milton, 2005, 2-3). To this definition, Umemoto (2012) added wisdom, which is time-tested knowledge that has been proven effective (Figure 1). We adopt Umemoto's definition of knowledge in this paper.

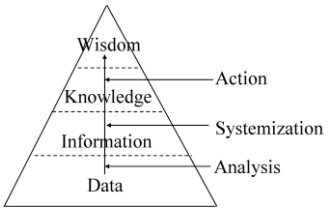

Figure 1: Episteme Pyramid
Source: Umemoto, 2012, p.276.

According to our review of knowledge management theories focusing on projects, two dominant categories of research were identified: factor- and process-related research. Factor-related research focuses on the nature of knowledge, i.e., tacit/explicit, and knowledge strategies were studied according to the nature of knowledge. Codification and personalization strategies were proposed by Hansen et al. (1999). Codification is a mechanical-centric process with a strong affinity for explicit knowledge. Personalization is an individual centric process with a strong affinity for tacit knowledge (Hansen et al., 1999). We analyze knowledge situations in our case study using these strategies. With regard to factor-related research on project knowledge management, tacit knowledge is acquired and shared in a project work context even though a project by definition is of a temporary nature (Koskinen et al., 2003).

Process-related research focuses on knowledge processes, such as knowledge creation, transfer, sharing, and reuse. The SECI model, which is an organizational knowledge creation theory (Nonaka and Takeuchi, 1995), is most frequently cited model in this area (Choo, 2012). When process-related research is applied to project knowledge management, the transfer or sharing of knowledge is the topic most discussed because of the transient features of projects whose ends are clear, according to the Project Management Body of Knowledge (http://www.pmi.org/).

Common knowledge is knowledge that everyone knows in an organization and is based on common experiences, common logic, and/or heuristics that are defined and agreed to within a community (Milton, 2005). He noted that common experiences are transferred among projects as tacit knowledge and finally become explicit knowledge when embedded in company policies or rules. He focused on the methods of knowledge transfer, not the knowledge processes. Common understanding in this paper means a kind of common knowledge that emphasizes a mutual understanding.

A definition of culture is "knowledge as kind of patterned way of thinking and behavior" (Li and Umemoto, 2013). We adopt Li and Umemoto's definition of cultures. According to this definition, cultures in international projects are regarded as knowledge, which includes project members' patterned thinking and behaviors as ways of doing work. Regarding the review of cross-cultural knowledge management, research that focuses on positioned knowledge management in international project management is scarce within the scope of studies reviewed herein. Holden (2002) noted the importance of tacit knowledge and stated that contextual knowledge sharing is an issue for knowledge management in a global company.

With regard to practical research, critical factors for knowledge management in projects were proposed by Hanisch et al. (2009) and Ajmal et al. (2010): both mention "culture" as one of the considerable factors of knowledge management in projects.

A boundary spanner or a transnational intermediary, who mediates in international projects, has been identified as critical for project success (Gopal and Gosain, 2009; Boden et al., 2010; Abbott et al., 2012). A boundary spanner provides knowledge bridges for practices, procedures, and methods and has the purpose of building trust within relationships (Abbott et al., 2012). In Japanese IT projects, a boundary spanner is called

the “Bridge SE,” which promotes cultural understanding in addition to business interactions (S-Open Offshoring Development Study Group, 2004). From the definition of culture as knowledge, a boundary spanner intermediates tacit knowledge. Boundary spanning is a personalization strategy. At a practical level, Abbott et al. (2012) analyzed the boundary spanner’s role and work processes. Gopal and Gosain (2009) proposed boundary spanning activities between the vendor and the clients that enable knowledge sharing, thus impacting on project performance. However, in the reviewed papers, processes involving the transfer of tacit knowledge in international project settings have not been explored. As a consequence, the following proposition arises:

> Proposition 1: In international project settings, both explicit and tacit knowledge are processed in each local setting and/or between local settings.

“Local” in this paper means one country or region, which is to distinguish it from international or global.

2.2 Knowledge management theories concerning virtual environments

One of the most important concepts regarding projects is *Ba*, which is a physical, virtual, and mental space where a context is shared between people (Nonaka et al., 2000; Umemoto, 2002). The mental space is a space of shared inter-subjectivity, which is a tacit prerequisite that every member in the *Ba* feels. From the meaning of *Ba*, we define an international interaction space as *Ba* where projects are implemented between the two countries.

Katzy et al. (2000) adopted both space and organizational perspectives to describe virtual situations. If the “affiliation dispersion of team members” is high and the “geographic dispersion of team members” is high, then the perspectives are called virtual. Katzy et al. regard the virtual situation as a place of opportunities and challenges. In contrast, processes of tacit knowledge in a virtual environment have not been discussed in the reviewed papers. Consequently, tacit knowledge processing in virtual settings in international projects is unexplored. As a consequence, the following proposition arises:

> Proposition 2: In virtual and international project settings, tacit knowledge is transferred.

2.3 Knowledge management theories concerning emergence

In terms of emergence, Mintzberg and Waters (1985) proposed emergent strategies when an implemented strategy was not un-intentional or different from the original. Such behavior, which is flexible and responsive, is important when an environment is too unstable or complex to comprehend. From that perspective, such un-intentional movements should be considered in international projects because of the uncertainty characteristics of the projects. Originally, emergence meant the appearance of a new

characteristic or value that exceeds the sum of its constituents. The meaning of emergence in this paper is similar to the definition proposed by Mintzberg and Waters: in this paper, knowledge emergence is used to express a knowledge behavior that appears un-intentionally. This emergent knowledge is held to be greater or different than the transferred knowledge. Ramaprasad and Prakash (2003) extended the concept of emergence to project management as "emergent project management"; however, it was not the same as the process of knowledge emergence.

We sometimes run into difficulties because of the uncertainty characteristics of international projects and/or geographically dispersed situations. We assume that in such complex situations, knowledge emergence might occur between locals with fewer interactions compared with a real situation in the same place. Here interactions between locals means, for example, interactions between a parent company in one location and a subsidiary in another location. In the reviewed papers, the processes of knowledge emergence in international project settings have not been explored. As a consequence, the following proposition arises:

> Proposition 3: In international project settings, a common understanding emerges between local settings.

To summarize, little research on knowledge processes in international projects has been conducted among the reviewed studies. The correlation between knowledge processes in international projects and project success as well as the uncertainty of the influence of culture on knowledge has not been explored. There is scarce research or models that present knowledge processes, including tacit knowledge, in international project settings. As a result, we propose project knowledge management from the perspective of cross-cultural settings.

3 Case Study

We conducted a case study as a research strategy for a Japanese chemical company (hereinafter referred to as Company *J*), which started its global expansion activities in the 1990s. Company *J* has 15 overseas locations, including Singapore. Company *J* started its overseas operations in Singapore in the 1980s just before its global expansion. In 2009, the company in Singapore became a subsidiary of Company *J* (hereinafter referred to as Company *S*). As a result, the headquarters in Tokyo started managing Company *S*, including the IT-related operations. Some parts of the IT department function of Company *S* were outsourced to Company *H*, which is an IT outsourcing company in Singapore. Company *J* began a project to create an IT managing scheme of Company *S* from the Tokyo headquarters in 2010. We selected the companies as a case study because Company *J* and Company *S* had issues of international interactions. We attributed the root cause to be tacit knowledge sharing. This case study contains observations made over the

course of a one-year consultation project during which data for the study were collected. Despite the limited number of participant interviews, their long-term experience and understanding of the project enabled sufficient detailed information to create a theoretical model.

3.1 Situation and issues

Company *S* uses IT systems for its operations. Most of its servers are located in Japan and managed by the Japan headquarters of Company *J*. Consequently, Singapore employees used the systems in Japan from Singapore, though some servers still remained in Singapore. In 2011, the IT policy of Company *J* was to control all servers under the Japan headquarters in Tokyo. An investigation of the IT systems of Company *S* had started and server consolidation in Japan was planned. This meant that the server administrators were in Company *J*, even though the users were in Company *S* in Singapore. There was an IT function in Company *S*, but it was outsourced to Company *H*; thus, Company *S* was only given limited authorization for IT operations. There was an assignee from Company *J* in Company *S*, but that person was in charge of business administration and not IT.

During the project, weekly meetings were held using live video conferencing equipment. People involved in the project in Company *J* and in Company *S* gathered together in Japan and in Singapore, respectively, and had a virtual live meeting. They also used email and telephones in conjunction. The conference facility was sophisticated. One year after starting the project was being gradually delayed. The IT manager and the members in Company *J* were concerned by the situation, but they were uncertain of the causes. Someone started to notice that the IT policy with which Tokyo controls everything did not always suit Company *S*. The discussion was started to delegate some part of the authorization of the IT operations to Singapore.

3.2 Research methods

A series of semi-structured interviews was conducted to detect issues and recommend improvements to Company *J*'s operations. The results were analyzed by MAXQDA, which is a qualitative data analysis application. The analysis method based on grounded theory is below (Satoh, 2008). Grounded theory is a qualitative analysis method used in the social sciences and developed by Glaser and Strauss (1967). The grounded theory steps are as follows:

i. Interviews were transcribed.
ii. Transcripts were segmented by codes. This is referred to as de-contextualization, which removes context and abstracts the characteristics. The segmented parts were separated from the original context. The segmented codes were categorized further into groups by characteristics.

iii. The segmented parts with codes or groups were re-contextualized according to a story based on correlation and chronological order. Then, a relation map between codes was created (Figure 2).

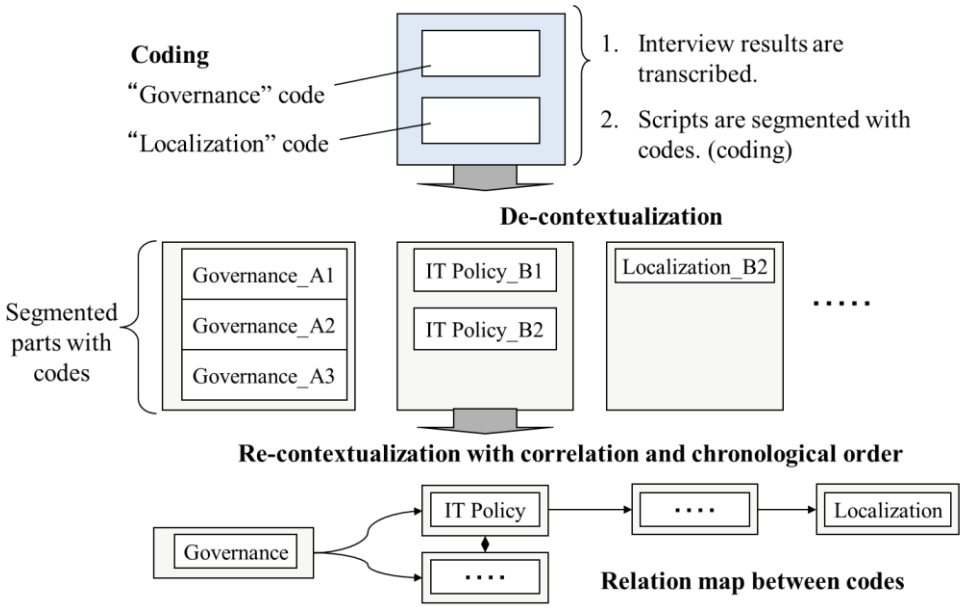

Figure 2. Analysis method
Source: Author-created schematic based on the description in Sato (2008).

3.3 Interviews

Five interviews were conducted in May, 2012 with the following:

- Manager in charge of the accounting system of Company *J* (Tokyo)
- Project Manager (PM) in the IT department in Company *J* (Tokyo)
- Systems Engineer (SE) in the IT department in Company *J* (Tokyo)
- General Manager (GM) in Company *S* (Singapore assignee from Company *J*)
- Systems Engineer (SE) in Company *H* (Singapore)

The interviewees were key members in a project that involved creating an IT managing scheme for Company *S*.

The Project Manager and the Manager of Company *J* were mid-level managers. The Systems Engineer in Company *J* was a member of the IT department in Tokyo. The General Manager was a top manager in Company *S*. The Systems Engineer in Company *H* was a member of the outsourced company in Singapore who was assigned for the IT work of Company *S*.

Before the interview, the objective was explained to the interviewees. The interviews formed the core dataset and field notes were taken to supplement the context of observations made during one year. The interviews lasted from 40 to 60 minutes and were conducted in person, except for the Systems Engineer in Company *H* and General Manager, whose interviews took place in a virtual setting using a live video conferencing system. The interviews were conducted in the first language of the interviewees and recorded and transcribed into text by the author. The following is the summary of each interview:

Summary of each interview

- Manager in Company *J*:
  He mentioned that if a personalized approach was followed such that the decision of a boundary spanner to transfer the implications of what Tokyo thinks was taken in Singapore, then the responsibility of the boundary spanner regarding governance would be important. Three patterns, listed below, were presented:
  - -Hiring a boundary spanner in Singapore (high cost, will work for Company *S* and not Tokyo, Tokyo's policy or implications might not be transferred correctly. He said "It's not a real boundary spanner.")
  - -Assigning someone in Singapore as a boundary spanner (low cost, if the person's work is limited to the IT-related job, so be it. But the person cannot understand what Tokyo thinks. The person doesn't share the implicit prerequisites with us. Tokyo's policy or implications might not be transferred. It is not the boundary spanner, rather a systems engineer who has a bridge mission. It does not solve the issues we have.)
  - -Sending an assignee from Tokyo (high cost, will work for Company *J*, and it is a real boundary spanner who transfers tacit knowledge or Tokyo's policy. It is good but expensive.)

- Project Manager (PM) in Company *J*:
  He said that a solution through a personalized approach (personalized strategy) costs a lot. He needed a codified and systematic scheme that did not depend on humans. For example, for a task that requires judgment such as access authorization work for server folders, a matrix of access authorizations and responsibilities of each work should be prepared to be done by anyone, regardless of the person's skill. He said that Tokyo members should prepare the coded documents for a systematic approach; however, he also mentioned that the creation of the matrix was difficult and took time, and it should be maintained timely manner. As a result, preparing and maintaining all documents for systematic approach (codification strategy) required one personnel, so the costs are the same as in the personalized approach.

- Systems Engineer (SE) in Company *J*:

He had been doing the actual server work of Company *S*. The servers of Company *S* were located in Japan. He felt that he covered all the requirements of Company *S*. He also thought that a codified approach using a scheme or tools to solve the issues was not complete, but that a personalized approach was better.
He said that:
"The support for Singapore users should be provided in Singapore by the members in Singapore who know the local situation better than Japan. In that case, outsourcing Company *H* cannot do the outsourced work, which now is an issue. Even though Company *H* knows the situation, it is difficult for them to support the work, which needs a judgment. So, the best thing is to assign a person who covers such work in Singapore. Company *H* is the other company, not Company *S*. The person should work for Company *S* and Company *J* and his tasks would include the judgment work, so an employee should be assigned to do such work."

He had frequently communicated with his counterpart Systems Engineer in Singapore via email, instant messaging, or phone, but not face-to-face. However, he understood the actual situations in both Singapore and Japan.

- General Manager (GM) in Company *S*:
He said that Tokyo did not completely understand the situation in Singapore. He mentioned that Company *S* was able to manage IT to some extent locally. He said that, "The servers are in Japan and maintained in Japan, but the applications in the servers are used by Singapore users. Even if Tokyo controls everything from Tokyo, it doesn't fit Singapore's situation. To solve the situation, Tokyo contacted Company *H* which is a local company. But Tokyo wanted to control at that time, so the contract was limited and the responsibility remained in Tokyo. However, Tokyo is accustomed to leave the all tasks to a vendor, which is common in Japan, but the contract doesn't support this. I, as a member in Company *J*, have to cover such undocumented tasks. It is very hard. Ideal solution is to create a systematic scheme that doesn't depend a lot on the person. Tokyo needs to understand the way of global work that once the person leaves a company, no skill or experiences remain. The labor turnover is high in Singapore. Or, Tokyo reconsiders the contract with Company *H* and outsources them all including server maintenance. Ultimately, I think Singapore should have servers in Singapore, but the business volume in Singapore doesn't permit it. I understand it is difficult in terms of cost. I need a person in Singapore who understands my thinking or users' requirements and negotiates with Tokyo."

- Systems Engineer (SE) in Company *H*:
He welcomed the fact that Company *J* gave them authorization to operate, but he thought that the job descriptions should be changed. Moreover, the member in Company *S* said that the IT Policy had to be determined by Tokyo. He said
"Not only we need to change the job descriptions but also need some authorization to operate for some work. We cannot do any new work without authorization. Moreover,

the IT policy has not been decided yet. The previous GM in Tokyo set the consolidate management from Tokyo. But currently, the policy is very wavering whether the consolidation or decentralization is required in Singapore. Before changing the job description, I think IT policy should be determined, otherwise the job description cannot be changed, and the decision must be determined by Tokyo. I understand what Tokyo's concerns are but they themselves are unable to come to a decision."

3.4 Analysis of interview results

According to the method described in Section 3.2, coded segments are extracted from the transcripts. Some samples are attached in the Appendix for reference. De-contextualization was perform by MAXQDA, a qualitative data analysis software.

During the de-contextualization process, eight codes are extracted, which are listed with detailed descriptions below (*Coding and De-contextualization*). Table I shows the de-contextualization results of the transcripts of the interviews. Table II shows the examples of the coded segments. De-contextualization results are categorized (Table III) and re-contextualized with relations between codes according to a story (*Re-contextualization and Relation Map*) to make a relation map with comments (Figure 3).

Coding and De-contextualization

The transcripts of the interview results are segmented by codes. Eight codes are extracted, which are listed with detailed descriptions below:

- Governance: Governance is the original requirements from as well as the issue of Company *J*. It was reported that the managing scheme of Company *J* did not fit the actual situation of Company *S*.
- Undecided IT Policy: The IT policy has not been firmly decided as to whether to implement the central control from Tokyo or the local control by Singapore.
- Ambiguity of responsibilities: Roles and responsibilities are not clearly defined for IT tasks. It is difficult to define all tasks with roles and responsibilities. (There might be tacit knowledge that cannot be explicitly written.)
- Requirements of Company *S*: Some part of the requirements of Company *S* was not acknowledged, especially the ones that were related to local business practices.
- Difference in context: Difference between Company *J* and Company *S*, and/or Company *J* and Company *H*, i.e., the approach for the tasks that are not explicitly described in the work description or the approach toward security or governance. The interviewees felt that one of the reasons for the issues was the difference of context between Company *J* and Company *S* and/or *H*. As the solution of the issues caused by a contextual difference, a boundary spanner or a framework is proposed.
- Boundary spanner: An intermediary person providing personalized solution for the requirements that are not clearly written in the work description.

- Framework: Codified solution for the requirements arising from contextual differences by defining tasks clearly.
- Localization: This is the ultimate goal to be achieved by a boundary spanner or a framework. In international projects, localization means that a local or a subsidiary manages themselves with the understanding of the strategies of a parent company.

All interviewees mentioned "undecided IT policy" and "ambiguity of responsibilities" as issues. Regarding the "difference in context," i.e., the difference in the sense of security was also mentioned, except by the SE in Company *H*. The results show that the SE in Company *H* did not notice the differences of context at that moment. Every interviewee in Company *J* expressed their thoughts or ideas on how to solve the situation. The SE in Company *J* and the Manager in Company *J* supported a personalized strategy by a boundary person, whereas the PM in Company *J* supported a codified strategy. The GM in Company *S* supported both. The supporters' expectations for the boundary person differed. The SE in Company *J* and GM in Company *S* both expected "a liaison" role between Singapore and Japan, whereas the Manager in Company *J* presented the patterns of styles of a boundary person. It is interesting that the results of the Systems Engineer in Company *J* and the General Manager in Company *S* are almost the same. The former had worked for Company *S* and understood the actual situation. He had not visited Company *S*, but he knew the situation through frequent interactions via email, telephone, and video conferencing, and sometimes via instant messaging. The other people in Company *J* communicated through formal interactions, only using the video set. In this situation, it can be said that the SE in Company *J* and the GM in Company *S* expressed Company *S*'s requirements.

Table I. De-contextualization Results of Interview Transcripts

Codes	Manager in Company *J*	PM in Company *J*	SE in Company *J*	GM in Company *S*	SE in Company *H*
Governance	✔	✔			
Undecided IT policy	✔	✔	✔	✔	✔
Ambiguity of responsibilities	✔	✔	✔	✔	✔
Requirements of Company *S*			✔	✔	
Difference in context	✔	✔	✔	✔	
Boundary spanner	✔		✔	✔	
Framework		✔		✔	
Localization	✔		✔	✔	

Legend: the checkmark indicates that the associated person mentions the codes.

Table II. Examples of Coded Segments

	Manager in Company *J*	**PM in Company *J***	**SE in Company *J***	**GM in Company *S***	**SE in Company *H***
Governance	Governance was an issue when we examine Singapore IT two years ago, so we started to control from Tokyo.	Governance is required in the current situation.	N/A	N/A	N/A
Undecided IT policy	One of the reasons of "Undecided IT policy" is drastic change in business situation.	Users' requirements and Tokyo's requirements don't match.	Everyone thinks different things.	IT policy doesn't match the real situations in Singapore.	Currently, the policy is very wavering whether the consolidation or decentralization in Singapore.
Ambiguity of responsibilities	Responsibilities between Company *J* and *H* are not clear.	It should be covered systematically	One person who has responsibility for Singapore support should be assigned.	I am now doing the tasks fallen down the gap.	We work according to the job descriptions.
Requirements of Company *S*	N/A	N/A	Current organizational scheme is not enough to meet Singapore requirement.	Requirements of Singapore are accepted, but it is not covered organizationally.	N/A
Difference in context	Implicit requirements cannot be accepted in Singapore.	Tasks fallen down the gap are covered by Japanese assignees.	Tasks fallen down the gap are covered by Japanese assignees.	Without job description, it won't work in Singapore.	N/A
Boundary spanner	I want boundary spanner to control the local.	N/A	Tasks fallen down the gap should be covered by one person.	I need a person who can do anything.	N/A
Framework	N/A	Management framework as a tool is necessary.	N/A	In outsourcing, routines are necessary.	N/A
Localization	We have to manage even If localization is promoted.	N/A	One idea is that servers move to Singapore from Tokyo.	I support localization.	N/A

As a result, "governance" was Company *J*'s requirement as well as an issue, whereas Company *S* listed its "requirements" as an issue. "Undecided IT Policy" and "ambiguity of

responsibilities" were issues for both, and "difference in context" was a background reason or a root cause of the issues because "tolerance for ambiguity" (Frenkel-Brunswik, 1949) is a Japanese cultural characteristic. "Boundary spanner" and "framework" were raised as solutions for the issues, but they were actually the solutions for the root cause. "Localization" was the final goal.

Table III uses characteristics highlighted in interviews for further categorization of the codes into three groups: issues, root cause, and solutions. This altered perspective allows researchers to uncover relationships between the highlighted aspects of the project challenges and how they may be dealt with.

Table III. Categorization Results

Factors	Groups and Characteristics
Governance	Issue
Undecided IT policy	Issue
Ambiguity of responsibilities	Issue
Requirements of Company *S*	Issue
Difference in context	Root cause of the issues or influencer of the issues. Company *J*, Company *S* and Company *H* each *have* different knowledge.
Boundary Spanner	Solution of the root cause (personalized strategy how to mitigate the difference in context).
Framework	Solution of the root cause (codified strategy how to mitigate the difference in context).
Localization	Organizational scheme as a final goal. Kinds of solutions.

Re-contextualization and relation mapping

The de-contextualized groups are re-contextualized with correlations and in chronological order and, using the findings from the de-contextualization process, with relations between codes according to a story. Figure 3 is the relation map with comments that shows how this analysis helps generate a story of the interactions between the coded aspects and the impacts these interactions have.

According to the relation map, the issues are based on business, business culture, or operations that contain local tacit knowledge. Therefore, it includes tacit knowledge or knowledge including a tacit component as an important factor. Different perspectives of tacit knowledge by parties in different locations create issues through misunderstanding of context; therefore, an international common understanding is required. For example, for the interviewees, the ways of thinking are different between Japan and Singapore. This means that the value and the importance of value are different between members in Japan and Singapore.

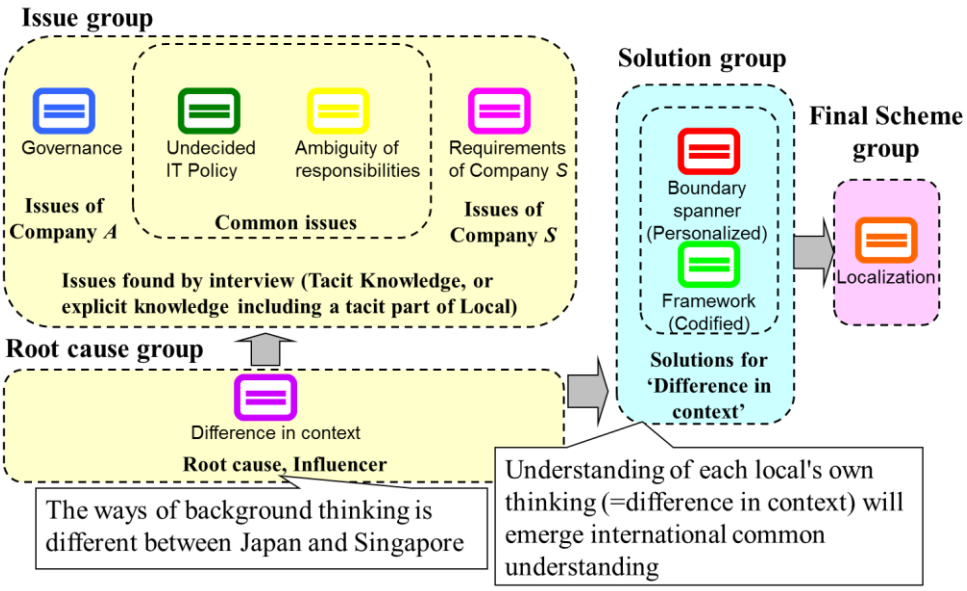

Figure 3. Relation map among codes

One example of different thinking relates to the scope of individuals' job descriptions. Singapore, employees work according to their job descriptions; however, there is a lot of work done that is not explicitly written in the job descriptions. Setup tasks for access authorizations are one example of such "tasks fallen down the gap." Company *H* has to set access authorizations for server folders. Company *H* needs a member list to set up the access authorizations, which contains each member's access permission level. A manager in Company *S* (who is an assignee from Company *J* and a Japanese) prepares the list; however, he does not know the criteria for making his decision as to whom and how access to folders should be given because he handles general affairs and not IT. In Japan, if such a case occurs, a vendor like Company *H* might prepare these criteria for the manager spontaneously. In Japan, such out-of-scope work is taken for granted by many people, and the requirement for such tasks is understood tacitly among customers and vendors. However, this is not the way of doing work in Singapore. This is one of many such differences that require careful consideration of assumptions in cross-cultural contexts.

From the definition of culture, "knowledge as kind of patterned way of thinking and behavior" (Li and Umemoto, 2013), the difference of context is cultural in nature. In this case study, common issues, such as cultural differences, had been recognized by Companies *J*, *S*, and *H*; however, they failed to notice the root cause: "difference in context." Members raised their ideas of solutions to mitigate these differences and, in doing so, tacitly noticed that once the "difference in context" was understood, the issues

were resolved. To understand the "difference in context" means to understand each local's own thinking, including tacit knowledge, which prefaces their ways of doing business, i.e., "culture." International common understanding implies recognizing and understanding the differences of others. "Recognize" means to understand and internalize in his/her mind without any written documents and, finally, with written documents, according to the definition of common knowledge (Milton, 2005). Consequently, members implicitly noticed that once the international common understanding was created and shared, the issues might be resolved. This means an international common understanding gradually emerged. The person who has an international common understanding can understand the reasons for a different opinion or behavior from a counterpart person working in a different context.

3.5 Findings

The findings from the analyzed results are listed below and provide evidence of the knowledge processes in international IT projects between two countries.

- Each local setting has its own tacit knowledge.
  - In the case study, there are several differences of assumptions in the ways of doing work. Such assumptions are regarded as tacit knowledge.
  - Each local has its culture. The definition of culture, "knowledge as kind of patterned way of thinking and behavior," (Li and Umemoto, 2013) shows that each local has its own explicit/tacit knowledge as culture. This means each local setting has its own tacit knowledge.

- A local's tacit knowledge is not sometimes acknowledged by the other local.
  - The example of "difference in context" in the previous sub-section is evidence for the above finding.
  - The de-contextualization result in Table I shows that the SE in Company *H* did not notice the differences of context, which were acknowledged by the Japanese.

- An international common understanding will emerge from understanding the thinking of each local and/or value, which might bring the project to a successful conclusion.
  - The situation described in the previous sub-section shows that the members gradually understood and recognized other's thinking and culture. They eventually understood the extent of the other's needs.

In addition, the findings related to the interview results are listed below:

- Personnel in the field sometimes know the actual situation better than others.

- Even in virtual settings, the frequency of interactions, including informal transactions, help in understanding tacit knowledge.
    - The interview results and those listed in Table I support the above findings. The SE in Company *J* who directly worked for Company *S* knew the situation well through his job through frequent interactions via email and other virtual tools. Only the SE in Company *J* and GM in Company *S* expressed Company *S*'s requirements.

Table IV shows the knowledge situations of the project that were found from the analysis results and observations over the course of one year. Companies *J* and *S* share explicit knowledge through documentation, like ordinary companies; however, this suggests that even though explicit knowledge is shared between local settings, the tacit knowledge belonging to each local setting remains. In the project situation at the end of 2012, an international common understanding was gradually being developed but was not yet firmly established. It can be estimated that once an international common understanding emerges, the issues might be resolved.

The project is categorized into three phases. Phase 1 is the "analysis phase," when issues are detected and analyzed. In the Phase 1, each local has their own knowledge; however, the project is not completely organized. In this phase, issues and situations are analyzed through members' experiences. Phase 2 is the "realization phase," when knowledge strategies are applied to clarify issues and recommendations are offered to resolve the issues. Phase 3 is the "creation phase." A common understanding emerges from understanding the thinking of each local and/or value as a result of the application of the strategies. The international common understanding is internalized in each local and synthesized with local knowledge. A new local knowledge might emerge by leveraging shared knowledge, and the process of localization begins. We define "localization" in this paper when a local has the freedom of discretion with an understanding of the central strategy.

These findings were fed back to the project to explain the situations that had occurred. The managers and the members of the project noticed the importance of a common understanding and localization; the IT policy was subsequently changed to delegate a portion of IT authorization to Company *S* in 2013 to promote local management by Singapore. Finally, Company *J* adopted a personalized strategy and assigned an overseas representative from Company *J* to Company *S*. One of the reasons for adopting a personalized strategy was that Company *J* wanted to transfer its company's policy and/or its way of doing business, which was hardly explicitly documented. Company *J* needed to internalize (i.e., tacit understanding) common understanding. The result shows that an international common understanding is the ideal situation and that this Company *J* aims to achieve.

Table IV. Knowledge Situations

Factors	Details Regarding Knowledge	Situations	Phases
Governance	Tacit knowledge, or explicit knowledge, including a tacit part of local	Existing as an issue in Company *J*	Phase 1: Analysis Phase (issues are analyzed)
Undecided IT policy	Tacit knowledge, or explicit knowledge, including a tacit part of international	Existing as an issue in Companies *J* and *S*	
Ambiguity of responsibilities	Tacit knowledge, or explicit knowledge, including a tacit part of international	Existing as an issue in Companies *J* and *S*	
Requirements of Company *S*	Tacit knowledge, or explicit knowledge, including a tacit part of local	Existing as an issue in Company *S*	
Difference in context	Deep tacit knowledge	Existing as a root cause of the issues in Companies *J* and *S*	
Boundary Spanner	Personalized strategy with a strong affinity for tacit knowledge (Hansen et al., 1999)	Proposed as a solution for differences in context	Phase 2: Realization Phase (knowledge strategies are applied)
Framework	Codified strategy with a strong affinity for explicit knowledge (Hansen et al., 1999)	Proposed as a solution for differences in context (though this is a strategy for explicit knowledge, in general)	
Localization	Final scheme where an international common understanding is internalized in each local	This is a final goal. Once the difference in context is shared and understood, this scheme would be achieved	Phase 3: Creation Phase (international common understanding is localized)

4 Discussion

A discussion of each proposition is presented below and these are combined to form the basis of the ARC model, shown in Figure 4. This is a new theoretical model of knowledge management for international IT outsourcing projects, with a view toward localization of the knowledge processes. This model is to be explained later.

Proposition 1 stated “In international project settings, both explicit and tacit knowledge are processed in each local setting and/or between local settings.” Our findings indicate that in international project settings, even though explicit knowledge is shared between each local setting, tacit knowledge is processed in each local setting and can be transferred from one local setting to another.

Proposition 2 stated "In virtual and international project settings, tacit knowledge is transferred." Our findings indicate that frequent informal or formal interactions via telephone, email, or through video conferencing help transfer tacit knowledge even in virtual settings. The frequent interactions support understanding.

Proposition 3 stated "In international project settings, a common understanding emerges between local settings." Our findings indicate that other locals' tacit knowledge can be internalized and localized. "Localization" means that a local has the freedom of discretion with an understanding of the central strategy. Once tacit knowledge is shared between local settings and an international common understanding emerges through interactions, knowledge processes will engage in a virtuous cycle. As a result, localization starts with leveraging shared knowledge on the subsidiary's local side.

International common understanding encourages localization within the globalization process. A parent company can manage the local with small workload, and the local can receive and internalize knowledge. This is a win−win scheme. As a result, local knowledge might be generated further in the local setting; however, the processes of emergence are not precisely detected in this case study. Therefore, further empirical study is needed for this proposition to be completely tested.

A theoretical model of knowledge management in international IT outsourcing projects from cross-cultural perspectives is shown below: We named the theoretical model the "ARC Model" of knowledge management in international IT outsourcing projects. "ARC" stands for "*Analysis*, *Realization,* and *Creation.*" In this model, the ordinate is the degree of localization and the abscissa is the international common understanding. The ovals indicate the phases of these knowledge processes. The arc back shows the level of control from a central source.

Phase 1: Analysis

This is the early stage of knowledge transfer from a parent company to a local. Each local or subsidiary is independent with low central control. The parent company's strategy or thinking has not been shared. In this phase, common understanding is low and the local does not have discretionary authority, which is granted by the parent. The situation in the local is analyzed to understand the issues and plan appropriate solutions that will be implemented in the next phase.

Phase 2: Realization

Knowledge has been transferred from one local to the other using knowledge strategies. A parent company's strategy or thinking and/or differences between locals have been gradually shared and clarified. In this phase, freedom of discretion in a subsidiary is low with a strong control from the parent company. Solutions for the issues are provided in this phase.

Phase 3: Creation

Knowledge with experience becomes the solutions, which are gradually internalized in the local. The local is independent with an understanding of the parent company's strategy and/or value. In this phase, the subsidiary has responsibilities and freedom of discretion and an international common understanding emerges.

In Phases 1 and 3, the control level is low; however, the quality of control is different. In Phase 1, the quality of control is low with little common understanding of the strategy of the parent company. In Phase 3, the quality of control is high through common understanding even though the control level is low as the value and strategy of the parent company is internalized by the local. This process repeats many times during each project or in an organization. Project managers and/or managers can utilize the model to make decisions on how and when they should implement their strategies to achieve high quality localization.

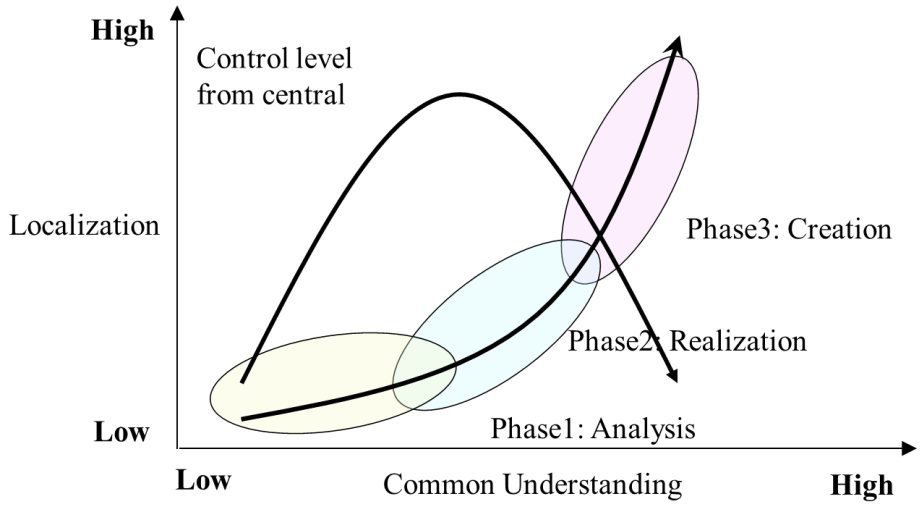

Figure 4. ARC Model of knowledge management in international IT outsourcing projects

5 Conclusions

In this paper, a literature review was presented to describe unexplored areas in knowledge management and to present propositions. From the results of the review, a novel concept−project knowledge management from the perspective of cross-cultural settings−is proposed. Findings from a case study were presented, describing the situation and issues that arise in knowledge processes in international project settings. From these

findings, the ARC model of knowledge management in international IT outsourcing projects was proposed. As an academic contribution, we found that if a common understanding emerges, then localization is promoted. We also found that even in virtual settings, tacit knowledge is transferred. In addition, the research synthesizes project knowledge management and cross-cultural knowledge management and expands the role of knowledge management into international project settings. As a practical contribution, the theoretical implications and the theoretical model contribute to international projects in actual businesses to promote localization. Project managers and/or managers can utilize the theoretical model as a basis for implementing high quality localization, managed by the local workforce by relying on a common understanding. Project managers and/or managers can utilize the model for what, when, and how they plan their strategies or manage their projects. The model is particularly effective for creating a plan and/or a framework to emphasize the importance of a common understanding of differences and values.

Appendix

Interview Questions:

- What kinds of issues exist in terms of IT related things in the Singapore subsidiary?
- Do you think the requirements from the users in the Singapore subsidiary are satisfied? If not, what is the reason(s)? Do you think the current organizational formation and/or personnel appropriate?
- Do you have any suggestion if the organizational formation is transformed?
- Do you think Company *H*'s formation is sufficient to support users in the Singapore subsidiary?
- Do you think the job descriptions for Company *H* are appropriate?
- What kind of IT work has occurred that is not covered by the job descriptions?
- Have you experienced difficulties regarding communication with Singapore members?
- If so, what do you think is the reason? For example, virtual environment, differences in ways of thinking, cultural differences, etc.
- Can you understand the requirements of Singapore users?
- (For Singapore members) Do you have any requests for Tokyo to clarify?
- (For Singapore members) Can you understand Tokyo's requirements?
- Do you think we can promote localization? To do that, what is necessary?
- What do you think are the success factors for localization?

Samples of the coded segments:

Some samples of the coded segments are shown below (underlined): ("K" stands for an initial of the interviewee's first name.) All of the transcripts were coded for de-contextualization according to the method shown here.

Interviewees: Manager in Company *J*: Boundary Spanner (underlined)

K: There are some options to handle tacit tasks which responsibilities are uncertain: one method is an intermediary option who can translate the ambiguous meaning….

Interviewees: Manager in Company *J*: Localization (underlined)

K: This is the first IT outsourcing for us, and we think the type of business scheme like this might be increased when we expand our business in overseas. We are thinking to promote the localization. Japanese managements have been assigned from Japan, but from now on, we'd like to hire local managers to manage themselves. Assignees from Japan will go back to Japan when the assignment period ends.

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