Impact Of Multiple Normative Systems On Organization Performance Of International Joint Ventures

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Abstract*

Research on international joint ventures (IJV) reveals difficulties in managing cross-cultural teams. Our research aims to understand how cultural differences between Japanese and American firms in IJV projects effect team performance through computational experimentation. We focus on and characterize culturally-driven normative systems as a central role of cultural differences, composed of two dimensions: *cultural values* and *cultural practices*. *Cultural values* refer to workers' preferences in making task execution and coordination decisions. These preferences drive specific micro-level behavior patterns for individual workers. *Cultural practices* refer to workers' perceptions and expectations to include norms adopting each culture's typical organization style, such as centralization of authority, formalization of communication, and depth of organizational hierarchy. Our ethnographic observations have documented distinctive micro-level *behavior patterns* and *organization styles* for Japanese and American teams. We use a computational experimental design that sets *task complexity* at four levels and *team experience* independently at three levels, yielding twelve organizational contexts. We then simulate the four possible combinations of US *vs.* Japanese team *individual behavior* and *organization style* in each context to predict *work volume, cost, schedule,* and *project quality* outcomes. Simulation results predict that: 1) both Japanese and American teams show better performance across all contexts when each works with its typical organization style, suggesting positive correlation between two normative components (*cultural values* and *cultural practices*) on team performance; 2) the Japanese organization style performs better in the case of high task complexity, while the American organization style performs better in the cases of low and medium task complexities, implying that the impact of normative systems is contingent upon task complexity; and 3) the Japanese organization style tends to have significantly lower project quality (system integration) risks than the American organization style. In addition, *cultural practices* (typical organization styles) have a larger impact on project performance than *cultural values* (culturally driven behavior patterns). Our simulation results are qualitatively consistent with both organizational and cultural contingency theory, and with limited observations of US-Japanese IJV project teams.

1. Introduction

In an era of globalization, as economic borders between countries come down, cultural barriers will most likely appeare and present new challenges and opportunities in business (House et al, 2004). Projects in the construction industry face unique challenges in coordinating among sponsors, financiers, developers, designers and contractors from different countries. The project participants work for companies with varying corporate cultures and management styles. Their companies' headquarters are located in the different countries so that project teams need to overcome a variety of languages, business customs, and cultures. In addition, project products are mostly one-of-a-kind and largely handcrafted as the inherent nature of construction industry. Therefore, in order to building facilities, project teams generally need to cope with various pressures such as short project duration, strict budget, local institutions, and physical environments.

Research on international joint-venture (IJV) projects reveals significant difficulties in managing cross-cultural teams. According to one study, two out of every five IJV project teams struggle through their projects and show poor performance (Beamish and Delios, 1997). One key problem is the increased internal complexity caused by pre-existing differences among IJV team members in cultural values, beliefs, norms, and work practices. In particular, normative

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systems including both values and norms (Scott, 2001) can define appropriate behaviors and legitimate processes, playing a central role in cultural differences between subgroups composing of an IJV project team. In other words, IJV projects can be viewed as a place where different normative systems bump into together, giving us a great opportunity to observe cross-cultural effects on team performance.

In order to lead a project successfully, project managers need not only to comprehend the differences in normative systems among their partners, but also to understand the influence of these differences on team performance. This research attempts to characterize differing normative systems that emerge in IJV teams, and to model and analyze effects of normative systems on team performance through computational "virtual" experimentation.

In this research, we focus on two cultures—Japanese and American—as an example of the minimum dyadic unit of cultural and institutional interaction in global construction projects. We expect that we can generalize our findings which will be applicable to other cultures. Many researchers have characterized distinguishing differences between Japanese and American cultures in business situations (e.g., Nakane, 1970; Ouchi, 1981; Aoki, 1992). Their findings help in understanding the internal consistency of Japanese *vs.* American social and organizational principles and their differences from one another. However, very few cross-cultural studies have focused on the construction industry, even though the international construction market alone is worth $106.5 billion (June 2001 issues of Engineering News Record (ENR) magazine).

We begin by defining culture. Generally, culture can be defined as a set of shared experiences, understandings, and meanings among members of a group, an organization, a community, or a nation (e.g., Redfield, 1948; Davis, 1984; Schein, 1989; Hofstede, 1991). Through sharing common successes and struggles, groups create their own unique cultures, leading to the development of unique sets of values—i.e., broad tendencies to prefer certain states of affairs over others—and practices (norms)—i.e., conceptions of appropriate business practices to include legitimate means and processes-. Both *cultural values* and *cultural practices* have been elaborated and fostered as culturally-driven normative systems of a social or a group for years, playing a central role of cultural differences in IJV projects. Therefore, this research views cultural differences from two dimensions: *value differences* and *practice differences* (Hofstede, 1991; House et al, 2004). Hofstede (1991) originally describes national culture in terms of both values and practices. Although our focus of this research is on project organizations rather than national culture, the dimensions of value and practices provide a good starting point for us to study culture and cultural differences in project teams. Our work extends Hofstede's definitions to cover project organizations.

Computer simulation is growing in popularity as a research method for organizational researchers (Dooley, 2002). Multi-agent based models, such as the Virtual Design Team (VDT) (Levitt et al, 1994; Jin and Levitt 1996), can provide a laboratory to address "what-if" questions about project team performance and organization design (Burton, 2003). The VDT model was not originally intended to capture cultural factors, but its rich characterization of both organizational and actor behaviors provide some capability to model cultural phenomena. The long term goal of this research is to extend the representation and reasoning of the extant VDT model to capture the impact of cultural differences in global construction projects. As the first step toward this goal, the current research explores the extent to which the VDT model can be used to model cultural influences on project team performance.

In this research, we take the following steps to analyze how culture impacts on project team performance. First, we characterize the typical normative systems of Japanese teams and American teams in terms of their value differences and practice differences, based on literature and our observations. Second, we encode selected cultural factors into the micro-level behavior and organizational parameters of the VDT model. Third, we analyze the effects of value and practice changes on team performance through "Intellective Simulation" using idealized organizations (Burton & Obel, 1995). Finally, the simulated results are qualitatively compared with "Cultural Contingency" propositions for the "preferred coordination mechanism[1]" (Hofstede, 1991; Lincoln and Kalleberg, 1990).

2. Culturally-Driven Normative Systems

In this research, values and practices are viewed as the basic building blocks of culture (Hofstede, 1991; House et al, 2004), hence, culturally-driven normative systems. This research characterizes culturally-driven normative systems of Japanese and American teams along value-practice dimensions through observations and literature survey. Specifically, we conducted four case studies using the ethnographic approach (Spradley, 1979) between April and August 2003. All four projects were joint-venture projects between Japanese and American firms located near the San Francisco Bay Area. Thus, we had a good control over the broader legal and political regulative institutional context (Scott, 2001).

Cultural Values: Hofstede (1991) defines values as conceptions of the preferences and feelings in certain states of affairs with an arrow to a plus or a minus side. Cultural values can be seen as the driver of preferred or desirable behaviors, when participants make decisions or coordinate with each other. We call the behavior, "micro-level behavior" (Jin and Levitt, 1996), which can be observed by focusing on how participants make decisions and communicate with others. Therefore, this

[1] His proposition implies that members of a given cultural group will show better performance when working within their preferred organization structure.

research extends the term "*cultural values*" to refer to the preferences people use to make work-related and communication-related decisions in projects. For instance, based on our observations, Japanese workers tend to seek consensus before making decisions, while Americans prefer to decide independently. We observed that Japanese and American workers have distinctly different patterns of micro-level behavior. These observations are consistent with existing literature (Nakane 1970). In addition, *value differences* are linked to national culture (Hofstede, 1991). Hofstede's work[2] provides a useful set of dimensions against which value differences can be measured. For instance, the *individualism-vs.-collectivism* index Hofstede proposes can explain why Japanese people tend to seek consensus among team members, since Japanese workers are high on the Collectivism scale. In collectivist countries, "harmony should always be maintained and direct confrontations avoided" (Hofstede, 1991, p.49-78). Based on our observations, harmony and trust among group members are key aspects of Japanese workplace culture, and can be seen in many different activities, including meetings and contracts. Thus, lower individualism, high collectivism countries like Japan tend to have group-based decision-making.

Cultural Practices: Scott (2001) asserts that norms specify conceptions of appropriate business practices to define legitimate means and processes to pursue valued ends. Thus, this research extends the meaning of "*cultural practices*" to include norms that regularize specific project management styles and organization structures. Based on observations, *practice differences* at the project team level are characterized by three organizational elements: the level of centralization of authority, the level of formalization of communication, and the depth of the organizational hierarchy. Different cultures in different countries tend to set these organizational elements differently, because different norms prescribe different reasoning and legitimacy for each of these organizational elements. Our ethnographies found that Japanese project teams tend to have multiple levels of hierarchy and to be more centralized, while American firms usually adopt a flat organization hierarchy and decentralized authority. These observations are consistent with existing literature (Lincoln & Kalleberg, 1990) (see Table 1).

Table 1 summarizes the two culture dimensions (*cultural value* and *cultural practice*), their attributes, and the values of these attributes for Japanese and American cultures. At project level, each nation has its own sets of micro-level behavior and organizational style, comprising culturally driven normative systems.

Table 1: **Summary of Culturally Driven Normative Systems**

Cultural values	**Culture A (American)**	**Culture J (Japanese)**
Decision making	Individual decision making	Consensual decision making
Communication	Individually-based	Group-based

Cultural practices	**Culture A (American)**	**Culture J (Japanese)**
Centralization	Decentralized authority	Centralized authority
Formalization	Medium level of formalization	High level of formalization
Organizational hierarchy	Flat level of hierarchy	Multiple levels of hierarchy

3. Computational Simulation Model

The heterogeneous normative multi-agent simulation model of this research is developed based on the Virtual Design Team (VDT) model. The VDT[3] model is adopted as a virtual organization laboratory for three reasons: 1) the VDT model was built to design project organizations, the same unit of analysis as this research, 2) the large numbers of organizational and individual level behavioral parameters available in the VDT model can potentially represent culturally-driven normative systems with some fidelity, and 3) the VDT model has been validated by many previous researchers (e.g., Thomsen et al, 1999). Furthermore, the VDT model fulfills the three key criteria for being used as a "theorem prover" (Burton & Obel, 1995) - reality, content, and structure - to examine hypotheses. Therefore, this research uses the VDT model to analyze the effects of organizational and individual normative differences.

The VDT model (Jin and Levitt, 1996) succeeded in extending the information processing view (March and Simon, 1958; Galbraith, 1973, 1977) by measuring the fit between information processing capacity and information processing demand at the level of an individual actor, called a "neo-information processing view" (Burton and Obel, 2004). In this view, this research encodes stochastic patterns of individual actors' behaviors in decision making and communication driven by differing *cultural values*, based on observations and a literature survey. In other words, we set heterogeneous types of agents in the VDT model. Similarly, this research models organization structures and stochastic decision-distribution patterns driven by differing *cultural practices*. In addition, task complexity and team experience are set as idealized context variables. We assume two independent variables reflect the effects of changes in values and practices: *micro-level behavior of*

[2] Hofstede proposed using four dimensions to describe cultural differences among 53 countries including Japan and the United States: 1) power distance, 2) individualism vs. collectivism, 3) masculinity vs. femininity, 4) uncertainty avoidance, and 5) long term orientation vs. short term orientation.

[3] We use SimVision®, educational version 3.11.1, which was developed by Vité Corporation and is licensed from ePM, LLC, Austin Texas. Please see the website for more information: < http://www.epm.cc/ >

actors (cultural values), *organization style* (cultural practices), over the full range of our context variables of *task complexity*, and *team experience* (Figure 1).

- The *micro-level behavior* of actors is related to their *cultural values*, and refers to actors' decisions about how to handle exceptions and how to communicate with others. Since *cultural val*ues form the basis of how people behave and how they make decisions, *cultural values* are linked to micro-level behavior in the VDT model. We assume that the American behavior pattern is the same as the original set of micro-behavior parameters in the VDT model, because the VDT model was developed and calibrated in American firms (Christensen, 1993; Thomsen, 1999). We create a Japanese behavior pattern by manipulating two sets of micro-behavior parameters that are related to decision-making and communication behaviors respectively, based on our observations and the extant literature (Hofstede, 1991; Lincoln and Kalleberg, 1990; Aoki, 1992). We set two types of micro-behavior patterns to represent Japanese and American styles (Figure 1-1)
- *Organization style*, which is linked to *cultural practices,* refers to the organizational parameters within the VDT model that determine the exception handling paths and authority levels of decision makers. Since cultural norms within an organization specify appropriate and legitimate means and processes (Scott, 2001) that enable the organization to conduct a project, *cultural practices* are linked to an organization's structure style. Specifically, we set three organizational parameters based on our observations: the centralization level, formalization level, and depth of organizational hierarchy. This set of three organizational parameters represents each nation's typical organization style. For instance, the American organization style is set to a low level of centralization (i.e., more decentralized), a medium level of formalization, and includes direct supervision links between the project manager and subordinates. In our analysis, we set two types of typical organization styles to represent the Japanese and American styles (see Figure 1-2).
- In building a model that predicts project performance, we consider one aspect of contingency theory (Galbraith, 1977; Thompson, 1967) to define context: *task complexity*. We examine four different levels of task interdependencies: pooled, sequential, reciprocal, and intensive workflows (Thompson, 1967; Bells and Kozlowski, 2002). These dependencies represent a scale of task complexities, from lowest to highest, respectively (see Figure 1-3).
- The level of team experience is also taken into consideration as a second context variable in order to explore the effects of team mutuality on team performance (see Figure 1-4). Team mutuality indicates that a project team has had a previous experience working together.

4. Design of Virtual Experiments

The main purposes of the intellective experiments are as follows:

--: To study the effects of changes in micro-level behavior patterns (*cultural values*)

--: To study the effects of changes in organization structure styles (*cultural practices*)

--: To study the relationships between micro-level behavior patterns (*cultural values*) and organization structure styles (*cultural practices*) for the full range of possible task complexity and team mutuality contexts.

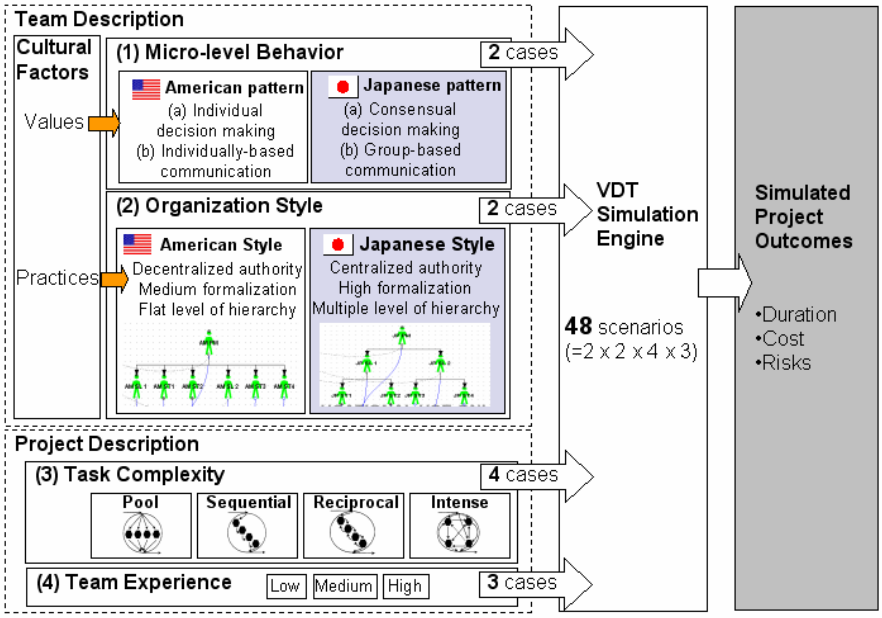

Figure 1: **Modeling Framework**

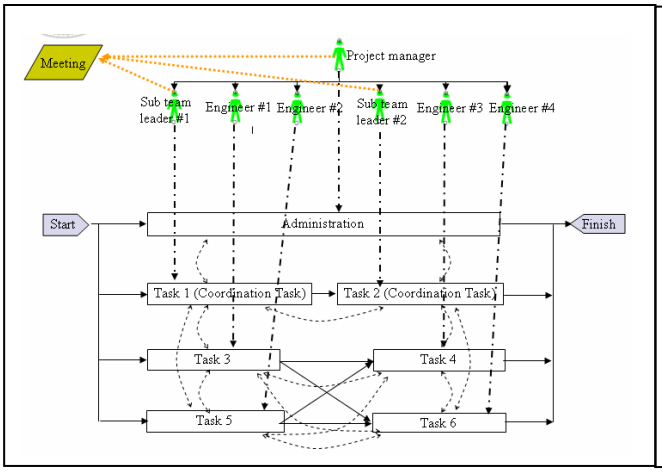

Figure 2: Example of American Organization Structure Type with Intense Complexity

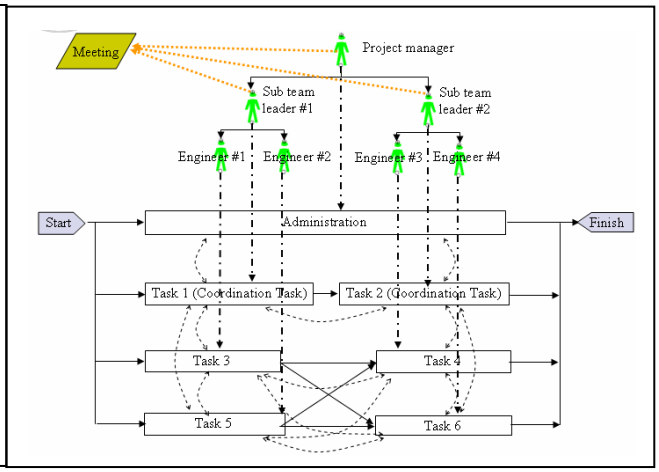

Figure 3: Example of Japanese Organization Structure Type with Intense Complexity

Note: These figures illustrate examples of the *intense* coordination complexity cases. As shown in Figures 2 and 3, both organizations have the exactly same workflow and required work volume as the intense complexity cases. All teams are composed of seven members, including one project manager, two sub-team leaders, and four sub-team members. We change only either structure types or micro-level behavior patters actors possess.

——→ shows precedence links among tasks

·····→ shows rework and communication links among tasks

- - - → shows work assignment between team members and tasks

For experimental purposes, the actor and task configurations are identical [4] (Figures 2 and 3 show examples of the *intense* coordination complexity cases with higher numbers of interdependence links between tasks). As shown in Figure 1, we simulated a total of 48 scenarios (2 organization styles x 2 micro-behavior patterns x 4 task complexity levels x 3 team situation levels).

5. Results: Analysis of the Effects of Culturally-Driven Normative Systems on Team Performance

The VDT model, a multi-agent based simulation model, is designed to predict duration, cost, and two kinds of process quality risks as measures of team performance, as shown in Table 3. At first glance, there is no significant difference in the project duration between Japanese and American structural styles. However, differences appear in the hidden work volume, cost, and project quality risks. The amount of hidden work volume is a good proxy for both project duration and cost (Levitt and Kunz, 2002), since the amount of direct work remains constant for all scenarios. Even if duration is apparently the same, hidden work volume presents potential risks of increased cost and duration, as they cause non-critical path tasks to take longer, and thus reduce overall project slack. We analyzed three dependent variables, 1) hidden work volume, 2) product quality risks (see Note 3), and 3) project quality risks (see Note 4) , to measure the impact of changes in elements of culturally-driven normative systems (organization styles and micro-level behaviors) on team performance.

Based on the cultural model described above, we carried out an analysis of the impact of cultural factors on relationships between organization style, team cultural behavior patterns, task complexity, and team experience.

Figure 4 and 5 illustrate the effects of organization structure styles on process quality metrics. The hidden work volume increases as level of task complexity increases. This implies that the idealized case can appropriately capture a basic proposition of contingency theory: "the greater the uncertainty of the task, the greater the amount of information that has to be processed between decision makers during the execution of the task." (Galbraith, 1974) In the cases of medium task complexity, the American style has less hidden work volume[5] than the Japanese organization style. On the other hand, in the case of high task complexity, this tendency reverses. In particular, when team experience is low, the American style has less tolerance for high task complexity than does the Japanese style.

Figures 6 and 7 show the effects of changes in micro-level behavior patterns on hidden work volume. The effect of changes in micro-level behavior patterns is smaller than the effect of organization style. However, organizational performance of workers who have the culture's preferred micro-level behavior is positively correlated to the use of each culture's typical organization style, in cases of medium to high task complexity. In the case of pooled and sequential workflow, the differences between Japanese and

[4] Actor and task configurations include the actors' skills, the skills required by tasks, the duration of tasks, the hourly salary of actors, the task responsibility assignment, and the total number of team participants. All teams are composed of seven members, including one project manager, two sub-team leaders, and four sub-team members.

[5] Less hidden work volume implies better performance

American behavior patterns are relatively small. This implies that increasing task complexity amplifies the impact of *cultural values vs. cultural practices* mismatches, as we would expect, since it increases the frequency of exceptions that will arise in executing direct tasks (Galbraith 1973).

As shown in Figures 8 and 9, there are no significant differences between the Japanese and American styles in terms of predicted product quality (component quality) risks. However, the Japanese organization style tends to have significantly lower project quality (system integration) risks than the American organization style. The more centralized Japanese structure and close supervision by first level managers with lower spans of control in the deeper Japanese hierarchy imposes tight control on information exchange and exception handling for both Japanese and American workers. So this prediction has good face validity.

When comparing relative magnitude of changes in organization style and behavior patterns, changes in organization style have a larger impact on hidden work volume than changes in behavior patterns.

Table 2: **Summary of Simulated Results**

	Task Complexity Low ⟷ High							
	Pooled		**Sequential**		**Reciprocal**		**Intense**	
Structural Style	**Type *J***	**Type *A***	**Type *J***	**Type *A***	**Type *J***	**Type *A***	**Type *J***	**Type *A***
Duration (Critical Path Method)								
Duration (Months)	8.0	8.1	29.6	28.8	30.7	29.6	13.5	13.1
Standard deviation	(0.18)	(0.15)	(1.30)	(0.80)	(1.60)	(1.00)	(1.10)	(0.60)
Comparison	Type *J* = Type *A*		Type *J* = Type *A*		Type *J* = Type *A*		Type *J* = Type *A*	
Hidden Work Volume								
Hidden Work Volume (Person-months)	3.54	4.46	14.60	12.57	26.02	21.13	29.19	38.15
Comparison	Type *J* < Type *A*		Type *J* > Type *A*		Type *J* > Type *A*		Type *J* < Type *A*	
Cost								
Cost ($1,000)	281	288	355	343	431	401	446	497
Standard deviation	(2.65)	(2.78)	(27.49)	(17.16)	(47.60)	(33.89)	(33.41)	(56.28)
Comparison	Type *J* < Type *A*		Type *J* > Type *A*		Type *J* > Type *A*		Type *J* < Type *A*	
Functional (Product) Quality Risks								
Product Quality Risk Index	0.469	0.468	0.466	0.464	0.467	0.461	0.478	0.480
Standard deviation	(0.044)	(0.037)	(0.037)	(0.041)	(0.035)	(0.034)	(0.033)	(0.022)
Comparison	Type *J* = Type *A*		Type *J* = Type *A*		Type *J* = Type *A*		Type *J* = Type *A*	
Project Quality Risk								
Project Quality Risk Index	-[6]	-	0.267	0.437	0.284	0.467	0.279	0.472
Standard deviation	-	-	(0.044)	(0.067)	(0.037)	(0.046)	(0.031)	(0.033)
Comparison	-		Type *J* < Type *A*		Type *J* < Type *A*		Type *J* < Type *A*	

Note:

(1) Total simulated work volume is the sum of production work volume and coordination work volume (Jin and Levitt, 1996, pp175)

Hidden Work Volume = Total Simulated Work Volume – Designed Work Volume

(2) For each scenario, we run 100 trials and calculate means and standard deviations.

(3) Product quality risk represents the likelihood that components produced by the project have defects based on rework and exception handling (Jin and Levitt 1996, pp179)

(4): Project quality represents the likelihood that the components produced by the project will not be integrated at the end of the project, or that the integration will have defects based on rework and exception handling (Jin and Levitt, 1996, pp179).

[6] Since there are no communication or rework relationships between tasks in the context of pooled workflow, project quality risk is always zero, and so is not shown for those scenarios.

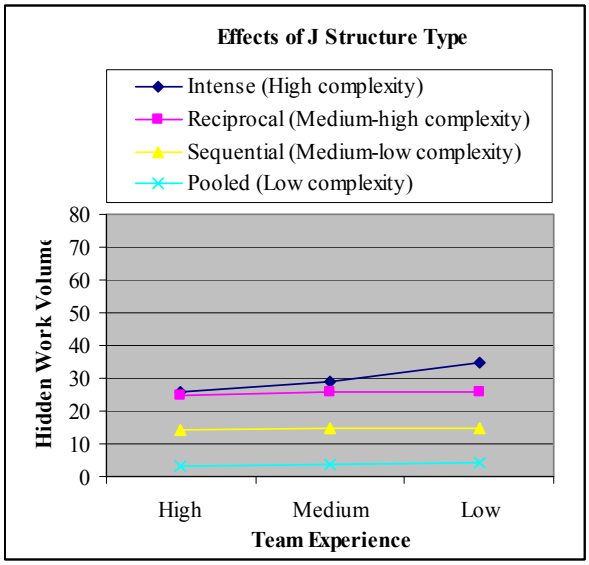

Figure 4: **Effects of Japanese Organizational Structure Type**

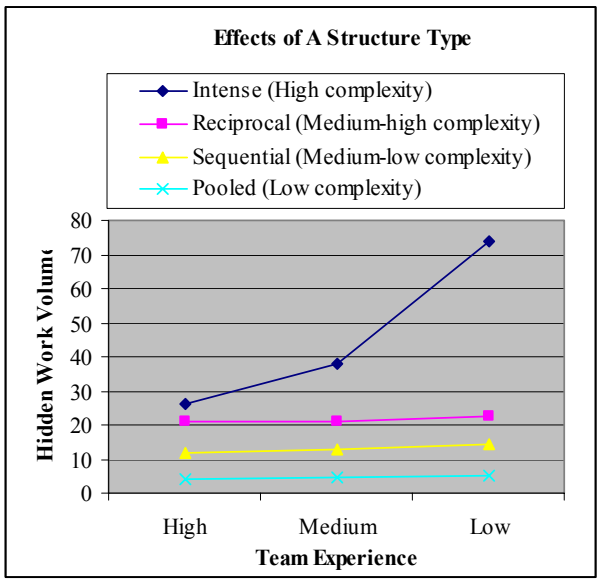

Figure 5: **Effects of American Organizational Structure Type**

Note: This figure compares the performance of Japanese *vs.* American organization structure types. The X axis shows the level of team experience. The Y axis shows total hidden work volume in person-months. Task interdependencies such as pooled, sequential, reciprocal, and intense workflow represent a range from low to high task complexity respectively.

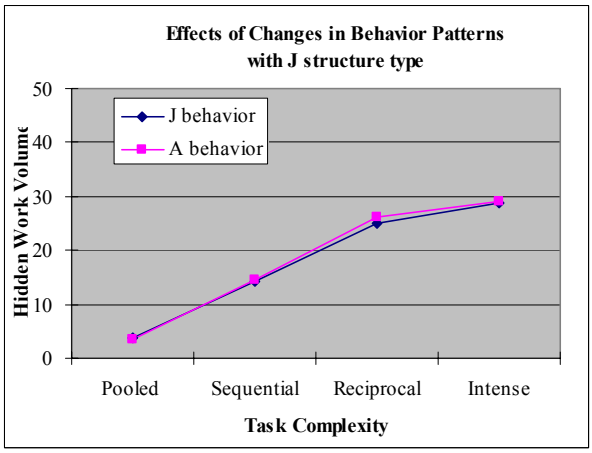

Figure 6: **Effects of American *vs.* Japanese Micro-Level Behavior Patterns with Japanese Organizational Structure Type**

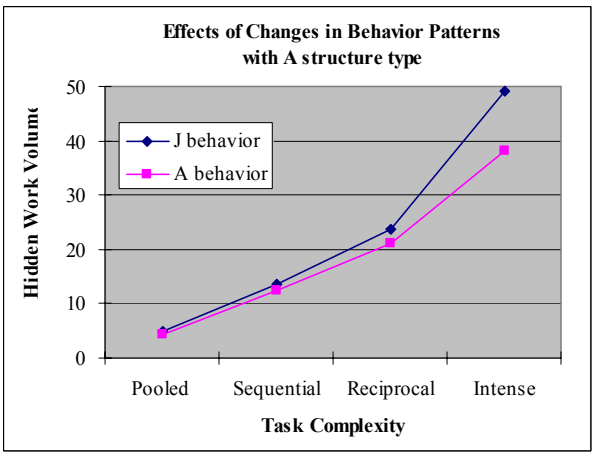

Figure 7: **Effects of American *vs.* Japanese Micro-Level Behavior Patterns with American Organizational Structure Type**

Note: This compares the performance of Japanese *vs.* American micro-level behavior patterns for each structure type. The X axis shows the level of task workflow such as pooled, sequential, reciprocal, and intense interdependencies. Each workflow represents from low to high task complexity respectively. The Y axis represents total hidden work volume in person-months.

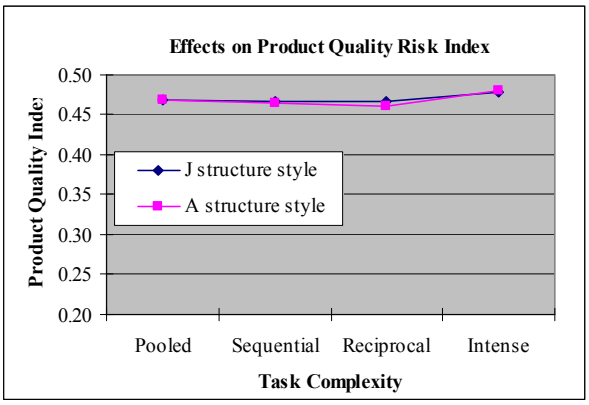

Figure 8: **Effects of Organizational Structure Type on Product Quality Risk**

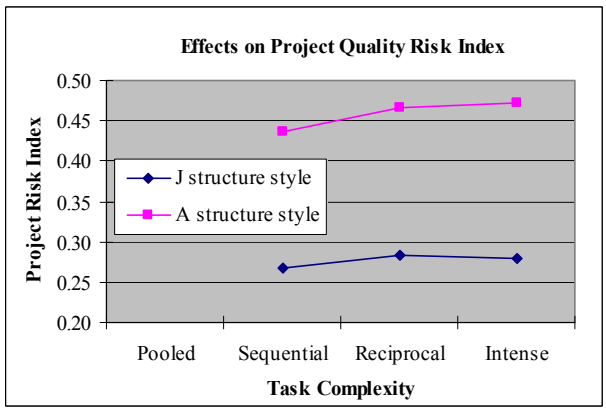

Figure 9: **Effects of Organizational Structure Type on Project Quality Risk**

Note: This compares the performance of Japanese *vs.* American micro-level behavior patterns. The X axis shows the task complexity from pooled (lowest), sequential, reciprocal, and intense (highest) interdependencies. The Y axis represents total hidden work volume in person-months.

6. Discussion

Through computer simulations, we examined the effects of changes in organization structure types (*cultural practices*) and micro-level behavior patterns (*cultural values*) for a range of possible project situations (task complexity and team mutuality contexts).

Effects of changes in organization structure styles: Each typical organization structure style driven by culture has its own matched project situation in terms of team performance. Specifically, Japanese organization style shows better performance in the case of high task complexity, while American organization style shows better performance in the low and medium task complexity cases. This implies: that managers need to set up appropriate organization styles by considering project situations; that the impact of *cultural practices* is contingent upon the types of task complexity; and that IJV participants need to find equivalent points in *cultural practices* by considering task complexity and environments.

Effects of changes in micro-level behavior: We find support for Hofstede's proposition of preferred coordination mechanisms (Hofstede, 1991), i.e., that team performance is better when management practices are congruent with national cultural values. Hofstede proposes that each culture has a preferred coordination mechanism, implying that workers from each nation show better performance if they use their own preferred management practices (Hofstede, 1991). Our results contribute to the small body of organizational and virtual experimental evidence supporting the importance of congruence between *cultural values* and *cultural practices,* hence, the two normative components. We extrapolate from these findings to conclude: that each *cultural practice* has evolved to match its *cultural values*, in order to maximize efficiency; and that the impact of normative systems (*cultural values* and *cultural practices*) is contingent upon not only types of task complexity, but also types of agents. Inconsistency among normative components can yield undesired results. A project manager must be careful in identifying normative components and in maintaining their consistent relations when designing multi−agent systems (MAS)

Moreover, Hofstede (1991) asserts that each culture's preferred organization style can be predicted from two of his national cultural value indices—power distance and uncertainty avoidance. Figure 10 shows a two-by-two power-distance-uncertainty avoidance matrix, with one of Mintzberg's (1983) five archetypal organizational configurations in each corner, and the fifth, the divisionalized structure archetype, as a kind of "compromise structure type" in the center. Based on case studies, the Japanese and American organization structures are close to the preferred mechanism plotted by Hofstede. Specifically, the Japanese organization structure has relatively high centralization, high formalization, and multiple levels of hierarchy. Hofstede also suggests that Japan is categorized with France as preferring a full bureaucracy, defined as high formalization and well-defined authority hierarchy (e.g., Mintzberg, 1983: Burton and Obel, 2004). Therefore, our experimentation suggests the possibility to predict preferred organization styles from cultural value dimensions proposed by Hofstede (1991).

Relative impacts between organization styles and micro-level behavior patterns: Changes in behavior patterns had less impact on team performance than changes in organization structure. In other words, *cultural practices* have larger impact than *cultural values* on team performance. At this stage, the relative contributions of the organization system or behavior pattern are unknown and cannot be analyzed quantitatively.

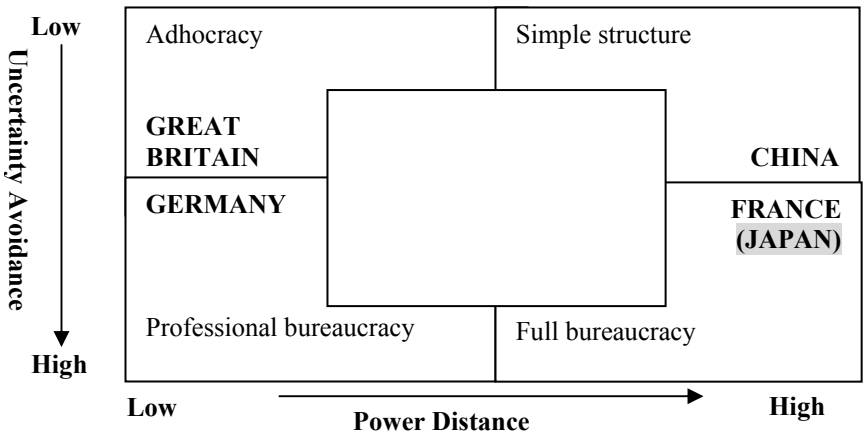

Figure 10: Preferred Coordination Mechanism (Adapted from Hofstede, 1991, p.152)

Note: This figure illustrates the typical organization structure predicted by "power distance index" and "uncertainty avoidance index." "Power distance index" refers to the extent to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally. "Uncertainty avoidance index" indicates the extent to which a culture programs its members to feel comfortable in unstructured situations such as unknown, surprising, and different from the usual. Uncertainty-avoiding cultures try to minimize the possibility of such situations by using strict laws and rules, and safety and security measures

In summary, when organizations assemble joint venture teams with members from different culturally-driven normative systems, a project manager should pay attention to three elements: micro-level behavior (*cultural values*), organization style (*cultural practices*), and project situations (task complexity and team mutuality). Managers need to change their management practice style based on the characteristics and requirements of a given project, because project situations are given at the start of a project, and the micro-level behavior is fixed in the short term (based on national culture), and because the organization style is the only variable a project manager can control. Careless selection of management practices may cause a worst-case scenario in a project. Heterogeneous normative multi-agent models can help managers to find the equivalent point by changing the organization style that provides the best match to their project's characteristics and their team's micro-behavior.

The existing VDT model has known limitations that constrained us in capturing all of the cultural and broader institutional phenomena that emerge in global projects. We were unable to adequately represent factors such as multiple behavior patterns for different workers in a project, additional exceptions caused by work practice differences, organizational learning, and some of the positive impacts—e.g., increased innovation— that might result from cross-cultural interactions. Our experiment focused only on the impact of different patterns of micro-level behaviors and organization structures.

--: Examining the cases where multiple behavior patterns coexist in a project remains an intriguing research focus. We are currently working to extend VDT to permit a modeler to assign different *cultural values* to each "Actor"—i.e., each individual or sub-team—in the project

--: A second constraint was that the current VDT model is not able to parameterize additional exceptions caused by differing values and practices between subgroups of a joint-venture team. In particular, based on our observations, subgroups are likely to have their own standardized low-level work practices, rules and criteria. Our ethnographies provided evidence that such differences generated exceptions between subgroups when selecting standardized criteria for a project, such as those used for safety. Several researchers have addressed differences in institutionalized practices in IJV projects (e.g., Mahalingam et al, 2004).

--: Another VDT-imposed limitation of this work is that we had to assume that team members do not adapt their values or practices during the project. However, researchers have increasingly been interested in how people learn *cultural values* and *cultural practices* from each other (e.g., Orr, 2004).

--: Finally, in the current research, we did not take into consideration potential positive impacts of cultural interactions, through innovation, creativity, and advanced technology. Several researchers have started exploring innovation issues in project-based organizations (e.g., Taylor and Levitt, 2004).

7. Conclusion

Research on IJV projects reveals the difficulties of

coordinating cross-cultural teams. Our research sheds light on some effects of the increased internal complexity that IJV project teams face when *cultural values* and *cultural practices* are misaligned. It makes an initial attempt to predict the impacts of differing normative systems on team performance in IJVs through virtual experimentation. We conducted ethnographic interviews to understand and encode *cultural values* and *cultural practices* into the parameters of the VDT model and then characterized the performance outcomes that emerge in global projects involving both Japanese and American cultures, represented along cultural value-practice dimensions.

The effects of changes in micro-level behavior patterns and organizational control styles show interesting correlations between *cultural values* and *cultural practices*, and gives initial evidence that these parameters have been encoded correctly, since our model predictions align with extant theory. These findings not only extend application of the current VDT model to address the case of heterogeneous normative multi-agents, but also demonstrate a possible framework for modeling distinguishing culturally-driven normative factors that emerge in global projects. In addition, our work contributes in a small way to using simulation to bridge the gap between cultural-cognitive psychology as micro-level theory and sociological organization science as macro-level theory.

We have argued earlier (Levitt et al, 1999) that global projects provide an ideal field setting in which to explore the effects of institutional clashes on the behavior and performance outcomes of organizations. Global projects bring together participants from multiple national, organizational and professional cultures. And all projects have unusually clear goals and metrics compared to most other organizational forms; they have a finite start and end date—often with durations that are less than a typical PhD degree—and clearly defined participation. Currently, there are intriguing and unexplored research opportunities to study dynamics of normative systems in inter-cultural, inter-organizational and inter-institutional settings, such as global projects.

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Notice of Previous Presentation

The preliminary version of this paper was presented at the 2004 North America Association for Computational Social and Organizational Science (NAACSOS) conference at Carnegie Mellon University, and was awarded "best graduate paper" in the Ph.D. Student Research Abstract Competition. This paper focuses more on differing normative systems observed in global projects and developing a heterogeneous normative multi-agent model, providing a different view from the previous paper (Horii et al, 2004).

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