RISK MANAGEMENT MODEL FOR INTERNATIONAL CONSTRUCTION JOINT VENTURES

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ABSTRACT: The current Asian financial crisis has put the role of risk management in the construction business into focus. For firms engaging in the international construction business, one of the most effective means of mitigating financial risks is through a joint venture (JV) with a local partner. There are, however, risks associated with an international construction JV. Based on a study by the writers on the risk factors and their mitigating measures, the most effective risk mitigating measures were categorized into eight groups. These are partner selection, agreement, employment, control, subcontracting, engineering contract, good relationship, and renegotiation. In this paper, a risk management model incorporating these measures was proposed. Three cases of international construction JVs were analyzed from the perspectives of the execution of these measures. It is hoped that this model would help construction firms in improving their decision-making process for their overseas ventures.

INTRODUCTION

Asia has plunged into an economic crisis and the construction market has been greatly reduced. Construction companies have no choice but to seek effective methods to protect their business in an increasingly competitive market. Joint ventures (JVs) and other forms of cooperative ventures, such as strategic alliances, have taken on an increasingly important role in international contracting competition. Although this kind of business alliance can avoid some business risk, it also presents other uncertain factors that could influence normal business performance (Thompson and Perry 1983). Among all of the risk factors, those associated with financial, government policies, project relationship, economic condition, and subcontractors are considered to be the most critical in international construction JVs. To alleviate these risk factors, one must develop appropriate strategies. A risk management model is proposed in this paper with the aim of helping construction firms to mitigate the risks. The model is based on the effective risk management measures recommended by construction practitioners in an international survey. Three case studies will be used to illustrate the roles of these measures during the start-up and operation phases of the JVs.

Research Objectives and Methodology

An international survey was conducted from May to July 1998, to seek the views of international experienced professionals on construction JVs (Bing et al., unpublished data, 1999). From the survey findings, a risk management model was proposed. The aim of this paper is to study the effective risk management measures of international construction joint ventures (ICJVs) through case studies to achieve validity for the risk management model.

Risk Management Model

In this paper, a group of eight measures, namely: (1) partner selection; (2) agreement; (3) subcontract; (4) engineering contract; (5) employment; (6) good relationships; (7) control; and (8) renegotiation, are incorporated into a risk management model for the successful management of ICJVs. As shown in Fig. 1, this process model consists of three rows and five columns. The first column shows the three typical phases that a risk management process must go through: (1) Identification; (2) analysis; and (3) treatment. The second column shows the second-stage development of the risk management process to identify the risks based on the sources of the risks, to analyze the risks using the hierarchical process, and to respond to the risks using risk management measures. For the last three columns, there is only one element in the top row, which categorize the risk factors into three groups: (1) internal; (2) project-specific; and (3) external. The middle row shows the most critical risk factors analyzed during the three stages of ICJV: (1) Start-up; (2) operation; and (3) dismantle. Once a risk is identified and defined, it becomes a management problem (Flanagan and Norman 1993). The bottom row presents the most effective management measures to mitigate the risk in each stage of an ICJV. At the pre-JV stage, the model recommends that firms select suitable JV partners, draft a clear JV agreement before the setup of the JV, choose a competent staff, and decide on an appropriate management control structure. During the operation of a project, it is important to enter into a fair engineering contract, employ qualified subcontractors and suppliers, maintain a good relationship with the host government and other parties, and adopt renegotiation as a dispute-resolution and problem-solving technique. These risk mitigation measures are extremely critical for a successful JV.

DESCRIPTION OF CASES

The three ICJVs and their projects are as follows.

- Case 1: A Chinese-Singaporean JV for a S$120,000,000 public housing project in Singapore.
- Case 2: A Japanese-Singaporean JV for the S$250,000,000 postal center project in Singapore.
- Case 3: A Chinese-Hong Kong-New Zealand JV for an Asian Development Bank (ADB)-financed, RenMinBi RMB 180,000,000 expressway project in China.

Case 1 represents an unsuccessful JV in Singapore. It was the first foray into the competitive market of Singapore by a construction company from a developing country. Both JV partners suffered financial losses. The case provides useful lessons for construction companies of the risks that they could face in undertaking a JV.

Cases 2 and 3 were successful JVs. Case 2 shows how a Japanese firm and its local partner successfully managed their JV project in Singapore, whereas Case 3 shows how two for-

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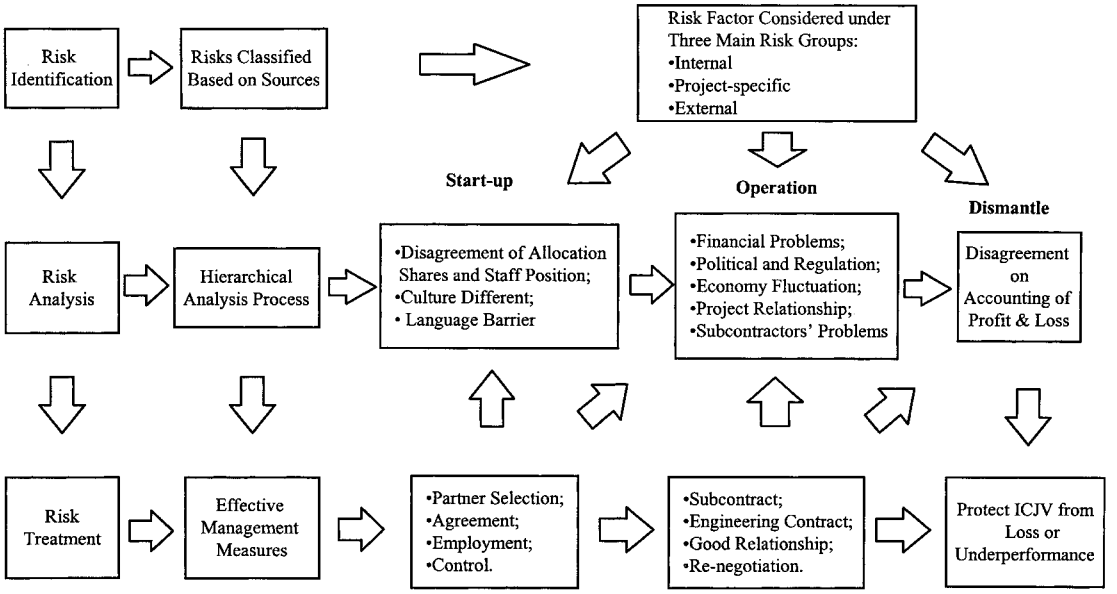

FIG. 1. Risk Management Model for ICJV

TABLE 1. Main Characteristics of ICJV Cases

Characteristics (1)	Case 1 (2)	Case 2 (3)	Case 3 (4)
JV parties	China-Singapore JV	Japan-Singapore JV	Hong Kong-New Zealand-China JV
Project type	Building	Building	Civil engineering
Location of project	Singapore	Singapore	China
Contract value	S$120,000,000	S$250,000,000	RMB 180,000,000
Project duration	27 months	25 months	25 months
Shareholding	40:60	50:50	20:20:60
Operating structure	Integrated with local partner controlling	Nonintegrated with shared management responsibilities and operation	Integrated with local partner having distinct management and operating responsibilities

TABLE 2. Influence of Risk Factors

Rank (1)	Risk factor (2)	Influence to JV		
		Case 1 (3)	Case 2 (4)	Case 3 (5)
1	Client's cash flow problems	No	No	No
2	Partner's parent company in financial problems	No	No	No
3	Inconsistency in government policies, laws, and regulations	No	No	No
4	Economy fluctuation	No	No	No
5	Poor relationship	No	No	Yes
6	Exchange rate fluctuation	Yes	No	Yes
7	Incompetence of local subcontractors and suppliers	No	No	Yes
8	Force majeure and social disorder	No	No	No
9	Inflation	No	No	No
10	Disagreement on accounting of profits and loss	No	No	No
11	Employees from each partner distrust each other	Some	Some	Some
12	Restrictions on fund repatriation	No	Yes	No
13	Excessive demands and variation from client	No	No	No
14	Policy changes in your partner's parent company toward IJV	No	No	No
15	Partner's lack of management competence and resourcefulness	No	No	Yes
16	Disagree on some conditions	No	No	No
17	Labor, material, and equipment import restriction	No	No	Yes
18	Security problems at project site	No	Yes	No
19	Overinterference by parent company of either partner	No	No	Yes
20	Language barrier	Some	Some	No
21	Disagreement on allocation of staff positions in IJV	No	No	No
22	Different social, culture, and religious	Yes	Yes	Yes
23	Disagreement on allocation of works	No	No	No
24	Pollution	No	No	Yes
25	Technology transfer dispute	No	No	No

Note: Yes means risk factor had strong influence on the ICJV involved; Some means the risk factor had certain influence on ICJV involved; and No means risk factor had little influence on ICJV involved.

eign firms successfully helped their local partner manage their JV project in China. The success or failure of the JVs was based on whether the following criteria were achieved for the projects: Within budget and profit, client satisfaction and goodwill, on/ahead of schedule, quality standards, safety standards, enhanced reputation for an international joint venture (IJV) partner, an IJV project team's satisfaction, and an IJV partner's satisfaction and goodwill.

The main characteristics of the three cases are summarized in Table 1. The descriptions of the projects and ICJVs are given in the following section. The case studies were analyzed based on the management measures referred to in the proposed model and the influences of the risk factors in each case, as illustrated in Table 2.

Case 1: JV in Housing Development Board (HDB) Project in Singapore

The names of the companies involved in this unsuccessful JV are kept anonymous. The project was located in a newly developed town in the western part of Singapore and involved the construction of seven 20-story residential buildings and a multistory car park. It was developed by the HDB, the local government organization responsible for public housing in Singapore. The foreign partner, hereafter referred to as F, is a state-run construction company from China and this was its first overseas project. The local counterpart, referred to as L company, is a Grade 7 construction company (meaning it could only tender for government projects that are less than S$50,000,000) in the local construction industry. The project was beyond the financial capability of L to handle alone because L was undertaking four other projects at that time. It lacked sufficient capital, workforce, and equipment. L acted as the sponsor company and the JV is hereafter referred to as L-F JV. The share distribution between L and F was to be 60 and 40%, respectively. The board of directors was composed

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of seven people, four from L and three from F, and the board meetings were to be held biannually.

After the project was awarded in September 1995, problems immediately emerged. The applications for employment passes for F company's staff were rejected by the Singapore Immigration Department. It was very difficult for the L-F JV to obtain the right staff in a timely manner. Lower wages for the F staff was one reason why it won the contract for its competitive tender price. From February to August 1996, the progress was stagnant due to the absence of the site managers and engineers. The project was far behind schedule and the work was of poor quality. The client was dissatisfied and the relationship between the JV and the client deteriorated.

Serious negotiations were then held among the directors from the two parties and they agreed that the project would not continue in the same manner. It was decided that two directors of the L-F JV, one from each partner, were to be sent to the site to act as the project and deputy project managers, with their salaries paid by the parent companies. In July 1996, four engineers from China and trained in Singapore, along with six technical personnel, joined the project and the construction program then began to resume. But because the subcontractors were small, they had difficulty in making up the lost progress.

When the F company provided initial funds for setting up the L-F JV, it transferred U.S. dollars (US$) to the Singapore dollar (S$). By April 1998, the exchange rate of S$ to US$ had dropped 25% due to the Asian currency crisis. The L-F JV director from the F company estimated that his company would lose at least US$1,000,000 in this JV project due to the cost overruns, possible liquidated damages, and foreign exchange losses.

Case 2: JV of Penta-Ocean and Low Keng Huat in Singapore Postal Center Project

Penta-Ocean of Japan (hereafter referred to as PO) entered into the JV with Low Keng Huat of Singapore (hereafter referred to as LKH) for the construction of the S$250,000,000 Singapore Postal Center project. This project started in 1996 and was expected to be completed in January 1999. The project is a multistory steel building, which is a specialty of Japanese companies, including PO. PO was set up in 1896 in Japan and it was ranked 50th in the top 225 international contractors in the ENR in 1996. In Singapore, a JV with a local company is entitled to a preference margin in the tender price. Hence, PO joined with LKH to improve the chances of winning the tender, and they had a successful JV project experience. LKH is a G8 construction company that is financially stable, and it possesses the requisite technical expertise for local construction projects.

The JV was on a contractual basis without a permanent entity being formed and with both companies holding equal shares in the JV. The draft JV agreement was prepared by PO. LKH scrutinized and negotiated for some slight changes. A final agreement was then signed and put into practice.

A supervisory board consisting of two directors from each company was set up to monitor the site staff and project's performance. An account was set up prior to the project for the JV's funds. Any transaction from the account would have to be approved and agreed on by the supervisory board. The employees sent by individual partners would have to stay throughout the project, and it was each company's responsibility to manage its flow of manpower. Each company was responsible for its staff and any compromise would have to be reached through negotiation if any employee was removed from the project.

The management system adopted by the JV was established by PO with some adjustments made by both companies. The project manager was from PO and the deputy from its counterpart. To ensure undisrupted operations, the site operations were undertaken by LKH, as it commands better management skills and contacts in the local industry. Most of the work was done by the JV, while work was awarded to the subcontractors and suppliers previously used by LKH. Although disagreements between the staff surfaced occasionally, they were resolved as they arose between the parties involved. By September 1998, the progress has been satisfactory and this project was expected to be finished within the allocated budget and on time.

Case 3: JV of Second Bureau of China Construction (SBC), Paul Y, and Downer in Heibei Expressway Project, China

This ICJV was formed by the Paul Y Construction Group of Hong Kong (hereafter referred to as PY), Downer of New Zealand (hereafter referred to as Downer), and the Second Bureau of China Construction of China (hereafter referred to as SBC). The project was for the construction of the first section of the Heibei Expressway that was financed by ADB, and the project was awarded after an international competitive tender.

The JV partners possessed the requisite and complementary skills for this project. Downer is strong in civil engineering works and building structures. PY has a good track record in the construction markets of Hong Kong and Southeast Asia, particularly in the field of building and civil works. These two companies had previously partnered in JVs to win three contracts in the Hong Kong International Airport. PY has a record of good collaboration with Chinese contractors in China's construction market. SBC is a state-run construction enterprise with a long history and rich experiences, and it has a strong connection with the central and local governments.

All three companies have been in business in Hong Kong for many years. The JV was arranged in Hong Kong, and the agreement was drafted based on the laws of Hong Kong. It clearly stated that the JV was only formed to bid and execute the project if the tender was successful. No partner would be allowed to withdraw without consent from the others. Each partner was held both jointly and individually responsible for the JV works and would accept the loss or profit according to their shares. The share distribution of SBC:PY:Downer is 60:20:20, respectively. SBC was appointed the lead party to communicate with the client.

Because the project was financed by ADB, international competitive bidding was conducted and the tender documents stipulated that the 7.5% preferential margin would be given to the local bidder as well as a JV with the Chinese partner holding more than 50% of the shares. As required by the client, the contract was based on the International Federation of Consulting Engineers (FIDIC) conditions of the contract, and the governing laws were those of China.

The three-partner staff had solid technical backgrounds and successful experiences working together in previous JV projects in Hong Kong. Maintaining a good relationship with the clients and other project participants is crucial for ICJVs. During the tender periods, a fact-finding delegation was organized and led by the executive directors of foreign partners to visit the client and investigate the project's site conditions. The communication channels were maintained by SBC officials and their foreign partners (Qiu and Shao 1998).

The two main departments of the JV were the financial and accounting department and the construction engineering department. The financial and accounting department was handled by PY and Downer's employees. It was located in the JV's headquarters in Hong Kong. The construction engineering department was staffed by SBC's men and located in the site in Heibei, China. Several staff from PY and Downer acted

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as consultants in the construction engineering department. The earthworks were subcontracted to local companies, whereas the others were undertaken by SBC itself. By September 1998, this project was near its clean-up stage. It is expected that the costs were within budget and that the completion of the project would be on time. All partners were satisfied about this alliance.

ANALYSIS OF RISK MITIGATION MEASURES

Measures Adopted in ICJV Start-Up Phase

As the model shows, risk management must be carried out as early as possible to mitigate any negative impact on the project's progress and profitability. In the early stage of a JV, selecting a suitable partner, drafting a good agreement, formulating correct personnel policies, and adopting a suitable operational structure are the most effective management measures for future risk avoidance or mitigation. In the three cases, the ICJV decision makers adopted some of the measures. These would be elaborated on in the following section. A summary of the measures is shown in Table 3.

Partner Selection

Partner selection for a JV is a risk in itself because it directly affects the outcome of the JV. Essentially, the company should analyze the various attributes of the potential JV's partners and choose one that can complement them most in terms of needs.

Companies usually search for partners who have compatible objectives, are experienced in JV projects, specialize in technical skills with suitable management styles, and are trustworthy and financially credible. Companies with existing relationships with each other may find it easier to form JVs.

In the three cases, the companies of L (Case 1), PO (Case 2), and PY and Downer (Case 3) have strong financial capabilities. F (Case 1) and SBC (Case 3) are China's state-owned companies that possess assets instead of cash. In addition to financial aspects, management competence and complementary skills are also essential ingredients of prospective partners. For Case 1, F company needed local construction knowledge from L company, and L wanted experience and low-wage engineers and workers from F company. For Case 2, LKH needed PO's experience in steel structure construction. For Case 3, SBC needed expressway construction technology and management from PY and Downer, and also financial man-

TABLE 3. Risk Mitigation Measures in Start-Up Phase of Three ICJV Cases

Risk Management Measure		Case 1	Case 2	Case 3
Major measure (1)	Specific aspects of measure (2)	L and F first JV in HDB project in Singapore (3)	PO and LKH second JV in Singapore (4)	PY, Downer, and SBC first JV in Heibei Expressway of China (5)
Partner selection	Resourceful and financially strong	L was tight financially; F provided initial fund but lacked refinancing fund	Both companies are G8 (first grade) in Singapore; thus strong financially	PY and Downer are strong financially; SBC is resourceful in construction equipment
	Technical and management competence	L was good at prefabrication, F at building construction	LKH was specialized in concrete and PO in steel structure—thus complementary	SBC was new to expressway, but Paul Y and Downer were experienced
	Partner has strong relationship with host government	Not useful to solve restriction of labor import	Not critical for this project	Good for prequalification of bidding
Agreement	Ensure clear terms and conditions	Based on other JVs experiences—agreement is haphazardly drafted	Based on previous successful JV partnership—a clear agreement	PY and Downer, PY and SBC had previous JV agreement. The new agreement is quite clear
	Define clear authority and responsibility	L was responsible for prefabrication and installation, F for other building works	PO was on steel structure and LKH on concrete structure-good allocation of works	PY and Downer for financing, technology, and coordination, SBC on constructing
	Accounting standard	Based on Singapore accounting standard	Based on Singapore accounting standard	Based on Hong Kong accounting standard
	Define transfer scope clearly	No transfer definition	No transfer definition	No transfer definition
Employment	Employ local staff with bilingual ability	Most employees were bilingual	Difficult to find bilingual employees, but Japanese staff were trained in English	Choose bilingual staffs from Hong Kong's headquarters. SBC staffs were trained in English
	Define each staff's scope of work	JV project organization was good, but lack of technical staff was problem	JV operational structure was well organized and responsibilities were well defined	JV's operational structure was well organized and responsibilities well defined
	Select staff carefully for ICJV	Staff were selected by project managers	Staff were carefully selected by project managers	Staff were selected by project directors
	Employ unbiased and experienced staff	Staff were employed by JV independently	Critical staff had previous JV experience	Critical staff had been involved in JV experience
	Choose right staff for technology transfer	No such requirement	No such requirement	No such requirement
Control	Allocate work to partner according to his ability	L in charge of precast work and F for constructing, but F failed to take part in practice	PO responsible for steel structure and LKH for concrete structure, well allocated between them	PY and Downer in charge of technical and financial matters and SBC of constructing
	Maintain ICJV policies by being dominant over partner in ICJV	L control JV's site operation	Project-based JV with equal management control	Construction policies were controlled by SBC
	Control ICJV's board of directors by parent company	L controlled board of directors	Both partners had equal control in the board of directors	SBC controlled board of directors

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agement ability. In Cases 2 and 3, each of the partners was qualified technically in its respective area, with a competent management.

A good relationship with the client is important for the success of a project. The three projects in this research were developed by the government or governmental agencies. In China, ''guanxi'' or special relationship is still very popular in construction marketing. SBC has good contact with the officials of the Heibei Provincial Communication Department, a representative of the Chinese government. This is the critical factor for PY and Downer in deciding to bid this project in the form of a JV with SBC. For the other two cases, one was able to maintain a good relationship with the clients; whereas the other's attempt failed due to its inability to meet the client's expectations.

JV Agreement

Most of the researches on JVs have concluded that a good JV agreement is an essential success factor and can avoid a great deal of trouble and conflict in future JV operations. A good JV agreement must be drafted in clear terms and conditions that can be easily understood by all partners as well as the working staff, and each partner's authority and responsibility in the JV must be clearly understood.

In the three cases, the parties regarded their agreement as clear and the scope was well defined. In Case 1, both partners had previous experiences in JVs with other companies. They used their former agreements and adjusted into one set of agreements for the HDB project. All of the terms and conditions were recorded. The agreements for the second and third cases were developed from the previous agreements used in successful JVs.

In terms of work distribution, the projects were broken into packages and works were allocated to the respective partners. In Case 1, L was responsible for prefabrication and installation, and F was responsible for the general building works. In Case 2, PO was responsible for the steel structure, and LKH was responsible for concrete works. This allowed both partners to concentrate their resources on defined works. In Case 3, PY and Downer were responsible for technical works and financial matters, and SBC did the site work.

Basically, a JV should be established based on mutual trust and understanding, but the agreement must be more concrete and precise regarding liability. For example, the clauses of liquidated damages caused by the delay of a project's completion were found to be very diversified in all three cases.

Other important factors that need to be included in an agreement are recommended by Chow (1985) and Cushman (1986). Agreement on one accounting standard is emphasized here. Accounting administration is very important in JVs and other kinds of alliances. Profit or loss should be distributed according to the respective shareholding. Once the distribution of profit/loss is agreed upon, conflict associated with profit/loss distribution will be minimal.

Employment

It is very difficult in personnel policy and management to establish a good management team with employees from diversified backgrounds. The difficulties have been explained by Killing (1983). Personnel issues may affect the JV's performance because partner firms may send second-rate personnel to staff the operation, or the policies instituted run counter to the purpose of the venture (Brouthers et al. 1997). For Case 2, the LKH director had mentioned in an interview that PO sent new engineers to the JV project at the beginning:

> They sent engineers and technical workers who have recently graduated from Japan to this site to undertake major activities. This benefits PO's cost and training plan, but not the project program. The staff whom our company sent to the project are all experts and experienced and we spent higher salary to employ such persons.

In this research, several principles on ICJV staffing were studied. One of the principles was to employ those who can communicate directly and understand each other. The language barrier constituted an impediment in communication between the foreigners and the local staff members. If the recipient misunderstands the instruction content and puts this instruction into action, mistakes will undoubtedly be made. In the construction industry, mistakes are costly and modifications are time-consuming. When Balfour Beatry reviewed its two JV projects in Malaysia, the company ranked language as the biggest barrier (Carrillo 1996). In Case 2, the Japanese staff were chosen based on their English proficiency so that they could communicate in simple English. When they arrived in Singapore, an additional 2-week English training was held. In Case 3, the staff of PY and Downer sent to the JV could speak Chinese, and the SBC employees chosen had the essential English speaking abilities.

Another characteristic of a successful staffing policy in an ICJV is that the staff must be committed to the ICJV and unbiased to different partners. In Case 1, the F-L JV employed most of the staff from the local manpower market. ICJVs in Cases 2 and 3 chose their critical staff based on their good records in previous JV projects. All of the staff involved in the three cases were encouraged by the directors to commit to the JV. The other effective risk mitigation measure was to carefully organize the construction operation structure so that the responsibilities and rights of all the positions did not have too much ''gap'' or ''overlap.'' The probabilities of conflicts would then be reduced because the staff could perform their work without unnecessary disturbances.

Management Control

The management control of a construction JV project by one ''who has the decision-making power'' is discussed on the basis of Killing's (1983) definition. Chow (1985) provides a complete explanation of all types of construction JV control formation. It was recommended by Sing (1994) that control by a more advanced management partner would be more beneficial for the JV, as she compared two IJVs in China.

In the three cases, two management styles are adopted: Shared and controlled. At L and F JVs, the decision making was distributed by their shareholding. The L-F JV was controlled by the L company to a certain degree. In Case 2, at the top-, middle-, and lower-management levels, PO and LKH adopted the principle of ''split management.'' With this management structure, the principle of shared decision making was achieved. The other important fact was that the steel structure was built by PO and the concrete structure was built by LKH; thus, the scope of works was managed by each party independently. Both sides' employees had limited contact with each other and this subsequently reduced conflicts. At the JV of PY, Downer, and SBC, the ''shared-management'' principle was applied at the top-management level. Except for the financial department, the middle and lower levels of management were composed of SBC managers in all departments, with four to five PY and Downer staff acting as advisers.

Measures in ICJV Operation Phase

The risk management model shows the measures that have a strong influence in mitigating the risk during the execution

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TABLE 4. Risk Mitigation Measures in Operation Phase of Three ICJV Cases

Risk Management Measure		Case 1	Case 2	Case 3
Major measure (1)	Specific measures (2)	L and F JV in HDB project in Singapore (3)	PO and LKH JV in Singapore Post (4)	PY, Downer, and SBC JV in Heibei Expressway of China (5)
Subcontract	Use experienced and familiar suppliers and subcontractors	Building subcontractors and suppliers were small trade specialists	Subcontractors and suppliers were transferred from parent companies	Main works were undertaken by JV, some were subcontracted to local large contractors
	Employ influential logistic agents	No such requirement	No such requirement	Logistics were handled by SBC with local contracts
	Engage local security firm	No such requirement	No such requirement	Engage local security entities
	Subcontract to local pollution control specialist	No such requirement	No such requirement	Seldom adopt pollution protection
	Subcontractors complement the partner's shortcoming	Cannot find strong subcontractors to replace absence of F	Not necessary	Not necessary
Engineering contract	• Reimbursement classes • Adjustment clauses in contract	Typical COC contract condition with reimbursement clause	Typical COC contract condition with reimbursement clause	FIDIC condition with reimbursement clauses
	Specify construction extension clause in contract	Typical COC contract condition with variation clauses	Typical COC contract condition with variation clauses	FIDIC condition with variation clauses
	Adopt current international conditions in contract	Not necessary	Not necessary	FIDIC
	Dual-currency condition	Not adopted	Not adopted	Not adopted
Good relationship	Comply with local culture and tradition	Staff were from local market without problems	Foreign staff adapted into local way of living	Foreign staff were quite familiar with local culture
	Establish good relationship with host government	L and F did not have good relationship with related government departments	Both companies had good relationship with local government authorities	PY and Downer invited local authorities to visit JV company in Hong Kong and SBC had established good relationship
	Maintain good contact in name of ICJV	All matters were resolved in name of JV	JV seldom contact local authorities	JV used to take part in public activities to maintain good relationship with junior local government
	Ask parent companies to maintain good relationship for ICJV	L played important role for relationship	Both parent companies maintained good relationship	Parent companies maintained good relationship with senior local government
	Maintain good relationship with local environmental authority	L-F JV and L maintained good relationship with environmental authorities	Both parent companies maintained good relationship	JV and SBC maintained good relationship with local environmental authorities
Review and renegotiation	Conflict/dispute review and renegotiation	Renegotiation emphasized in JV's daily problem-settling process	Usually renegotiate to settle dispute of construction problems	Conflicts and disputes among staff usually solved by renegotiation meeting organized by chief executive officer
Others	Conduct detailed feasibility study of project	Yes	Yes	Yes
	Appoint independent accounting auditor	Not necessary	Not necessary	Not necessary
	Insure all insurable force majeure risks	According to requirement of engineering contract	According to requirement of engineering contract	According to requirement of FIDIC contract condition

of an ICJV. The ICJV must select suitable subcontractors and suppliers, enter into a fair engineering contract with the client, and set up and maintain a good relationship with relevant local government authorities who are in charge of the project and other project parties. These measures would be elaborated based on the cases in this section. A summary of the measures in the operation phase of the three cases is shown in Table 4.

Subcontract

Subcontractor selection is very critical for the success of a construction project. Many research works have been conducted to study the relationship between the main contractor and their subcontractors. Setting up a strategic alliance with subcontractors was recommended by Kowk and Hampson (1997).

For Case 1, subcontracting was well developed in the Singapore construction industry. However, it was difficult to find a strong subcontractor to replace the absence of F company. Building subcontractors are small-trade specialists. Coordination became difficult for the local partner contractor and progress was not achieved. That is one of the main causes for the initial failure of this JV project.

At the PO and LKH JV project, the subcontractors and suppliers had a good relationship for a long period of time with the JV parties' parent companies. The project was located in the city center near the LKH company. Procurement was convenient and logistics did not present a major issue. The other advantage of this project's location was that there was never a security problem compared with a remote area, and thus providing special security at the site was unnecessary.

For Case 3, the SBC had a team of construction manpower and specialists and a whole fleet of equipment. The construction program was undertaken by the SBC, who was the main contractor and also the subcontractor. If certain work could not be undertaken by the SBC, it was very easy to find another large contractor to be the subcontractor because of the vast number of construction companies in China. In China, it is necessary to employ logistics agents, security firms, and pollution control specialists. It was, however, very difficult to find a good security and logistics company in China. The SBC had to apply for setting up logistic centers in some counties. Engaging a local security firm to handle site security problems and to avoid local residents' protests is a government rule in China. The local construction company must set up a security

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department that must report to the local police branch. In China construction projects, pollution is considered in cities, but in rural areas, security rather than pollution is the more serious consideration.

Engineering Contract

The engineering contract is an extremely important instrument in a construction project. It is a legal definition of liability and responsibility between the client and contractor and an instrument for allocating risk and profit between them. Different developers would prefer different contract conditions. The ICJV contractor should enter into the kind of contract that is familiar to avoid uncertainties of a project.

According to Bunni (1986), engineering contracts were originally drafted in a precise, legal language that would remain unequivocal even when subjected to detailed and hostile scrutiny by astute legal minds. However, as revisions were incorporated, the language become more complicated. In certain cases, the number of words in each sentence grew to a level beyond the understanding of the average reader. Theoretically, these sentences can only be easily and readily understood by 4% of the population (equivalent to an intelligence quotient of 130 and over). The tendering period is too short to study such a complicated legal and technical language.

Adopting current international construction contracts that are familiar to most contractors is one way for a better understanding of the contract conditions and clauses. These contract conditions are considered relatively fair by both contractor and client. Standard contract forms such as those issued by professional and trade bodies are recommended, such as the Institution of Civil Engineers, JTC, and FIDIC.

In China, FIDIC contract conditions are accepted by most investors and contractors. The local construction contract is written in Chinese. It is simple, but can be difficult to use. Because of the uncertainty of a project's underground conditions, such as an expressway, the client would normally allow for time extension and reimbursement clauses. For Case 3, PY, Downer, and SBC's JV considered it fair to allocate risks between the client and contractor based on FIDIC contract conditions.

In Singapore, the sample construction contract forms were compiled by the Singapore Institute of Architects, the Public Works Department, and the Construction Industry Development Board. Recently, the Public Sector Standard Conditions of Contract for Construction Works (COC) was introduced to enable a common contract form to be used in all public sector construction projects. Standardization will increase familiarity among users, reduce tendering efforts, and promote greater efficiency in contract administration. The COC contains the main core conditions. Provisions that are more project specific or agency specific would be incorporated in the particular conditions. In the two cases in Singapore, the contract forms are based on COC. This COC was useful to developers, consultants, contractors, or any company involved in public sector construction projects.

Good Relationship

Maintaining good relationships with other project parties and entities is critical for maintaining a stable JV. In the three cases, the JV and their parent companies showed good will to all parties involved in their project. Thus, the ICJVs won strong support for fulfilling the construction tasks.

Compliance with local culture and tradition is the best measure to win trust and receive friendly treatment from the local population. In Case 2, PO assigned its Japanese staff to reside in public apartments and to eat in hawker centers, as the local people do. The Japanese would then become accustomed to the local culture and tradition. For Case 3, PY and Downer chose staff with strong Chinese language abilities and cultural backgrounds for ease of coordination with local Chinese employees.

Establishing a good relationship with the host government and other entities, such as environmental authorities, can help to alleviate hostile attitudes and to collect useful information for marketing. This good relationship must be maintained either by the ICJV itself or with the help of parent companies. In Case 2, the JV seldom contacts the local authorities. All of the coordination and mediation works were done by their parent companies, which have a long history and solid relationship with the authorities. In Case 3, the three parent companies knew that good guanxi was very important for the survival of a new JV. When the ICJV was set up to bid on the project, PY and Downer invited local authorities and clients to visit the JV company in Hong Kong to show them that both parent companies were sincere in the ICJV and the project. At the same time, SBC actively contacted the local senior government officials in the project location to win their trust and support. In Case 1, although both L and F companies were close to the local government, this relationship nevertheless did not help in getting approval from immigration authorities for sending staff from F to Singapore as a result of their unfamiliarity and noncompliance with the rules and regulations.

Review and Renegotiation

Last, but not least, reviews and renegotiation of conflicts should be emphasized in managing a successful JV. When parties engage in joint problem solving and come to a mutually satisfactory solution, it enhances partnership success. The impact of conflict resolution on the relationship can be productive or destructive. Renegotiation is one of the more reliable conflict resolution techniques. It belongs to constructive resolution techniques, including joint problem solving and persuasion (Mohr and Spekman 1994).

In the three cases, a problem-resolution technique using negotiation is practiced. Both the parent companies and the JV project leaders realized the incentive of using negotiation to settle internal conflicts. The top and middle managers knew that the use of destructive conflict resolution techniques (e.g., domination, confrontation) were seen as counterproductive and would cause a strain in the partnership. The weekly coordination meeting was viewed as the most important opportunity to resolve problems at the sites. Some of these problems were between the ICJV and the subcontractors or other project parties, and some were between the partners. These problems and conflicts were usually discussed and resolved in the meeting or after the meeting by the project manager and his vice project manager. The most critical problems were handled by the directors, through telephone communication or an immediate meeting.

Other risk mitigating measures were also adopted in the cases studied. A feasibility study of the projects was conducted so that the projects could be smoothly implemented in the form of a JV.

CONCLUSIONS

The analyses of the risk mitigation measures have shown that the risk management model could be a useful process model for implementing a successful construction JV. The critical risk factors must be systematically studied from the perspectives of internal, project-specific, and external risk groups, and in combination with the ICJV's development stages. To mitigate the risk factors in a JV, one must develop appropriate strategies, particularly in the start-up and operation phases.

The three case studies show that the important measures

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must be adopted when a company decides to enter into an ICJV. It must consider the local partner's financial and management ability, its industrial relationship, and its relationship with local government. Another effective measure is to insist on drafting a good JV agreement that clearly defines each partner's responsibility and liability. The terms and clauses of agreement should be drafted in simple language for both partner's employees understanding. It is also necessary to ensure that critical staff are unbiased and experienced in joint management and have mastered the local language. It is preferable to adopt a one-partner-dominant style of management when one partner is strong enough to handle major construction works.

When the ICJV enters into the operation phase, it is critical to choose experienced and familiar subcontractors and suppliers, and to employ an influential local organization or individual, particularly as a logistic agent in a developing country to strengthen the ICJV operation. A fair engineering contract that includes time and cost adjustment clauses with its client is vital. Another measure is to maintain a good relationship with the host government and the local authorities. Finally, constructive conflict and dispute resolution techniques must be carried out throughout the life of a JV. Renegotiation needs an attitude of mutual respect and patience.

From the three cases, it can be concluded that the measures in the model are essential for an ICJV in Asia. The risks of an ICJV would be different from project to project with different participants. But the most critical risk factors exist in the financial aspects of JVs, government policies, economic conditions, and project relationships. It is hoped that the risk management model proposed in this research would help decision makers consider thoroughly the necessary management measures to improve the performance of an ICJV.

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