İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

RISK MANAGEMENT IN INTERNATIONAL CONSTRUCTION JOINT VENTURES (ICJVs)

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ULUSLARARASI YAPI ORTAK GİRİŞİMLERİNDE RİSK YÖNETİMİ

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FOREWORD / ACKNOWLEDGMENT

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Faruk DUMAN, Eng.

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LIST OF ABBREVIATIONS

ICJV	: International Construction Joint Venture
GATT	: General Agreement on Tariffs and Trade
JVs	: Joint Ventures
FDI	: Foreign Direct Investment
B.O.T.	: Build-Operate-Transfer
ADR	: Alternative Dispute Resolution
R&D	: Research and Development
ENR	: Engineering News Record
ITU	: Istanbul Technical University

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RISK MANAGEMENT IN INTERNATIONAL CONSTRUCTION JOINT VENTURES (ICJVs)

SUMMARY

The chaotic start of the new century has brought new challenges for firms, industries and countries. Most significant challenge is risk factors. Success in such times is demanding new perspectives on risk management. Detailed structuring of risk factors and sub-titles of them about international construction industry within the thesis and also some management measurements are included in the study. Also by the help of the grouped risk factors there is a survey and its evaluation parts in the thesis.

To introduce the content of the study, the thesis identifies risk factors and some management measurements to that factors and finally some analysis for construction industry and construction firms. The focus of the study is identifying and explaining the basic formation of the risk factors as organizing strategic approaches to form an international construction joint venture and some managerial measurements according to these factors. Mentioned risk factors are studied with their sub-titles. Chosen risk factors are primarily grouped as 1) internal risk groups, 2) project-specific risk group and 3) external risk group. Then the same risk factors are grouped according to the project phase as 1) start-up phase 2) operation phase 3) dismantle phase.

Accordingly, in Chapter 1, introduction to the topic, research objectives, the purpose and the content of the study are presented briefly and in Chapter 2, the study continues with a description and analysis of the construction industry. Accordingly, production and process characteristics of the construction industry are reviewed with trend analysis and business environment understanding in construction.

In Chapter 3, risk management and joint venture issues are examined according to the international construction. In this chapter there are both the grouping and examining the risk factors and also explaining the organizational structure of the joint ventures.

In Chapter 4, there are the survey results according to the mentioned risk factors. Also there are the evaluation and examination parts of the survey in this chapter.

Finally in Chapter 5, findings and conclusion of the study are presented; and suggestions for the future research are outlined.

In terms of the methodology, at first there is a literature review on risk management and joint venture issues in international construction. Then according to the founded risk factors there are the results of the conducted survey. Finally there are some explanations and recommendations about the findings and future studies.

ULUSLARARASI YAPI ORTAK GİRİŞİMLERİNDE RİSK YÖNETİMİ

ÖZET

Yeni yüzyılın başlangıcıyla beraber, firmalar, endüstriler ve ülkeler için rekabet edebilirlik anlamında yeni güçlükler ortaya çıkmaya başlamıştır. Bu güçlüklerden en önde geleni de risk faktörleridir. Bu yeni durumda başarı; risk yönetiminde yeni bakış açılarını yakalayabilmek ve belirlenen risk faktörlerine karşılık en etkili risk yönetim önlemlerini almaktır. Tez çalışmasında risk faktörleri ile ilgili ana başlıklar ve detaylı alt başlıklar ortaya konmaktadır. Ayrıca çeşitli guruplara ayrılmış olan bu risk faktörlerini ele alan bir anket sonucunun da değerlendirilmeleri bulunmaktadır.

İçerik olarak bu çalışmada inşaat sektörü ve inşaat firmaları için risk yönetimi analiz edilerek etkili risk faktörlerine karşılık yönetim önlemleri tanımlanmaktadır. Çalışmanın odak noktası, uluslararası yapı ortak girişimlerinin oluşturulmasındaki temel stratejik yaklaşımların ve bu ortak girişim projeleri sırasında ortaya çıkan risk faktörlerinin tanımlanması sırasında alınması gerekli yönetim önlemlerinin anlatılmasıdır. Belirlenen risk faktörleri aynı zamanda alt başlıklar altında incelenmektedir. Seçilen risk faktörleri öncelikle üç ana başlık altında toplanmaktadır: 1) içsel risk gurubu, 2) projeye özel risk gurubu, 3) dışsal risk gurubu. Belirtilen risk guruplarındaki faktörler daha sonra projenin 1)başlama 2)operasyon 3)teslim aşamalarında da ele alınmakta ve incelenmektedir.

Bu bağlamda, Birinci Bölümde, konuya giriş, çalışmanın amacı, araştırma ve kullanılan çalışma çerçevelerinin kısaca sunumu yapıldıktan sonra İkinci Bölümde, inşaat endüstrisinin tanımı ve analizi yapılmıştır. İnşaat endüstrisinin ürün ve süreç özellikleri, trend analizi ve inşaat sektörü iş alanında gözden geçirilmiştir. Üçüncü Bölümde, risk yönetimi ve ortak girişim konuları uluslararası yapı çerçevesinde ele alınmıştır. Bu bölümde risk faktörlerinin detaylandırılması ve guruplandırılması yapılırken aynı zamanda ortak girişim projelerinin organizasyon yapıları ve oluşum stratejileri ele alınmaktadır.

Dördüncü Bölümde, daha once belirlenmiş ve guruplara ayrılş olan risk faktörlerinden derlenmiş bir anketin sonuçları gözler önüne serilerek çıkan sonuçların değerlendirilmesi yapılmıştır.

Sonuç olarak Beşinci Bölümde ise çalışmada yapılan saptamalar ve varılan sonuçlar sunulmuş, gelecekte yapılacak araştırmalara öneriler ortaya konmuştur.

Metodoloji olarak, risk yönetimi ve ortak girişim projeleri ile ilgili literature taraması yapılmıştır. Bu taramadan ortaya çıkan sonuçlar doğrultusunda en çok rastlanan risk faktörlerinden bir derleme yapılmıştır. Elde edilen risk faktörlerinin guruplandırılmasıyla birlikte anket uygulamasına geçilmiş ve veriler doğrultusunda yorumlarda bulunulmuştur. Bu sonuçlar yorumlanırken alınması gereken yönetim tedbirleri de aynı zamanda incelenmiştir.

1. INTRODUCTION

Even though international construction is not a new phenomenon, globalization provides the possibility of new opportunities to construction companies. Developing countries need new infrastructure and buildings and welcome specialized contractors from industrialized countries. The lowering of international barriers also allows construction companies to conduct business in developed countries such as the United States and the European Union. But the international construction business is sensitive to world events and it entails political, financial, cultural, and legal risks. Understanding the opportunities and threats associated with international markets and assessing a company's preparedness for international ventures are crucial to the growth and sometimes the bare survival of construction companies.

There exist several reasons for construction firms to expand their business into international markets. These reasons include stagnant domestic markets, spreading risk through diversification into new markets, competitive use of resources, and taking advantage of the opportunities offered by the global economy. Technological advances, political reform, worldwide trends toward privatization and an increasing recognition of economic interdependence, represent the primary forces of globalization (Hutton 1988; Kennedy 1991). The global economy has created business environments that differ radically from those of the past. Agreements such as the Uruguay Round in the General Agreement on Tariffs and Trade (GATT) have fundamentally changed the structure of the construction industry. The globalization of construction markets now allows local construction companies to compete internationally (Han and Diekmann 2001).

In the global economy, no market is forever safe from foreign competition. Even when companies stay at home, they eventually have to face foreign competition. The nature and direction of international trade in construction depends upon the global distribution of construction activity as well as the distribution of wealth. Although the economies of most countries are affected by the state of the industrialized economies, the demand for design and construction services in certain international

markets can be high when it is low at home (Kangari and Lucas 1997). Also, structures are expensive and can be financed most easily by countries with large savings or the capacity to borrow. While there are a large number of United States and Japanese contractors that undertake international work, there are also a large number of foreign companies doing business in the United States and to a lesser extent in Japan. The rate at which this shift toward a more integrated global economic system is occurring has recently been accelerating (Hill 2000). All companies should plan for survival and growth in a world of global competition (Root 1994).

International construction is much riskier than domestic construction. The complex international environment is affected by diverse variables that are not part of the domestic markets and that create risks never encountered in domestic conditions. The complex variables that affect the performance of construction companies in overseas markets need to be considered in this decision. Furthermore the threats and opportunities associated with target countries should be well understood (Hastak and Shaked 2000).

Globalization creates an environment in which firms struggle to win projects in traditional markets and expansions of their markets (Naisbitt and Aburdene 1990; Cetron and Davies 1991). In their own markets, stronger outside competition is causing firms to gather additional strength through the use of joint ventures (Yates and Aniftos 1996).

Similarly, as markets erode due to competition, firms need to seek project revenue from outside their home territories. They often joint with firms local to the new territory, to assemble local knowledge or relationships into a venture, thereby reducing risk and creating a partnership that clients will find effective and trustworthy (Kilmann and Kilmann 1991; Shen et al. 2001).

Over the past two decades there has been an unprecedented change in the nature of global business environment. Joint ventures (JVs) have emerged as a popular strategy in an environment in which fast access to up-to-date technology and emerging markets is more critical than ever before (Yoshino and Rangan 1995). JVs occur when two or more legally separate bodies form a jointly owned entity in which they invest and engage in various decision-making activities (Geringer 1991). The

increasing magnitudes, complexities, and risks associated with major construction projects have brought together organizations with diverse strengths and weaknesses– to form JVs to collectively bid for, and execute projects (Kumaraswamy et al. 2000). A JV may be termed International where at least one of the parties (or parents) is based outside the country where the venture is taking place (Geringer and Hebert 1989).

Construction organizations have extensively used international JVs as a vehicle to enter new construction markets around the world. The number of international construction joint ventures (ICJVs) is growing worldwide at an increasing pace, especially in developing countries (Lim and Liu 2001). Developing countries see ICJVs as one of the best instruments for meeting the competing interests of national development and the prevention of the domination of the economy by foreign investors (Sornarajah 1992). The use of ICJVs basically stems from theories on how strategic behavior influences the competitive positioning of a construction organization. According to Kwok et al. (2000) ICJVs can be in one of three legal forms (i.e., corporation, partnership, or contractual/consortium).

Recent published works on ICJVs have addressed such issues as: (1) motivation behind ICJVs formation including: market access, technology transfer, risk sharing, and conforming to host government policies (Reszka and Edwards 1997; Sridharan 1997); (2) associated advantages and disadvantages (Carillo 1996; Norwood and Mansfield 1999); (3) critical success factors (Fan and Fan 1998); and risk analysis and management (Bing et al. 1999; Kwok et al. 2000; Shen et al. 2001). The majority of these works have focussed primarily on risk and/or success factors without relating these factors directly to the performance of ICJVs.

1.1. The Purpose and Scope of the Study

International construction projects are those in which the contractor, the lead consultant, or the employer is not of the same domicile, and at least one of them is working outside his or her country of origin (Stebblings 1998). The construction industry is complex and multidimensional, and to improve this situation, the major construction projects in developing countries are often carried out in joint ventures with construction companies from developed countries. International collaboration can be of particular benefit to less-developed and developing areas. Transglobal

economic developments offer an opportunity to develop products using the most up-to-date expertise and knowledge in a cost-effective manner (Clark and Ip 1999). International projects are normally fast paced but require a longer time span, and more parties are involved. Collaboration between the concerned parties requires clear project definition, and each set of objectives under the definition may be subject to changes as the project evolves.

Parties to international projects are also concerned with the clarity of local laws and the interpretation of those contracts governed by local laws. Transglobal collaboration calls for greater cultural understanding and sensitivity in terms of personnel management by the concerned parties. Human problems are involved, such as language, communication, and the understanding of cultural differences. It is generally acknowledged that the contextual environment of a country or region also influences the construction industry of each jurisdiction.

International construction involves all of the uncertainties common to domestic construction projects as well as risks specific to international transactions. Consequently, despite the worldwide trend toward globalization, a very small portion of contractors actively seek international contracts due to concerns of probable failures. The participants demonstrated either weak risk seeking in profit situations or strong risk seeking toward loss situations when choosing between conflicting options of risky opportunities and sure payoffs.

Joint venture has become an important sector in the global construction industry. However, the difference in management systems, technological practice, and cultural background among the partners within joint ventures brings difficulties to the function of joint venture. A significant degree of risk is involved in joint venture investments. Thus, foreign firms increasingly intend to spend more effort in studying proper strategies of managing risks in their joint venture businesses.

In the lights of the mentioned situations above; the initial driving question in this research is arisen by noticing the importance of risk management in construction industry for being successful. At this junction, this study aims to overview the specific characteristics of construction industry, international construction and the term joint venture. It also bears two important points to be recognized;

- Construction industry is one of the major businesses for international trade and improving the living standards of a developing country such as Turkey; can only be achieved by obtaining sustainable risk management on the market.
- Risk management in construction industry is an important topic for developing countries and this could only be ameliorated with an analytical and detailed thinking about the project based conditions, industry, market and participants.

Finally, through the subject matter, the study aims to provide an insight for future executives of international construction joint ventures about risk management and serve as an initial step for future studies on the topic.

1.2. Research Objectives

The risk management issue is highlighted in many sub-stages within this study and the goal of this dissertation is founded to investigate and understand the risk management concerns in international construction joint ventures and analyze the issue according to the changeable conditions of joint ventures.

The objectives of this research are to;

- Overview the specific characteristics, trends, market and business cycles of the construction industry.
- Explain the central concepts of risk management and basic analytical tools of evaluating risks in international construction joint ventures.
- Overview the core risk and risk management in international construction industry and highlight risks in international construction by joint venture case risk management tools.
- Outline previous studies and survey results about international construction and joint ventures.
- Identify risk management and risk analyzes of Turkish construction firms in international construction joint ventures by a new survey.

- Conclude general outcomes of the survey and the study and identify areas for future research.

1.3. Content of the Study and Methodology

After reviewing the purpose, research objectives and content of the study in Chapter 1, the thesis continues with a description and analysis of the construction industry in Chapter 2. This section also includes the important aspects of the construction industry and its market conditions. By taking these features under question, a comprehensive understanding of construction business is provided.

In Chapter 3, the concepts and the tools about risk and risk management are described. Also the types of joint ventures, its properties and importance in international construction industry for the participant firms are discussed.

In Chapter 4, there is a single survey on Turkish firms and the international firms in Turkey about joint ventures and risk management concepts. In the conclusion part there is a comparison on the previous studies and the new study done.

Findings and conclusions are presented in Chapter 5 and the evaluation of possible ways for further analysis of risk management in international construction joint ventures.

In terms of methodology; the concepts and definitions suggested by various authors are used to form a basis of risk management and its necessity in international construction, especially on joint venture type business relations. Then, there is a detailed knowledge on the tools about factors that causes joint ventures and international construction risky. We will examine the previous survey results briefly and there will be a new survey and results of it. According to the findings there will be an evaluation of previous and current survey results.

2. THE CONSTRUCTION INDUSTRY

Construction industry is considered to be an engine in the national economy. It is a large business and has many important links to the rest of the economy. The role of the construction industry becomes even further important for the countries in the process of industrialization. The apparent reason for this is the requirement of construction activity for roughly all types of investments (Stallworthy and Kharbanda, 1985). Literally, construction industry is considered as "locomotive" sector in that it leads and stimulates other commercial activities in an economy. For this reason, it is seen as a crucial sector for most of the countries for functioning notional economy (Oz, 1997).

Construction industry has contributed more than $448 billion (ENR, 1995, Langford 2001) in terms of annual value of direct world construction put in place (Directly and indirectly it is assumed $3.2 trillion) and this constitutes about %6.5 of the world's Gross Domestic Product(GDP).

2.1. Characteristics of the Construction Industry

Every industry has its own characteristics. Construction Industry has also its unique ones. In literature there are various definitions for the characteristics of the construction industry. Here, the classification made by Sugimoto (1990) is employed as the main framework and tried to be enhanced by adding other items to shape a quick list of more theoretical and fundamental understanding of construction industry.

(1)Experience-Good and Customization Characteristics:

It is defined by Sugimoto (1990) that each output of construction production is customized to best fit the features, quality, cost and location a client requires and whole set of construction activities occurs only once for one particular output. Consequently, customization of construction activities makes the output of construction production an "experience-good" and compared to a "manufacturing

good", whose quality is evident on inspection before purchase, the quality of an "experience-good" is determined only by using it after purchase. Customization of production also makes the services an "experience-good" provided by a construction firm from client's perspective because the quality of the services cannot be established by client until a planned output is completed and actually used. The "experience-good" characteristic of services provided by a construction firm makes the past experience and reputations of the construction firm an important source of competitiveness. Also, costs incurred in searching for the most appropriate construction firm seems to be closely related to bidding procedures and from submission of a pre-qualification to the final decision-making. (Sugimoto, 1990)

(2)Immobility of the Final Outputs of Construction:

Ultimate outputs of construction are usually immobile and once they are built, they remain in place principally. Certainly, there can be some mobile outputs, such as floating plants etc. However, they are rather exceptional and are transported like other capital goods, e.g. heavy machines and equipments, ships and airplanes. Immobility of the final output necessitates the production at its planned location. A large part of construction production, not only physical production activities but also services, such as project management activities and supervision of design, must take place at the location where the output is to be built. (Sugimoto, 1990)

(3)Large Fixed Capital:

A final construction output requires a substantial capital expenditure compared to final outputs in other industries, such as consumer products. It should be noted that the size of the capital expenditure depends on the size, type, and planned features of an output and it begins to gain more value, when the client does not have enough sources for financing its demand (Sugimoto, 1990).

(4)Specialization and Diversification in Product Segments:

Construction firms construct physical facilities in all industrial sectors so that the final outputs of construction are of many kinds. Traditionally, these outputs have been conveniently divided into two categories by type of owners, private and public. The former includes individual, commercial and production facilities while the latter is intended for public uses. Since different segments require different expertise and such expertise assures acquisition of contracts, firms in the construction industry

have a motivation to specialize in certain segments both in physical production and management. On the other hand, demand for a particular kind of facility is defined generally being influenced by two different factors, those specific to the industry to which the facility belongs and the country in which is located (Hillebrandt, 1974). Consequently, demand for a certain kind of facility is subjected to complex fluctuations and to minimize such risks, firms may diversify into several product segments. However, determining the optimal degree of specialization and diversification is defined by Sugimoto as a complex decision and the segments in which a firm chooses to compete may depend on the balance between its internal resources and the competitive environment in the segment. (Sugimoto, 1990)

(5) Specialization and Vertical Integration in Functions:

According to Sugimoto, in the construction industry there are in general, four kinds of firms. First, there are specialty contractors specializing in physical erection of facilities and each usually specializes one of different kinds of work, such as erecting concrete or steel structures, placing concrete forms, pouring concrete, finishing floors and walls, and so on. Second, contractors specialize in managing labor. Third, design firms specialize in designing architectural and engineering facilities. Fourth, engineering firms specialize in designing and performing feasibility studies and other pre-construction activities for industrial and other complex facilities and these firms perform different functions in constructing a facility. Nevertheless, the distinction between these types of firms is defined by Sugimoto as often blurred through vertical integration in functions. To illustrate, an engineering firm, which is considered as a design firm "vertical integrated" with all sorts of pre-construction activities and may engage in project management and a contractor, can acquire the ability to design a facility and perform many pre-construction studies. Moreover, the border of the construction industry itself is defined as blurred as firms gain the ability to provide a financial package, which might otherwise be provided by a client or financial institutions. The degree of a firm's specialization against vertical integration of functions depends on the types of contracts in which the firm engages, a client's request to a construction firm to perform particular functions, or on a decision of firm as a part of its competitive strategy. (Sugimoto, 1990)

(6)High risks and uncertainties:

During construction processes, there are several uncertainties including the design process, the bidding process, the awarding of contract and so on. Thus risk and uncertainties put a major factor in the construction procedure. For instance, the owners or authorities may suddenly throw out all bids for some reason. In addition to this, at the work site conditions may be quite different from the original plan, also accidents, unpredictable disasters, such as earthquake, and fire add up some risks in the construction procedures.

(7)Flexible prices of structures:

Unlike many other industries, which issue a catalogue of their products with accompanying prices, there is no catalogue of prices of buildings or structures. Pricing in the construction industry is unique and sales prices of the products cannot be decided in advance. It is only when the nature of the desired product is determined through design plans and specifications that it can be priced exactly and correctly.

(8)Unique bidding basis:

Bidding arrangements are used for each construction structure and every project is priced separately and distinctly in the form of a bid for that particular project. Bidding provisions can vary, depending on whether the contract is let on lump-sum, fixed cost, cost-plus, guaranteed maximum price basis or etc.

(9)Relative subcontracting system:

General contractors cannot do everything in a construction project effectively. They do not have the expertise, enough manpower or supervision; so, they rely on the subcontractors. The subcontracting system is special in the construction industry in that it permits the kind of flexibility required whereby various mixes of contractors and crafts must be mobilized to suit the unique requirements of particular project. Also, subcontractors make possible the rapid mobilization and dismissal of crafts for a project as changes in the kind and volume of the project varies.

(10)Contingent, informal communication system:

In some industries formal communication is possible; however for the construction industry it is a hard one. The formal system supposes that everything is clear on the plans and in the specifications. Since most of problems which happen on the site

have to be solved quickly, acceptance of verbal decision and face to face relationships without formal procedures are normal methods of operating construction projects. These things may require shifts in plans and decisions and there is no time to follow the formal lines of communication. Even though construction is increasingly becoming formalized, with a stress on documenting decisions and lots of letter writing, the predominant mode of operations on the job site is still be named as contingency and informality.

(11)Considerable hand tool technologies:

Automation can bring industry revolution and this is happened in manufacturing industries. However, the construction industry is one of the few industries which still relies heavily on hand tools and a handicraft technology. Depending on the craftsmen, leads contractors to rely on the skilled workers to create the products and even the engineers and architects have to rely on the craftsmen to interpret their plans and carry out their intentions.

(12)Ambiguity of goods and service production of construction firms:

Particular to the specialization of functions of construction firms, there is a difficulty in defining their production: Although the construction industry is usually categorized as a service industry, firms in the construction industry produce both goods and services. Like manufacturing firms, most of the contractors produce a large amount of physical output while architecture and engineering firms may not produce any physical output directly. In addition, there are significant physical inputs, such as materials and equipment, into the construction process from suppliers, and the final outputs of the industry are goods. According to Sugimoto, theoretical treatment of construction production has not been sufficient enough to address this ambiguity in a systematic way and it is important to determine whether the construction industry is a service, manufacturing or distinctive industry which involve aspects of both. According to Sugimoto, if the construction industry and its production are unique, it is theoretically misleading to apply ideas established for other industries to the construction industry and its firms.

(13)International Involvement of a construction firm:

Manufacturing firms usually supply foreign markets in three primary modes: export, foreign direct investment (FDI) including equity-base joint venture, and others

requiring a loose commitment with a local firm (e.g. technical training, patent licensing, franchising, management service agreements, and non-equity cooperative agreements). These alternatives enable manufacturing firms to serve foreign markets and selection of the one of these modes is subject to the economic, political, and strategic judgment of the management of these firms.

In the construction industry, the ways of serving a foreign market is defined to be less straightforward by Sugimoto because of the unique production process and subsequent industrial structure of the industry. To illustrate, Seymour (1987) defined modes of foreign involvement based on the terms and concepts used in manufacturing firms for construction, such as FDI, joint venture, licensing, etc. However, for this point Sugimoto (1990) found Seymour's (1987) straightforward application of such modes unsuccessful for providing an appropriate interpretation for construction. According to Sugimoto (1990), Seymour's analysis (1987) underestimates the importance of the fact that production in the construction industry is basically carried out on a contractual basis, even in a turn-key contract. He defines some exceptions such as B.O.T. (Build-Operate-Transfer) contract where construction on equity exits.

(14) International Organization of a construction firm:

The international organizational units of the construction firms are typically classified into three primary forms, headquarters, foreign subsidiary, and project office, based on the roles played. According to Sugimoto (1990), in previous decades, a construction firm might be organized in such a way that headquarters performed all necessary inputs in the host country and performed the remaining project management activities. In this situation, the competitive advantages of construction firms would be nothing more than the static ones but he explained the current situation as being a more complex one. He also states that parallel to the changing technology the role of each organizational unit has also changed dramatically, and the rigid distinctions between headquarters, subsidiary, and the project office may mean little to construction firms. In addition, technology advances in communication not only allow firms to transmit work done at one location to multiple locations simultaneously but also give them the flexibility to decide where to perform a particular activity. Most importantly, reasons for giving to headquarters

and subsidiaries duplicated roles may diminish; each project office may not need a whole set of engineering and project management capability.

He concludes that to complete a project at one location firms are required to coordinate activities performed at several locations thus, construction firms which compete on the basis of firm-specific knowledge may need to coordinate such knowledge over their whole organization to be competitive in contemporary markets.

2.2. The Environment of Construction Industry

The structure and the environment of an industry directly influence the risks of the industry. In this section, the environment of construction firms and changes in processes and the market structure briefly stated along with some analytical concepts developed for the industry.

2.2.1. Business Environment of Construction Industry

Construction is often reported as being a fragmented industry and a fragmented is defined as 'one in which no company has a significant market share and is able to influence considerable outcomes within the industry' (Langford, 2001). Within this frame, a large number small and medium-sized companies and a small number of large companies usually inhabit a fragmented industrial structure.

Contracting is also defined as a geographically dispersed project-based industry with markets that operate from local to the international level. As project size, complexity, technology and international location enter the frame of reference, there are fewer and fewer companies able to undertake particular type of projects and accordingly fragmentation tends to decrease along the way. Construction is also a hierarchical industry designated by size of firm, where many small companies are tending to act as subcontractors to large companies and it is at the small firm end that fragmentation is most outstanding (Langford, 2001).

Therefore, the construction industry can be characterized as first, geographically dispersed and over-lapping market structures and second, is hierarchically structured is terms of company size. Large firms with specialist divisions and regional offices can manipulate resources to compete in a trendy sector of the market, however without a specialist division or a regional structure; a firm usually may find it

difficult to break into new market areas. Also, the traditional medium-sized building firm, based in depressed region has been worst hit by changes in demand (Langford, 2001). In this regard, risk management and strategic planning could equally have helped these firms to survive during periods of market change.

2.2.2. The Processes and Professions in Construction

Construction is essentially a large industry of small firms which is staffed by predominantly young, male, and casually employed operatives (Langford, 2001). The professions related with the construction industry may be seen as 'generalists' as similar with contractors, in order to increase and maintain flexibility. They tend to adopt a generalist attitude to their work in the face of changing market. To illustrate, architects are not inclined to specialize in one particular building type or method of construction. Langford (2001) states that the strategic choices of professions are related to their markets and most of them have chosen flexibility as a mechanism for survival and growth similar to contractors. He also adds that the generalist attitude is mainly related with the product rather than the service being provided to the clients.

In terms of design practices, important changes have taken place for the strategic role of the architect in the construction process. Traditionally architectural work undertaken by private practices varies with the size and turnover of the practice. To generalize; the smaller practices deal mainly with private individual clients or with larger clients requiring small-scale works and the larger practices are able to deal with corporate clients (Langford, 2001).

According to Langford (2001) by 1990's the perceptions of the architect's role in the construction process has started to change with new procurement methods introduced such as, management contracting, construction management, project management, prime contracting and design & built methods. Moreover, the old tradition of design as a separate entity from production is in the face of integration with processes such as design and built arrangements and prime contracting where approaches are evident.

Another point for professions is that current construction processes are replacing 'historically strong craft tradition' with the increasing role of prefabricated

components. This change brings a new set of skills for workers at the site and the craft process being transferred to off-site production centres (Langford, 2001).

2.3. International Construction

For many industries, large scale internationalization began after the Second World War, due to the great need for the transfer of technologies, skills and infrastructure. Accordingly, many of the domestic firms easily operate in overseas markets and sought opportunities. For Turkey, many construction firms specifically began to explore opportunities by 1970s in dominantly Middle East and North Africa locations. This is mainly due to two reasons (1) the decline in domestic demand and (2) new opportunities emerged as industrial, commercial and infrastructure expansion in Middle East Countries as a consequence of soaring oil prices and wealth.

Bon and Crosthwaite (2000) estimated the global construction market is over $3000 billion annually and according to Drewer (2001), $800-$1000 billion of the global construction output is undertaken by the '*international construction system*' currently; comprising firms operating throughout the world.

2.3.1. Classification of International Construction

International competition can be seen in many forms. In one extreme it can take the form of multi-domestic international competition which is largely independent within each country. An example of this type of international activity would be banking where in a country it has its own distinct customers, own assets and own reputation. At this end of the scale the international construction industry can be seen as a collection of domestic industries. Even though there may be *multinational* firms operating in the industry, each firm's competitive advantages are basically confined to that country or region. At the other end, there exist *global* industries in which a firm's competitive position in one country or region affects its position in other countries or regions. Rival firms compete against each other on a truly *global basis* and firms attempt to *combine advantages in the international arena with those in the domestic arena*. Here, Flanagan (1994) distinguishes between *international, multinational* and *global* firms in the construction arena. Accordingly while many construction firms can be described as international in scope few would be typified

as being global or even multinational. The international firm has a *large domestic market* and *dependent satellites* in several countries. The *global firm* has a home base, but brands *independent companies* around the world, e.g. Sony, Hewlett Packard, Toyota (Langford, 2001)

For Turkey vast majority of construction firms operate mainly in the domestic environment and internationalize their services on this basis. It is usually very difficult for the majority of Turkish firms to operate in a foreign country as a multinational and global basis, thus most of their activities can be classified as being in the first stage of internationalization. However, firms such as ENKA and GAMA have significant international presence and they may be classified as *multinational firms* with their new branches in Ireland and Holland respectively.

2.3.2. Size, Structure and Major Players in the Market

In 1995, the global market for construction, expressed terms of contracts, awarded to the world's top 225 contractors exceeded $448 billion (ENR, 2000). This market is defined extremely attractive, not only for its size and direct potential for earning profit and generating foreign exchange, but also for the suppliers of equipment, materials and related construction services (Langford, 2001). Accordingly, most researchers acknowledge that the global construction industry is large. While the ENR report suggests that the size of the global construction industry in 1995 was around $448 billion, Bauml (1997) suggests that this figure may be somewhat overstated due to the degree of sub-contracting among the top 225 construction firms (Langford, 2001).

Langford (2001) generally attributed the increasing demand for construction related work on the global scale to a number of factors which include, world population growth, higher lifestyle expectations of developed countries and for basic needs of third world nations, greater demands for infrastructure and services and growth in aid programs for agriculture and commerce. Seymour (1987) modifies this background by referring to 'two factors' which have a significant effect on the international construction environment in recent years. He hypothesize that (Langford, 2001)

> '…the first factor to have emerged in international contracting…is the influx of contractors into the industry from less developed countries…and the

second factor…has been the lower level of demand world wide for international contractors service.'

These two factors, together with the historical view of the industry, suggest that, in order to operate successfully in the global market, it is necessary to be in possession of a complete, detailed and realistic understanding of the industry and the factors which influence it (Langford, 2001). As noted previously, the global construction industry is large, mature, highly fragmented and very competitive and this background should also be viewed as the nature of international or global construction.

It is also vital to understand that where the leading players originate when examining the global construction market. Therefore, a detailed understanding of shifts in the size and structure of the market is crucial for obtaining a working knowledge of the global construction market.

It is noted by the help of previous studies' data that US resident contractors has decreased significantly from 36.3% in 1990 to 16.6% in 1995, but had recovered to 24% by 1999, while the aggregated European contractors' share has marginally increased from 43.2% in 1990 to 54% in 1999. While comparing these figures with the figures for China and Korea he noted both countries showed increases from 0% in 1990 to 2.8% and 4.4% respectively in 1995. Considering the European group he states that only the UK has shown a market drop in share from 10.4% in 1990 to 4.9% in 1995, but again revives by 1999.

2.3.3. Reasons for Internationalizations

Langford (2001) defined the reasons for a firm to internationalize based on the outcomes of a *portfolio analysis*. Accordingly, if a firm cannot improve its competitive position within its traditional market, could diversify into other domestic markets, or internationalize. He also stated four basic strategic reasons for a firm's intention to internationalize. These are;

- Current portfolio no longer meets the firm's objectives due to; (1) market diffusion in the domestic market and unreasonable return on assets, (2) general turn down in demand in the domestic market, (3) competitive stress from other firms in the domestic market.

- The firm may have sufficient resources to internationalize and wants to expand its operations.
- Greater profitability is expected from internationalization than diversification due to; (1) internationalization opportunities are sufficiently attractive, (2) the firm's products or services which are highly sought in the international arena.
- '*Gross is greener syndrome*' encourages the firms. Consequently, though they have insufficient information for a complete analysis of internationalization opportunities, they rather *dive* into the overseas environment since there are other similar contractors doing the same thing.

Crossthwaite (1998) carried out research into the reasons why British construction companies internationalized. In his study he identified some reasons which include, *increasing long-term profitability, maintaining shareholders' return, balancing growth and the avoidance of saturation in domestic markets*. In addition, Crossthwaite also sought to establish what the firm's overall objectives and found that these were, *to hit new and booming markets, to protect the company against business cycle, and to maintain an edge over competitors*. Langford (2001) also stated individual firms may have their own and subjective reasons for seeking to internationalize, these are namely; *the desire to increase their profitability, spread their political economic commercial risk, avoid saturation in their own domestic market and to improve their competitive position.*

3. RISK MANAGEMENT and JOINT VENTURE ISSUES IN INTERNATIONAL CONSTRUTION

3.1. Risk Management

Risk management involves identifying, analyzing, and taking steps to reduce or eliminate the exposures to loss faced by an organization or individual. The practice of risk management utilizes many tools and techniques, including insurance, to manage a wide variety of risks. Every business encounters risks, some of which are predictable and under management's control, and others which are unpredictable and uncontrollable. Risk management is particularly vital for small businesses, since some common types of losses—such as theft, fire, flood, legal liability, injury, or disability—can destroy in a few minutes what may have taken an entrepreneur many years to build. Such losses and liabilities can affect day-to-day operations, reduce profits, and cause financial hardship severe enough to cripple or bankrupt a small business. But while many large companies employ a full-time risk manager to identify risks and take the necessary steps to protect the firm against them, small companies rarely have that luxury. Instead, the responsibility for risk management is likely to fall on the small business owner.

The term risk management is a relatively recent (within the last 20 years) evolution of the term "insurance management." The concept of risk management encompasses a much broader scope of activities and responsibilities than does insurance management. Risk management is now a widely accepted description of a discipline within most large organizations. Basic risks such as fire, windstorm, employee injuries, and automobile accidents, as well as more sophisticated exposures such as product liability, environmental impairment, and employment practices, are the province of the risk management department in a typical corporation. Although risk management has usually pertained to property and casualty exposures to loss, it has recently been expanded to include financial risk management—such as interest rates, foreign exchange rates, and derivatives—as well as the unique threats to businesses engaged in E-commerce. As the role of risk management has increased, some large

companies have begun implementing large-scale, organization-wide programs known as enterprise risk management.

3.1.1. Steps in the Risk Management Process

According to C. Arthur Williams Jr. and Richard M. Heins in their book Risk Management and Insurance, the risk management process typically includes six steps. These steps are 1) determining the objectives of the organization, 2) identifying exposures to loss, 3) measuring those same exposures, 4) selecting alternatives, 5) implementing a solution, and 6) monitoring the results. The primary objective of an organization—growth, for example—will determine its strategy for managing various risks. Identification and measurement of risks are relatively straightforward concepts. Earthquake may be identified as a potential exposure to loss, for example, but if the exposed facility is in New York the probability of earthquake is slight and it will have a low priority as a risk to be managed.

Table 3.1. Risk Management Processes

1. Determining the objectives of the organization
2. Identifying exposures to loss
3. Measuring those same exposures
4. Selecting alternatives
5. Implementing a solution
6. Monitoring the results

Businesses have several alternatives for the management of risk, including avoiding, assuming, reducing, or transferring the risks. Avoiding risks, or loss prevention, involves taking steps to prevent a loss from occurring, via such methods as employee safety training. As another example, a pharmaceutical company may decide not to market a drug because of the potential liability. Assuming risks simply means accepting the possibility that a loss may occur and being prepared to pay the consequences. Reducing risks, or loss reduction, involves taking steps to reduce the probability or the severity of a loss, for example by installing fire sprinklers.

Transferring risk refers to the practice of placing responsibility for a loss on another party via a contract. The most common example of risk transference is insurance, which allows a company to pay a small monthly premium in exchange for protection against automobile accidents, theft or destruction of property, employee disability, or a variety of other risks. Because of its costs, the insurance option is usually chosen

when the other options for managing risk do not provide sufficient protection. Awareness of, and familiarity with, various types of insurance policies is a necessary part of the risk management process. A final risk management tool is self-retention of risks—sometimes referred to as "self-insurance." Companies that choose this option set up a special account or fund to be used in the event of a loss.

Any combination of these risk management tools may be applied in the fifth step of the process, implementation. The final step, monitoring, involves a regular review of the company's risk management tools to determine if they have obtained the desired result or if they require modification. Nation's Business outlined some easy risk management tools for small businesses: maintain a high quality of work; train employees well and maintain equipment properly; install strong locks, smoke detectors, and fire extinguishers; keep the office clean and free of hazards; back up computer data often; and store records securely offsite.

In recent years, intensive research and development has been done in the area of project risk management. It is widely recognized as one of the most critical procedures and capability areas in the field of project management. Voetsch, Cioffi, and Anbari found a statistically significant relationship between management support for risk management processes and a reported project success. However, shortcomings and improvement opportunities in this field have been identified. Some of the shortcomings are related to the ever increasing complexity of projects. Subcontracting is expanding since many companies are focusing solely on their core businesses, which results in more complex project networks and greater numbers of project participants. The scarcely studied viewpoint in the project risk management field is related to this complexity. Although the interaction between project actors occurs at many different levels, research done to study how networks act in preventing or mitigating risks is moderate.

Construction projects are characterized as very complex projects, where uncertainty comes from various sources. Construction projects gather together hundreds of stakeholders, which makes it difficult to study a network as a whole. But at the same time, these projects offer an ideal environment for network and risk management research. Additionally, construction projects are frequently used in management research, and several different tools and techniques have already been developed and

especially for this type of project. However, there is a gap between risk management techniques and their practical application by construction contractors.

Risk management is one of the most critical project management practices to ensure a project be successfully completed. Royer stated:

> *"Experience has shown that risk management must be of critical concern to project managers, as unmanaged or unmitigated risks are one of the primary causes of project failure."*

Risk management is thus in direct relation to the successful project completion. Project management literature describes a detailed and widely accepted risk management process, which is constructed basically from four iterative phases: risk identification, risk estimation, risk response planning and execution, often managing the risk management process is included.

When dealing with risks, the potential for improvement should also be taken into account, for example to undertake the project with fewer resources or to take advantage of an unexpected window of opportunity. Risks are at the very core of the business: risks and opportunities are linked; there are no opportunities without risks related to them. Thus risks actually raise the value of a project; usually higher risks bring higher opportunities.

Since opportunities and threats are seldom independent, they can also be dealt with at the same time. For example, many researchers prefer to use the word 'uncertainty' instead of 'risk', to stress the point that a risk has two sides, both negative and positive. The purpose of the risk management process in a wider sense should not solely be to ensure a successful project completion but also to increase the expectations of project goals and objectives. It means that project risk management should be turned into project uncertainty management.

Risk management is not limited to a few processes, but includes much more in order to have a complete view of the suggested risk management process. One of the most crucial decisions in a project relates to the allocation of risks: who carries which risks. This is directly linked to this study; as it will examine how risks are mitigated and handled in project networks and which actors take responsibility for risk management. Before the decisions of risk allocations are ready to be made, the

attitude that project actors have towards the risk has to be determined. Before a project starts, every actor's strategy, as well as the ability to bear and manage risks, has to be known before risks are assigned to them.

3.1.2. Project Risk or Project Uncertainty?

Although risk is widely studied, it still lacks a clear and shared concept definition: risk is often only perceived as an unwanted, unfavourable consequence. Such a definition embodies two misleading concepts: first, among professionals there is an established consensus that risk needs to be viewed as having both negative and positive consequences. Second, risk is not only related to events, i.e. single points of action, but risk also relates to future project conditions. Conditions may turn out to be favourable or unfavourable. The point is that future project conditions are hard to predict in the early stages of the project life-cycle. In addition, conditions can change during the project life-cycle and the risk is that the conditions are different, and potentially more severe than was first estimated. Risks analyzed only as certain events are further criticised for not taking the degree of impact into consideration. Risks are seldom on-off-types, meaning that risks do not either happens or "not-happen", the impact of the risk varies greatly, depending on the conditions at the time of the possible occurrence. Variability and the level of predictability (uncertainty) of the future scenarios determine the quality of risk analysis done today.

Therefore many researchers have suggested that the term risk should be replaced with a more neutral term that could embody a larger scope of than risk traditionally denotes. The term uncertainty is suggested to replace risk because it can easily embody the variability and ambiguity of risk. As such it does not perfectly fill the need for a term that should dissipate the negative or positive nuances.

Chapman and Ward explain that uncertainty which matters are critical to all projects and that this uncertainty relates to more than just time and cost objectives of a project. An uncertainty includes for example problems like which parties ought to be involved, their motives and alignment of project objectives with corporate strategy. According to the authors, managing these uncertainties efficiently is a best practice in project risk management. Same authors continued that risks are caused by a lack of certainty and that uncertainty is especially prevalent in the early project phases.

Since not all factors can be predicted at the onset of a project, yet decisions still have to be made, there is a risk that the outcome of these decisions is something other then what is expected.

Risk has also other dimensions; many of them only recently introduced in the literature. For example Artto and Kähkönen point out that risk also has the dimension of perception: to whom the risk is adverse or significant, to whom the risk is opportunity or less relevant factor. Risk perception is identified as one of the major improvement areas in the development of risk management practices. Kähkönen suggests that the definition of risk could be localised in a way that it is defined more precisely in every specific case.

3.1.2.1 Project Risk Categorisations

Project risks can be categorised in a number of ways according to the level of detail or a selected viewpoint. Some of these later presented categorisations are merely a risk lists, while some of these categorisations are formed based on the source of risk, by impact type or by project phase. One of the most typical risk categorisations is presented in Table 3.2. This four-level categorisation is presented e.g. by Artto and Kähkönen. This categorisation tries to fade a project type and be a general categorisation. Risks are divided into pure risks (e.g. hazards and weather conditions), financial risks (e.g. cash flow or credit risk), business risks (almost anything that can happen in a project) and political risks, which refer to the certain political environment and risks that are caused mostly by extreme conditions, such as, among others, war. Risks in the project network can relate to any one of this list's categories. Project actors can cause hazards to one and other because of inexperience, lateness of their products, delivery failure or unmade payments (bankruptcy) or new government laws either in favour or disfavour of the project.

Table 3.2. Typical risk categorisation

1. pure risks
2. financial risks
3. business risks
4. political/country risks

Turner suggested that risks can be divided either according to their impact or by where the control lies. Thus these categories can be further divided into business risks, insurable risks, external risks and internal risks, for example bad weather is

external risks since it can't be controlled by a project manager and business risks are those risks that in generally have to be accepted in order to have an opportunity to take advantage of positive outcomes of a risk.

Miller and Lessard studied large engineering projects (for example constructing a new factory) and categorised risks according to their source. Market, completion and institutional risks are divided into three categories. Market risk is mainly caused by the demand uncertainty, completion risks refer to technical risks during and after the completion of a project (for example, will the capacity of a factory be as designed and planned). Institutional risks are related to the political uncertainties in a specific situation. They see that the whole project network should be utilised to manage risks, but their perspective is not that much co-operation than financially efficient risk allocation. They propose "a layering process" to systemically transfer, diversify and sell risks with financial instruments, real options and contract incentives.

Another division is made by Finnerty, whose book on project financing describes nine types of risk that are presented. This list is constructed from a project financing perspective, and corresponds with the construction-project specific risk categorisations. The reason for this similarity is probably that most project financing projects typically concern large engineering and construction projects. From these lists, it is harder to detect classes that would be sources for the risks caused by other actors or network dynamics.

Table 3.3. Risk categorisation according to Miller and Lessard

Market	**Completion**	**Institutional**
demand	technical	regulatory
financial	construction	social acceptability
supply	operational	sovereign

Table 3.4. Risk categorisation according to Finnerty

1. technological
2. completion
3. economic
4. financial
5. currency
6. political
7. environmental
8. force major

Categorisations help to form risk lists that are useful when identifying risks, but are inadequate when forming the whole picture. Obviously, many of the Finnerty's and Miller and Lessard's risks relate to the network structure; supply risks and political risks are the best examples of the risks that are caused by the other than the main contractor. Both of these lists are done from the main contractor's perspective, and are not that much concerning the optimisation of the whole network. Risk continuums were also a concern of one case company manager, who emphasized the need for risk structure with cause-effect relationships while preliminary discussion about this topic were held. Also Chapman has taken the idea of risks having relationships, he concluded that their interrelations can be described and it does matter whether the risks are in a series or in parallel. This adds motivation to co-operate in order to manage risks, since one actor's false move, however minor, may cause a more serious damage to the actor working in the later project phase. Ward and Chapman have identified five different categories of uncertainty (table 3.5.); they are succeeded by the risk categorisations.

Table 3.5. Uncertainty categorisation according to Chapman and Ward

1. variability associated with estimates
2. uncertainty about the basis of estimates
3. uncertainty about design and logistics
4. uncertainty about objectives and priorities
5. uncertainty about fundamental relationships between project parties

From their list of five uncertainty (risk) areas, fifth is the most interesting in my point of view. Here authors have recognised that difficulty to identify responsibilities, capabilities and proper mechanisms for coordination and control is "a pervasive source of uncertainty". They add that these relationships may or may not include formal contracts. Hallikas, Virolainen, and Tuominen have presented a network risk categorisation that divides risks in a network into four categories (table 3.6.). These risks are related to the external sources of risk, meaning that managing these risks means to manage or to cope with the project's external environment.

Table 3.6. Risks in the Network environment according to Hallikas, Virolainen and Tuominen

1. Demand related factors and value chain positioning
2. Delivery performance ability
3. Financial factors
4. Pricing

3.1.2.2 Typical Construction Project Risks and Uncertainties

Construction projects are characterized as very complex, always unique projects, where risks raise from a number of different sources. These projects are characterized by a continuous decision making due to numerous sources of risk and uncertainty, many of which are not under the direct control of project participants. Construction projects have a bad reputation of failing to meet the deadlines and cost targets. That's why identifying risk sources is extremely important, since it is not necessarily possible to identify single risks. Odeh and Battaineh studied the most typical reasons for construction delays in Far-East construction projects. They found seven significant causes of delays: owner interference, inadequate contractor experience, financing and payments, labour productivity, slow decision making, improper planning and subcontractors. These kinds of risks can be seen as network-related. Thus in order to have a successful project, it should be guaranteed by some means that all participants are experienced and trained to do the project: it matters what kind of network is conducting the work.

Table 3.7. Typical construction risk categorisation

1. technical	2. social
3. construction	4. economic
5. legal	6. financial
7. natural	8. commercial
9. logistics	10. political

Baloi and Price concluded an extensive literature study on construction project risks in two different categorisation perspectives;a broad risk list (table 3.7.) and an impact type list (table 3.8.).

Table 3.8. Construction risk categorisation by impact

1. dynamic vs. static
2. corporate vs. individual
3. internal vs. external
4. positive vs. negative
5. acceptable vs. unacceptable
6. insurable vs. non-insurable

Mills' list of three of the most important risks in construction projects includes weather, productivity of labour and plant and quality of material. Cohen and Palmer identified risk trends in construction projects. They found that typically, risks are determined at the very early phases of the project (feasibility and planning) while the impacts are not experienced until the construction and production start-up phases. Their list of typical sources for risks in construction projects is presented in table 3.9.

Table 3.9. Typical risk sources in construction projects according to Cohen and Palmer

1. changes in project scope and requirements
2. design errors and omissions
3. inadequately defined roles and responsibilities
4. insufficient skilled staff
5. force major
6. new technology

Dubois and Gadde found that complexity in construction projects comes from two basic sources; interdependence of tasks and uncertainty. Uncertainty has four sources: management is unfamiliar with local resources and local environment, lack of complete specifications for activities at the construction site, lack of uniformity of materials, work, and teams with regard to time and place and unpredictability of environment. Again, the bolded phrases indicate the sources with the highest relevance to this study. Dubois and Gadde's study's main conclusion was that the unstable and changing network is a major cause of the short-term sub optimisation hampering a longer-term productivity, innovation and learning. To reduce this uncertainty, a firm should consider at least four different types of coordination inside the network and think relationships longer than just one project's perspective. As can be seen from the risk lists and categorisations presented here, networks are the cause of risks to projects, both directly and indirectly. Indirect means that networks cause

significant uncertainties that pose risks to projects. All the bolded items in the section above relate to networks as sources of risk. Risks that are caused by people in networks are social risks, they might also relate to personal chemistry. Other network actors are not totally in one actor's control: their behaviour is uncertain, local conditions and politics slowed decision making and uncertainty about other actors' capabilities cause risks to projects. It is also very clear that these lists or categorisations are based on the assumption that risk is something negative and threatens the project. This is more prevalent in construction risk categorisations than in general project risk categorisations in the frequent use of terms such as "lack of " ,"inefficiency", and "errors", among others. Opportunities in their part are rarely mentioned, thought it is obvious that without, for example business opportunities, business risks would not be worthwhile.

3.1.3. Project Risk Management Processes

Risk management should be its own process in project management, but at the same time is closely tied in all project processes and phases. There are several suggestions to improve the project risk management process, three popular process models are compared in table 3.10.

Table 3.10. Comparison of typical risk management processes

Project Business	**PMBok**	**APM**
risk management	planning	define
		Focus
Identification	risk identification	Identify
		structure
		ownership
		estimate
estimation	qualitative risk analysis	evaluate
	quantitative risk analysis	
response planning	risk response planning	plan
risk management control	risk monitoring and control	manage

All of these processes basically have the same phases; only the level of detail in describing processes varies. All of them are meant to be iterative processes where risk management phases are kept ongoing during the whole project life-cycle. Risk management process should be implemented at the early project phases, when there

is still a possibility for fundamental changes. The project should be carefully analysed as to which kind of methods to use at which project phases and a process needs to be customised according to all project characteristics. The underlying reason for risk management is to ensure well-grounded and unbiased decision making. Artto and Kähkönen concluded various risk management processes generally to include three core processes, namely risk identification, risk estimation and risk response planning and execution. They also differentiate five accessory processes: risk management planning, risk communication, risk ownership development, risk management strategy and risk management control.

3.1.3.1. Risk Identification

The identification phase is stressed by many researchers. It is quite obvious that if we are unaware of the risks, it's difficult to manage them, though this view is limited to the event-type scope of risk management. It is presented the concept of risk from different perspectives, thus forcing on risks in a wider scope, moving from a single event-scope to wider uncertainty-scope. Chapman points out that since the risk management process builds heavily on the primary identification phase, the success of later risk management phases is directly comparable to the quality of the first identification phase. Skitmore and Lyons conclusions contrast previous statements. Their study showed that risk management processes are applied the most in the execution phase, not in the conceptual phase. Still their study and usage of different risk management techniques showed that identification is the most frequently used risk management element. This proves that risk identification needs to be a continuous process and an efficient identification process requires many iterative rounds in even the later stages of project execution to successfully meet the expected targets.

Detailed steps and methods in identifying and categorising risks are presented in many literature sources. Methods generally include brainstorming, risk checklists, expert analysis/interviews, modelling and analyzing different scenarios and analysing project plans. Additionally, sources of risk or uncertainty and sources of known unknowns should be listed. Ward and Chapman emphasise using an uncertainty perspective in the project risk identification phase, since they consider such an approach to be the best way to determine all possible sources of opportunities

(positive risks), not just threats. These identification lists need to be followed and updated as our knowledge and understanding of the project environment increases.

3.1.3.2. Risk Estimation

After the risks have been identified, they must be evaluated in terms of the probability of occurrence and impact. An understanding of the possible effects on project objectives is needed: since most projects have only a limited amount of resources to use for risk management, concentration on only the major risks is essential. Reliable estimates of likelihoods and consequences are needed for prioritisation. Risks can be assessed either using a quantitative or qualitative analysis. The most common ways are to estimate risk probability and impact in simple scales for example, from 1 to 5 or from high to low, boundaries can also be numerically defined. In figure 3 a probability-impact grid is introduced, which is one typical and simple way to map risks. On the grid, risks that require the most attention are easily detectable. Lower left corner risks are noted, but actions to control them are taken only if there are sufficient resources or if mitigating the risk costs less than the product of possibility of risk's occurrence and its impact on project objectives (expected value).

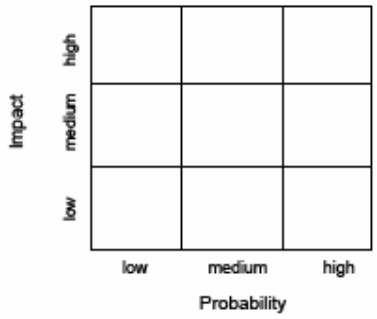

Figure 3.1. Probability-Impact Grid

Risk identification and evaluation does not provide enough support for the later risk management processes: the large amount of risk data from these two phases should be structured to aid in the interpretation and comprehension. Risks also need to be assessed in relation to other risks, since these relations may cause minor risks to become more relevant to the risk management process if they are significant sources for other risks. A lack of attention toward cause-and-effect-chains was also a concern of Aalto, Järvinen and Tuovinen, when they initiated their research on risk

continuums. Risk continuums are cause-and-effect-chains, where one event (risk) causes another to arise. Authors examined risks in four different levels of project business. In light of their results, managing risk continuums at all levels of project business is a fundamental step towards better and more efficient risk management. Also Turner suggests assessing risk links. Furthermore, he points out that this kind of risk analysis has to be limited to a relatively small number of single risks (e.g. 20 risks leads to 400 links to analyse). This limitation creates the danger that low-probability risks are left out, even if they were sources of more severe risks. Preventing these low-probability risks from happening might be less then the whole risk management process perspective.

3.1.3.3. Risk Response Planning and Execution

Planning of how to carry risks needs to have clear, shared principles in order to have a consistent attitude towards the risks. The purpose of the process is to ensure that actions that are planned and taken will have the expected effect on project risks, or if not, will effect whether new methods should be implemented. Risk response planning and the execution- phase needs an effective control process by its side to ensure that the risk management processes are iterative and ongoing, are not dismissed as project starts and it follows that decisions are implemented and have the expected results. Monitoring and controlling usually means writing and checking documents and conducting meetings. Also Artto et al. stress the importance of team work and communication as a means of risk management. Monitoring should also include evaluating the basis of earlier decisions, and assessing whether the assumptions made at the beginning are still relevant.Saari suggests a simple tool for monitoring the risk management process. She proposes using risk status as an indicator of the process phase under every recognized risk. Risk status describes the current situation of a certain risks. Table 3.11. describes the proposed definitions.

Table 3.11. Proposal for risk status definitions

1. identified
2. assessed
3. responses implemented
4. occurred
5. avoided

The risk management process described in this section is only a brief summary of the practices found in the vast written material that exists. Suggestions or instructions how these risk management processes could be adapted to a project network, where multiple actors need to co-operate, were not found. As well, any specific risk management tools for project networks were not yet developed. V-M Virolainen listed five important factors in managing risks in a project network: best practice, being prepared, recognition, follow-up and anticipation of the risk. How to achieve these factors is another question, for example best practices are not publicly documented anywhere.

3.1.4. Project Risk Management at the Company Level

Risk management at the company level has aspects that are not found at project level risk management. The main point is that a company has to have some kind of risk strategy to determine a common behaviour towards risks. Floricel and Miller developed five risk strategies for projects, intended for large-scale projects (e.g. construction projects) that described how risks in large-scale projects should be dealt with. They state that regardless of project-level strategies, a number of institutional anchoring elements must be put in place to tie project strategy to organizational strategy. It means that all organization's projects (called 'project portfolio') should be treated as stock portfolio. Also Ward and Chapman promoted the corporate scale view on risks rather than just a project scale view. They introduced the concept of risk efficiency as a prerequisite of the holistic risk management process and formed a 'decision rule' for efficient risk management:

> *"Always minimize the expected cost of a project unless the risk implications at a corporate level are unacceptable, in which case the minimum expected cost increase to yield an acceptable level of corporate risk should be sought."*

Authors point out that project level 'local optimality' may be in contrast with a 'global, company level' optimality. Project portfolio view, where all company's projects are managed in relation to others, is also convenient in risk management. If uncertainties and risks are seen as a portfolio and their interrelations and links to opportunities, then future potential gains could be better understood than they are at present. Projects should be seen as a part of a bigger entity. Like an investor, a

company might want to allocate its funds to projects with different levels of risk, so certain projects have higher risks, while other projects are allowed to bear only a limited amount of risk. It is important that risk management is not separated from the company's strategy. Risk management efforts and decisions should match the previously defined company risk profile. Financial theory perspective is useful to explain some of the gains from project portfolio view.

Practical tools for making risk management at the company level include, for example, Baccarini and Archer's suggestion that in addition to single risks in a project, whole projects could be assessed due to their level of riskiness. Projects could be prioritized according to their riskiness, for example using numerical scale from 1 to 5, where 5 is being generally unsure of the targets of cost, time and quality and 1 referring to a project with modest risks. Risk management efforts and assigned resources could be designed according to these categories. Similarly than from a single corporate perspective, in a single large project, where multiple actors work on one site, risks are most efficiently managed if the risks are managed using a whole project perspective, not just from every actor's own perspective. Projects where several actors are required to co-operate demonstrate how many dimensions need to be fitted together to ensure the successful completion of the project. Structures to fairly allocate risks and rewards among project actors in order to motivate the entire network to adopt a wider, whole project risk management perspective, is of extreme importance to successfully implement this new whole project perspective.

3.1.5. Literature View on Project Risk Management in Construction Industry

Typical construction project risks and risk figures of a construction project have been already discussed. Risks in construction projects are a significant element of the total project costs and thus their allocation has a major effect on project budget. Construction projects are open systems, rather than closed systems, which adds to the variability and riskiness of the project. The risk management process has to be adjusted to the cooperative environment in construction projects, but unfortunately this has not yet happened. Risk management in the construction industry still relies heavily on contracts, and the industry has the bad reputation of becoming involved in numerous disputes and claims. According to various studies, contractual structures

are the main sources of the lack of flexibility and they have a significant negative effect on the actor relationships.

The first improvement effort in the construction industry is an attempt to promote the risk management process. Risk management should be implemented; contracting risks to other parties does not mean they are managed since nothing is done to deal with these risks, rather only the final cost of the contract is increased. Contract clauses are estimated to raise project costs by 8-20% of the total costs. This supports and motivates efforts to find alternative methods in managing risks. Apart from contracts, studies show that construction risks are mainly handled with experience, assumption and human judgment. Since risks are highly situation-specific, expert judgment provides sufficient means of risk management. Problems occur when this expert knowledge isn't documented (which is common in the construction industry) and knowledge is not transferable. Other risks relate to possibly biased decision making, when personal background and assumptions inevitably reflect on the person's evaluation.

The usage of risk management techniques is varied in the construction industry. Brainstorming and team analysis for identifying risks are the most frequently used techniques, computer-aided methods are rarely used. Often risk management is restricted only to the identification phase, events can be known in advance, but their extent is not quantified. The biggest barriers in construction project risk management are a drive for cost effectiveness; risk management is seen only to consume resources and benefits are difficult to measure in financial terms. Lack of risk management resources and know-how restricts the use of risk management techniques. There are not enough capable personnel to conduct the risk management process and risk management is only in the heads of a few key people. Lack of an industry accepted model of risk analysis forces every construction company to form and test its own risk management models. Also cultural issues such as negative attitudes and mistrust of risk analysis, affects the results of the process. Simply a lack of knowledge and communication causes risk management failures.

Construction projects face a significant amount of uncertainty that is not related only to the early phases of the project. Ford, Lander and Voyer came to the conclusion that great project value remains hidden in the project, in positive risks (or uncertainty) that is not actively searched. Floricel and Miller made a similar find that

in large scale projects managers often try to secure favourable conditions for projects by identifying and pre-empting possible adverse effects by ignoring possibilities for positive ones.

Odeh and Battaineh recommended the following improvements to construction risk management: incentives for early completion should be included in to the contracts and adopting a new approach to awarding experience instead of the lowest price. That way an experience would have the weight it seems to deserve. In a network viewpoint the financial allocation of risks is critical. Zaghloul and Hartman said an adequate risk sharing system should be the kind that would give the benefits of risks not occurring in all parties. Floricel and Miller suggested establishing shared financial safety reserves for mitigating crises when they happen.

3.2. Joint Venture

A joint venture is a business enterprise under-taken by two or more persons or organizations to share the expense and (hopefully) profit of a particular business project. "Joint ventures are not business organizations in the sense of proprietorships, partner-ships or corporations," noted Charles P. Lickson in A Legal Guide for Small Business. "They are agreements between parties or firms for a particular purpose or venture. Their formation may be very informal, such as a handshake and an agreement for two firms to share a booth at a trade show. Other arrangements can be extremely complex, such as the consortium of major U.S. electronics firms to develop new microchips…. A joint venture is, in effect, a form of partnership that is limited to a particular purpose." Joint ventures have grown in popularity in recent years, despite the relatively high failure rate of such efforts for one reason or another. Creative small business owners have been able to use this business strategy to good advantage over the years, although the practice remains one primarily associated with larger corporations.

Most joint ventures are formed for the ultimate purpose of saving money. This is as true of small neighbourhood stores that agree to advertise jointly in the weekly paper as it is of international oil companies that agree to work together for purposes of oil and gas exploration or extraction. Joint ventures are attractive because they enable companies to share both risks and costs.

3.2.1. Types of Joint Ventures

Equity-based joint ventures benefit foreign and/or local private interests, groups of interests, or members of the general public. Under non-equity joint ventures (also known as cooperative agreements), meanwhile, the parties seek technical service arrangements, franchise and brand use agreements, management contracts, rental agreements, or one-time contracts, e.g., for construction projects. Participants do not always furnish capital as part of their joint venture commitments. There are, for example, non-equity arrangements in which some companies are more in need of technical services or technological expertise than they are capital. They may want to modernize operations or start new production operations. Thus, they limit partners' participation to technical assistance. Such arrangements often include some funding as well, albeit limited.

3.2.2. Legal Structure of Joint Ventures

As Lickson observed in A Legal Guide for Small Business, joint ventures are governed entirely by the legal agreement that brought them into existence. "Unless the joint venture is formalized by creation of a corporation or partnership, it never ripens into a taxpaying, legal entity on its own. Instead, the joint venture functions through the legal status of the venture participants, known as co-ventures or venture partners," Lickson wrote. "Since the joint venture is not a legal entity on its own, it does not hire people, enter into contracts, or have its own tax liabilities. These matters are handled through the co-ventures. Corporate law, partnership law, and the law of sole proprietorship do not govern joint ventures; contract law governs joint ventures." And as Marc J. Lane noted in the Legal Handbook for Small Business, "Since the venture ends at the conclusion of a specific project, issues of continuity of life and free transferability become moot."

3.2.3. Why Joint Ventures Fail

Small business owners should not engage in joint ventures without adequate planning and strategy. They cannot afford to, since the ultimate goal of joint ventures is the same as it is for any type of business operation: to make a profit. Experience dictates that both parties in a joint venture should know exactly what they wish to derive from their partnership. There must be an agreement before the partnership becomes a reality. There must also be a firm commitment on the part of each member to the

project and to one another. One of the leading causes for the failure of joint ventures is that some participants do not reveal their true business agendas, or mislead their partners about their ability to uphold their agreed-upon responsibilities.

Many small business consultants counsel clients to approach joint ventures cautiously. They acknowledge that such partnerships can be most valuable in nourishing a company's growth and stability, but also point out that smaller businesses usually have far less margin for error than do multinational corporations, or even mid-sized companies. Some experts recommend that business owners considering a joint venture with another establishment (or establishments) launch a small joint venture first. Such small projects allow companies to test the relationship without committing large amounts of money. This is especially true when companies with different structures, corporate cultures, and strategic plans work together. Such differences are difficult to overcome and frequently lead to failure. That is why a "courtship" is beneficial to joint venture participants.

Other factors that can have a debilitating impact on joint ventures include marketplace developments, lagging technology, partner's inability (rather than reluctance or refusal) to honour their contractual obligations, and regulatory uncertainties. Another problem with joint ventures concerns the issue of management. The managers of one company may be more adept and/or decisive with their decision making than their counterparts at the other company. This can lead to friction and a lack of cooperation. Projects are doomed to failure if there is not a well-defined decision making process in place that is predicated on mutually recognized goals and strategies.

3.2.4. Benefits of Joint Ventures

Among the most significant benefits derived from joint ventures is that partners save money and reduce their risks through capital and resource sharing. Joint ventures also give smaller companies the chance to work with larger ones to develop, manufacture, and market new products. They also give companies of all sizes the opportunity to increase sales, gain access to wider markets, and enhance technological capabilities through research and development (R&D) underwritten by more than one party. Until relatively recently, U.S. companies were often reluctant to engage in research and development partnerships, and government agencies tried not

to become involved in business development. However, with the emergence of countries that feature technologically advanced industries (such as electronics or computer microchips) supported extensively by government funding, American companies have become more willing to participate in joint ventures in these areas. In addition, both federal and state agencies have become more generous with their financial support in these areas. Government's increased involvement in the private business environment has created more opportunities for companies to engage in domestic and international joint ventures.

3.2.5. Reasons for forming a joint venture

Internal reasons

1. Spreading costs and risks
2. Improving access to financial resources
3. Economies of scale and advantages of size
4. Access to new technologies and customers
5. Access to innovative managerial practices

Competitive goals

1. Influencing structural evolution of the industry
2. Pre-empting competition
3. Defensive response to blurring industry boundaries
4. Creation of stronger competitive units
5. Speed to market
6. Improved agility

Strategic goals

1. Synergies
2. Transfer of technology/skills
3. Diversification

3.3. Considerations in International Construction

International Construction Activities - Characteristics and Problems

International construction projects are those in which the contractor, the lead consultant, or the employer is not of the same domicile, and at least one of them is working outside his or her country of origin (Stebblings 1998). The construction industry is complex and multidimensional, and to improve this situation, the major

construction projects in developing countries are often carried out in joint ventures with construction companies from developed countries. International collaboration can be of particular benefit to less-developed and developing areas. Transglobal economic developments offer an opportunity to develop products using the most up-to-date expertise and knowledge in a cost-effective manner (Clark and Ip 1999). International projects are normally fast paced but require a longer time span, and more parties are involved. Collaboration between the concerned parties requires clear project definition, and each set of objectives under the definition may be subject to changes as the project evolves.

Parties to international projects are also concerned with the clarity of local laws and the interpretation of those contracts governed by local laws. Transglobal collaboration calls for greater cultural understanding and sensitivity in terms of personnel management by the concerned parties. Human problems are involved, such as language, communication, and the understanding of cultural differences. It is generally acknowledged that the contextual environment of a country or region also influences the construction industry of each jurisdiction. Based on previous work by other researchers, Sheath, Jaggar, and Hibberd (1994) compiled a set of environmental influences associated with construction and a list of variables under each of the influence factors. The variables have been used to study the impact of these contextual factors on the choice of a project procurement system. Such a contextual research approach can be adopted and elaborated for studying the effect of culture on disputes in international construction projects.

Cultural Context

The term culture has wide connotations in anthropology and ethnography. Its meaning is not clearly defined, and even anthropologists do not agree on one clear and precise definition. Definitions differ greatly and are dependent on the theoretical perspectives of those who offer them. In the management literature, Hofstede (1984) defines culture as ‘‘the collective programming of the mind which distinguishes the members of one human group from other[s].... Culture, in this sense, includes systems of values and values are the building blocks of culture.’’ In the context of construction management education regarding culture, Loosemore (1999) states that ‘‘it is now accepted that a culture of a society is its shared values, understandings,

assumptions and goals learned from earlier generations. It results in common attitudes, codes of conduct and expectations that guide behaviour.''

Tso (1999), an anthropologist and designer, suggested some parameters that could help to delineate the playing fields for the concept of culture, but warned that the definition will shift within the boundaries of the parameters. She suggested that one will find the essence of the term culture within the following fields: ''culture describes the social system created by a group of people; it starts from the moment that a few people get together regularly and begin to establish norms and rules through which they will interact and communicate with each other and maintain order; it is about patterns of meaning; it is about shared beliefs, values, perspectives, and worldviews; it is about shared behaviour, practices, rules, and rituals; it is not limited to groupings by race or ethnicity, but can describe a sub-culture within a society— designers, for instance; it is often associated with language and communication; it is viewed as a mental or cognitive construct, created in the minds of people; it is learned; it can be found in materials: objects, artefacts, clothing, artwork, and so forth; and it can emanate from social institutions and structures, such as governments, economies, and legal systems, as well as geographic and environmental factors.''

Today, anthropologists take a relative position toward culture, believing that no one culture is ''better'' or ''worse'' than another. In this paper, we discuss problems related to culture as the word is understood by every man in the street without elaboration. It is a very general concept within the fields described by Tso (1999).

In international construction projects, any party involved must be cross-culturally competent. To be competent, Trompenaars and Williams (1999) claim that the transcultural manager should be aware of managing in seven dimensions: universalism versus particularism, individualism versus communitarism, specific versus diffuse, neutrality versus affectivity, inner directed versus outer directed, achieved versus ascribed status, and sequential versus synchronic time. These complex psychological and behavioural dimensions deserve in-depth study in the context of the international construction industry. Construction professionals involved with international projects should at least be able to recognize the expectations and behaviour of others. Cultural issues are expected to contribute to conflicts among parties to an international project and increase difficulties in the

management of the project (Fellow and Hancock 1994). ‘‘Without understanding there can be no friendship. If one wishes to understand a people one must identify oneself with them. One must study their language, customs and culture ... and they will be one’s friends’’ (Broster 1976).

Dispute Resolution Processes

With dispute resolution processes becoming international and unrestricted by frontier, legal system, or national culture, ‘‘cultural unity’’ is disrupted. International arbitration is said to be a ‘‘true clash of legal cultures’’ (Shilston and Hughes 1997; Cremades 1998). To interact with such a legal culture, traditional arbitration practices have to be modified to incorporate a proactive, flexible, and amicable (nonadversarial) process. In awareness of this, practitioners and commentators have been proposing various schemes and innovative practices (Cremades 1998; Uff 1998; Shilston and Hughes 1997). New legislation such as the Arbitration Act in the U.K. and the Arbitration Ordinance in Hong Kong has been promulgated to reflect this need. The practice of combined mediation and arbitration adopted in many countries such as China has aroused much interest (Chan 1997). Such a line of thinking leads to fusion of amicable and ‘‘judicialized’’ alternative dispute resolution (ADR).

The good that a dispute resolution mechanism will do depends on the person using it. The balancing act is dependent upon the neutral party appointed for the task. In the process of resolving disputes on an international construction project, the disputing parties and the neutral party are expected to participate in ‘‘shedding home-grown habits and prejudices’’ (Shilston and Hughes 1997). Singh (1998) claims that ‘‘in the context of large international projects where there are several parties of different nationalities involved, ADR offers the immediate attraction of avoiding any difficulties of conflict of laws or jurisdictional problems which may arise. It also allows the parties to reach agreement as to how their disputes should be resolved which can take account of national and cultural differences.’’

In construction disputes, the trend is toward conflict management, with the emphasis on designing a dispute prevention system to suit each project. This aims to focus on conflict in the very early stage of a project and to design the most appropriate ADR mechanism to be incorporated into the construction contract (Vorster 1993). In addition to the traditionally adapted arbitration, many new ADR mechanisms, such

as mediation, an executive tribunal, adjudication, a dispute resolution advisor, and a dispute review board, have been developed. In the worldwide comparative study complied by Fenn et al. (1998), the preferred choice of ADR mechanisms and their practice in each country were quite varied. For most large international construction projects, one of the ADR mechanisms, or a combination of the mechanisms in the form of multitier ADR mechanism, is incorporated into the construction contracts. This situation deserves vigorous investigation to decipher the relationship between cultural issues and choice of dispute resolution mechanisms for international construction projects.

Partner and Task Constructs

The search for a suitable complementary partner is usually initiated by the foreign organization that is interested in entering the local market. The partner selection process, adopted by the organization, often provides clues to the potential direction the ICJV will take after formation (Sridharan 1997). Geringer (1991) Posits that this process is considered to be of crucial importance to the formation and operation of JVs. Local partner selection is even more critical to the JV success in the context of newly emerging economies which are characterized by dynamic and complex environments as the right partner can increase the JV's adaptability, improve the strategy-environment configuration, and reduce uncertainty (Luo 1997). Anecdotal evidence suggests that selecting the suitable partner is vital for the success or failure of a JV in reaching its objectives (Devlin and Bleakley 1988).

Killing (1983) states that it is impossible to identify an exhaustive list of criteria which an organization should meet when attempting to assess a potential complementary partner. Nonetheless, selecting a partner that is credit-worthy and financially strong, and that has a strong connection with the host government is considered to be an effective measure to mitigate risks in operating an ICJV in Asian countries (Bing and Tiong 1999). Research has generally neglected to present advice on possible criteria for a partner or to point to those variables relevant in a determination of the ranking of such criteria (Al-Khalifa and Peterson 1999). However, basic factors and guidelines that need to be considered in the selection of a potential partner have been proposed (Harrigan 1986; Williams and Lilley 1993; Kumaraswamy 1997), but are yet to be empirically substantiated.

Geringer (1991), distinguished between partner-related and task-related dimensions of selection criteria. Partner-related factors are concerned with variables which are specific to the character, culture and history of the involved partners, for example, experience of management, past association between partners, business compatibility between the partners, the corporate culture of the partners, and prior ICJV experience.

Task-related factors, on the other hand, apply to the operational skills and resources needed by a JV to achieve project success. These relate to those variables that focus on operational and performance characteristics. Such variables include technical knowledge, market contacts, complementary resources, and the ability to negotiate with local authorities–in other words a wide range of variables, tangible or intangible, human or nonhuman. As a result, two independent constructs (i.e., Partner and Task) are used to represent the selection process.

Formation Construct

The groups involved in the process of ICJV formation often have divergent objectives (Sridharan 1997). These objectives need to be addressed during the formation of the conditions of the ICJV agreement. During the formation stage, potential partners spend considerable time to identify their common compatible interests in the task-related areas. Foreign organizations that possess unique organization-specific advantages which are strongly desired by the local partner are usually in a position to negotiate an agreement from a position of strength (Sridharan 1997). Depending upon the bargaining power exercised, the level of equity and resource contributions are determined, responsibilities of each partner are allocated, and lines of formal communications between the partners and with external parties are established.

As can be seen, a number of critical factors have the potential to enhance or impede this process and thus increase or decrease the likelihood of achieving a formal joint venture agreement. The Formation construct was developed using the Kwok et al. (2000) study which identified a number of these critical factors including: negotiation, profit and loss distribution, clarity of contribution among partners, control and decision making policy, clarity of sharing of risks and liabilities, composition of decision-making body, and dispute resolution procedures.

Government Construct

All international businesses are exposed to host government related risks to a certain extent. Root (1994) argues that instability associated with changes in host government policies towards foreign investment can directly affect business operations. Ostler (1998) identifies major host government-related risks encountered by construction organizations operating in the international arena. These include political, economic, structural, policy, environmental, market, and production factors. A review of the literature reveals a wide range of these risk factors, such as changes in law, corruption, delay in approval, expropriation, and reliability and creditworthiness (Zhi 1995; Salzmann and Mohamed 1999; Wang et al. 1999). According to recent surveys conducted in the UK and Australia, political and economic stability of the host country is a very important condition for working in overseas construction projects (Crosthwaite 1998; El-Higzi 2000). Local laws regarding foreign investment can affect a JV agreement. For example, many jurisdictions prohibit complete foreign ownership giving rise to difficulties if the local partner should pull out. Other jurisdictions may require that local personnel be placed in some or all management positions. Also, lack of appropriate legislation and frequent changes in current economic policies and commercial laws can negatively affect the JV's performance. Therefore, the Government construct refers to the degree of threat to the JV posed by such risk factors.

Operation Construct

The partner selection and venture formation processes set the basis of the relationship between the partners during the operation of the ICJV (Gjerde 1995). The smooth operation of the ICJV, after the initial honeymoon period, is mainly dependent upon the interaction between the partners in making strategic and operational decisions (Sridharan 1997). Relationships between organizations are at least as complicated as those between people. Several studies (Morgan and Hunt 1994; Ellram 1995; Smeltzer 1997) have shown that successful collaborative win-win relationships rely heavily on relational forms of exchange characterized by a high level of trust (willingness to rely on the partner in whom one has confidence) and commitment (enduring desire to maintain a valued relationship). Distrust among staff, from different partners, was found to be a critical risk factor (Bing et al. 1999).

Moreover, ICJVs do not function well when there is a lack of commitment from partners, and when the parties involved cannot derive values and benefits from being tied to each other (Kwok et al. 2000). There is an indispensable need for mutual trust, sharing of information, and confidentiality (Sridharan 1997). Should any of these essential ingredients be lacking, the

JV is likely to weaken and eventually fail.

ICJVs involve partners from different cultures, with different languages and behaviours. A primary concern of construction professionals, involved in international projects, is their lack of understanding of foreign cultures, ethics, and languages (Hall and Jaggar 1997). Many of the operational problems can be traced to the cultural differences that exist at both the national and organizational level. Cultural differences can often lead to a breakdown of communications (Loosemore and Muslmani 1999) Creating mistrust, and sometimes resulting in eventual dismemberment of the JV. Along with the cultural issues, differences in management styles of the two partners can result in conflict, and no resolution of such conflicts will eventually affect the performance of the JV (Sridharan 1997). Therefore, the Operation construct covers items such as mutual trust, commitment, openness, cultural diversity, compatibility in management styles, and conflict resolution procedures.

Project Construct

ICJVs are essentially formed to execute project-based activities in a different business environment which could influence the ICJV's performance. Therefore, this construct covers project related risk factors which are frequently reported in the literature as significant (Bing et al. 1999; Choudhury 2000). These include partner's cash flow problems, poor project participants' relationships, incompetent subcontractors and/or suppliers, disagreement on contract conditions, inability to understand the local business environment, culture and tradition, and employing local staff with no or little international experience.

Risk Analysis and Management

Because of the complex nature of construction business activity, process, environment, and organization, the participants are widely exposed to a high degree

of risk. However, risk management techniques are not so well developed in the construction industry. Almost all participants approach risk management in terms of individual intuition, judgment, and experience gained from previous contracts (Al-Iabtabai and Diekmann 1992). Because few companies appoint a specific person to be responsible for risk management, when problems do occur, they can be severely disruptive. Many researchers have asserted that risk analysis and assessment is essential and that management practitioners need to develop proven techniques, such as risk simulation techniques, rather than rely on intuitive methods. Risk management is a management discipline whose goal is to protect the asset, reputation, and profits of the JVs by reducing the possible losses or damages before they occur, and to ensure financing, through insurance and other means. Perry and Haynes (1985) have suggested a simple and systematic approach for construction management, which consists of three stages: (1) risk identification; (2) risk analysis; and risk response. Hampton (1993) used a multiple step process chart to explain this management process, which involves: set objectives, identify risks, evaluate risks, design a comprehensive program, implement the program, and monitor results.

Risk Groups

Several attempts have been made to assess the risk factors in JVs [e.g., Ding (1996) and Swierczek (1994)]. However, most of these studies have concentrated on a single risk factor, or a limited number of them. Although they have been very useful to the construction industry, they have not offered a satisfactory solution to the risk problem as a whole. One common method in considering the most frequent and severe risk factors is to classify them according to their sources and to use a hierarchical structure (Saaty 1980). Such classification will make it easier for the risk manager to visualize risks clearly and to deal with them in a logical, systematic way. It also seems to be more practical as it represents the actual parts of the system or the organization. Thus, a more comprehensive and detailed scheme incorporating ideas from existing literature will be developed in this study.

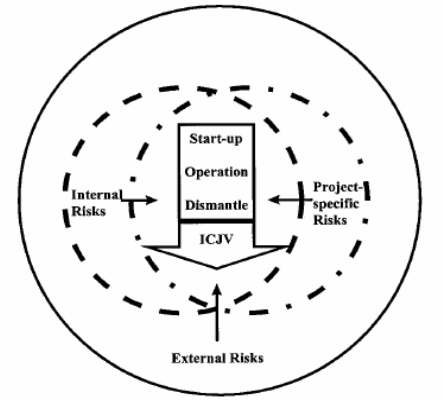

Figure 3.2. Risks of ICJV

It is proposed that the risk factors be categorized into three main groups as shown in Fig. 1: (1) Internal; (2) Project-specific, and (3) External. The Internal risk group represents the risks that are unique in a JV because different organizations are involved. The risks are developed from the nature of the operation that causes conflicts within the JV organization. The Project-specific risk group refers to unexpected developments during the construction period that lead to time and cost overruns or in shortfalls in performance parameters of the completed project. A high capital outlay and a relatively long construction period would make project costs particularly susceptible to delays and cost overruns. The External risk group represents the risks that emanate from the competitive microenvironment that the JV operates in. Operating in foreign countries is generally perceived to be more risky than domestic operations. The four main categories that need to be considered when operating in foreign countries are: (1) the political and legal systems; (2) economic and industrial conditions; (3) society; and (4) the physical environment.

Three phases in the life of a JV are proposed: (1) Start-up; (2) Operation and (3) Dismantle. The Start-up phase is the period from initial contacts between parent companies to JV start-up, including negotiation and a signing agreement. The Operation phase refers to the period of construction work being implemented. The Dismantle phase is the period when most construction tasks have been completed, the project is in the clean-up stage, and the participants start negotiating the ending matters. This categorization is intended to help managers understand the negative influence of risk factors during ICJV development and manage the ICJV more effectively.

4. RESEARCH SURVEY

Many authors have emphasized the importance of recognizing decision-makers' risk attitude in decision making. According to prospect theory (Kahnemann and Tversky 1979, 1982), the subjective values to the outcome (analogous to utility curves) for gains and losses are nonlinear, so-called normally concave for gains and convex for losses. It means that decision makers are more risk averse in the domain of gains and risk seeking in the domain of losses. In addition, the authors offered support to justify the forms of prospect theory's value: (1) Decision makers segregate gains and integrate losses to maximize satisfaction; (2) gains increase more slowly than losses decrease ("loss aversion"—a loss of a certain number of dollars is more aversive than a gain of the same amount is attractive); and (3) people are often risk averse in dealing with a small chance of a severe loss and risk seeking in dealing with improbable gains. This loss aversion has been offered as an explanation of why people categorize outcomes as gains or losses and dislike losses more than they like equivalent gains.

MacCrimmon andWehrung (1986) conducted risk attitude surveys in various business contexts. This study revealed important facts regarding a decision maker's attitude: (1) Decision makers are more risk averse in opportunity situations than in threat situations; (2) decision makers are extremely risk averse when the chance of loss is too high; (3) both Canadian and American managers believe that Canadians are more risk averse, but there was no significant evidence to support this belief; and (4) generally, older decision makers with more seniority in their firms are more risk averse. The results of this study are basically very analogous to the works of Kahnemann and Tversky. Both studies show that decision makers are inherently risk averse in gain (opportunity situation) and risk seeking in loss (threat situation).

In particular, Taylor (1991) concluded that subjects are more motivated to avoid losses than to obtain the equivalent gains. Brown (1995) also demonstrated that individuals gain knowledge of forecasting with greater accuracy when threatened by a loss than motivated with more gains (referred to as "loss avoidance"). In addition to

these studies, Mak and Raftery (1992) Demonstrated that people tended to be risk averse in forecasting project return ("conservative") and to be risk seeking in estimating project cost ("speculative"), which leads to the differences in personal risk perceptions and also generates the systematic biases in forecasting both project cost and return. Moreover, they indicated that professional individuals trained in a specific domain tended to be less error prone in making estimations than is the case of a novice group.

In comparison to these studies, a number of researchers have attempted to find risk attitudes in business decision making and human judgment. According to Cohen et al. (1982), men are generally less risk averse than women and so are people with higher levels of income. Weber and Hsee (1998) indicated a cultural impact on risk attitudes demonstrating that the Chinese are more risk averse than Americans or Poles. In particular, de Neufville et al. (1977) indicated that contractors behave differently when dealing with small and large projects, and when operating in good years or bad so that they are most risk averse toward larger projects in lean years and bid relatively lower.

4.1. Questionnaire Design

All of the studies mentioned above reveal that risk behaviour plays a central role in humans' decision making under uncertainty. Not surprisingly, however, previous research has mostly focused on how the risk attitude of decision makers can vary under assumed risk situations represented by simple lotteries. Consequently, they cannot forecast risk attitudes under realistic decision making situations such as bid/no-bid decision for international projects which exhibit a complex skein of various uncertainties.

That's why here we have a survey that includes mostly the risk factors. The aim of the survey is to make some additional judgements to the mentioned "bid/no bid decision making process"-"in operational process" and finally the "end process" of an international constructional joint venture. The research methodology consists of a detailed questionnaire survey. A thorough literature review was initially conducted to identify the factors that affect the performance of an ICJV.

• Part one: General information about the JVs—objectives, operation structure, ICJV size, and procurement method.

• Part two: Risk factors and risk management measures in ICJV. These factors are divided into three groups, namely, Internal, Project-specific, and External risks. Each group has several subgroups, and each subgroup in turn consists of several risk factors. A total of 25 risk factors were included under these three main risk groups.

• Part three: Identification of risk groups in different phases of ICJV, criteria of evaluating successful ICJV, and critical successful factors in the implementation of ICJV.

A Liker scale of 1–5 was used in the questionnaire. The respondents were required to indicate the relative criticality / effectiveness of each of these risk factors and management measures: 5 for extremely critical/effective, 4 for very critical / effective, 3 for critical/effective, 2 for fairly critical/effect and 1 for not critical/effective. There is not a single liker scale in the questionnaire. The third part of the questionnaire is designed as a scale of 1-10. There is just a single aim to do so. It is to identify the unique differences between sub-titles. For example “Loss due to fluctuation of inflation rate” and “Loss due to fluctuation of interest rate” are both financial risks but we have to identify which of them is most risky. That is why we prefer a larger scale than 1-5.Also while we are sending the questionnaire we have a sample. The target companies for the survey were as follows:

Generally the companies are turkish based companies. Some of them are working in Russia, Europe, Middle East, Katar, Afganistan and Turkey. Most of these companies work both to public and private clients in both domestic and abroad projects. Also many of them had more abroad projects than domestic over the last 5 years. Just a little number of the companies had some projects as sub-contractor over the last 5 years. There is no company that had more than two partners in an ICJV project over the last 5 years. Most of the companies give construction service to their clients but some of the others also give architectural design and engineering services. The general project types undertaken by the companies are; building, transportation, infrastructure and energy.

There are not only the numerical values in the survey but also there are some interviews done. This is because of finding the reasons why people choose “4” rather

than choosing “5” or “3”. We have to get some information and evaluate them according to the analysis. All the mentioned staffs are as the following.

4.2. Analysis

58 questionnaires sent to the companies by e-mail. But just 26 of them returned. While we are at the design process of the questionnaire, we especially care the time criteria. To minimize time factor most of the questionnaire is multiple-choice and they are very short and clear.

The response rate could be attributed to three main reasons.

1. Risk management is not widely practiced in construction companies.

2. Success or failures of JVs are secrets within JV partners; and participants are unwilling to share their experiences with others.

3. People do not care academic researches because of not using modern management methods rather than traditional ones.

4.2.1. Analysis on Group Basis

The ranking in different groups are Internal, Project-specific, and External risks, respectively. As shown in table 4.1, the criticality of the 25 risk factors ranges from the lowest value to the highest value.

TABLE 4.1. Risk Factors of ICJVs

	AVERAGE	STDEV
1. Client’s cash flow problems	4.18	1.18
2. Partner’s parent company in financial problems	4.04	1.06
3. Inconsistency in government policies, laws, and regulations	3.84	1.23
4. Economy fluctuation	3.80	1.15
5. Poor relationship	3.77	1.06
6. Exchange rate fluctuation	3.76	1.02
7. Incompetence of local subcontractors and suppliers	3.73	0.82
8. Force major and social disorder	3.67	0.99
9. Inflation	3.65	1.11
10. Disagreement on accounting of profits and loss	3.61	1.42
11. Employees from each partner distrust each other	3.57	1.32

12. Restrictions on fund repatriation	3.43	1.19
13. Excessive demands and variation from client	3.42	0.98
14. Policy changes in your partner's parent company toward ICJV	3.38	1.37
15. Partner's lack of management competence and resourcefulness	3.38	1.09
16. Disagreement over some conditions in engineering contract	3.33	1.22
17. Labor, material, and equipment import restriction	3.28	1.33
18. Security problems at project site	3.28	1.11
19. Excessive interference by parent company of either partner	3.18	1.07
20. Language barrier	3.16	1.27
21. Disagreement on allocation of staff positions in ICJV	3.02	1.21
22. Different social, culture, and religious background	2.98	0.99
23. Disagreement on allocation of works	2.96	1.20
24. Pollution, e.g., smoke and wastes caused by project	2.83	1.17
25. Technology transfer dispute	2.64	1.43

When counting the most critical risk factors that have a mean and above, the internal risk group has 7 risk factors, the Project-specific risk group has 5 risk factors, and the External risk group has 9 risk factors. This shows that each group has a significant but balanced influence on the performance of ICJVs. The financial problems from both the client and the partner's parent company are the most critical factors. Technology transfer dispute and pollution problems are two least critical factors. There are diversified perceptions on the risk factors because the standard deviations are quite significant.

Risk Group 1: Internal Risk Factors

TABLE 4.2. Group 1: Internal Risk Factors

	AVERAGE	STDEV
1. Partner's parent company in financial problems	4.04	1.06
2. Disagreement on accounting of profits and loss	3.61	1.42
3. Employees from each partner distrust each other	3.57	1.32
4. Policy changes in your partner's parent company toward ICJV	3.38	1.37
5. Partner's lack of management competence and resourcefulness	3.18	1.09
6. Excessive interference by parent company of either partner	3.18	1.07
7. Disagreement on allocation of staff positions in ICJV	3.02	1.21
8. Disagreement on allocation of works	2.96	1.20
9. Technology transfer dispute	2.64	1.43

Partner's Financial Resources and Managerial Competence. Among the nine factors in Table 4.2, the most critical factor is the financial problem of a partner's parent company. It received a mean of 4.04, far higher than the rest. Another risk factor related to a partner is its lack of management competence and resourcefulness, which is ranked 5th. Thus, the credit-worthiness of a prospective JV parties' parent company should be scrutinized and its current management competence and resources must be ascertained.

Disagreement on Profit/Loss, Accounts, and Work Allocation. Another critical risk factor is the disagreement on accounting of profits and loss. It received the 2nd ranking. Other disagreements such as the allocation of the staff position and the allocation of work received a less critical score, ranking 7th and 8th, respectively.

Policy of Parent Companies Toward JV. The policy of parent companies toward the JV is very critical and this risk factor was ranked 4th. The parent companies can influence a JV's performance by limiting its autonomy, contributing under qualified staff, and delaying the required funds. A JV agreement is composed of ''the terms, resources, shares, and management policies.'' Once the policies of a parent company change, support for the JV could be reduced and it would be difficult to keep the JV running smoothly.

Distrust. Distrust among JV staff from different partners is also a critical risk factor in ICJV. It received a 3rd ranking. In a typical JV, both general managers and functional managers would be drawn from their parent company to balance the influences from each parent company. Each manager is given a mandate to both manage the venture and look after the parent company's interests. Not surprisingly, the working relationship between the two managers tends to be strained, cumbersome, and inefficient.

Technology Transfer Dispute. Technology transfer dispute is the least critical factor in this group. Technology transfer is usually carried out in limited areas, through training to local staff during the design and construction phases. The companies exist mainly for commercial gain and their main objectives are more concerned with completing the project on time and budget rather than successful technology transfer.

Risk Group 2: Project-Specific Risk Factors

TABLE 4.3. Group 2:Project-Specific Risk Factors

	AVERAGE	STDEV
1. Client's cash flow problems	4.18	1.18
2. Poor relationship	3.77	1.06
3. Incompetence of local subcontractors and suppliers	3.73	0.82
4. Excessive demands and variation from client	3.42	0.98
5. Disagreement over some conditions in engineering contract	3.33	1.22

The risks caused by the project characteristics must be considered when dealing with the ICJV's risk. Many JVs are formed for a specific project, and the project's characteristics could strongly influence the ICJV's performance.

Client's Problems. Client's problems in this research contain two main elements: (1) Its case flow problem; and (2) its excessive demands and variation during the project's execution. A client's cash flow problem is regarded as the most critical risk factor to an ICJV. It received a value of 4.18 and is ranked first in this group and among all factors considered in this research. This financial risk to the ICJV contractor includes whether the owner has sufficient funds to complete the project or has the availability of funds for progress payment. A client's cash flow problem thus influences the cash flow of a construction contractor. Rashid (1991) studied international construction in developing countries and claimed that one of most critical risks for contractors operating in developing countries is that they may face delayed payment and sometimes non-payment risk.

Excessive demands and variation received the 4th critical position in this group. The risk to ICJV lies in the potential significant change of work allocation within partners, the disruption of work, and associated claims.

Project Relationship. The other most critical factor is a poor project relationship. It received a critical value of 3.77 and is ranked 2nd in the Project-specific risk group. A lack of communication and poor relationships could occur with other parties in a project, such as the consultant/designer, subcontractors, or suppliers. A strained relationship will occur when the partner goes directly to the client without informing his counterpart, particularly when the matter concerns contractor client reimbursement.

Subcontractors and Suppliers. Currently in the construction industry, many project activities are being subcontracted out by the general contractors. These risks are uncertainties related to a subcontractor's or supplier's technical qualifications, timeliness, reliability, and financial stability (Akinci and Fischer 1998). These risks can result in time loss and increased cost during construction. It is rated as the 3rd critical risk factor in the group. Schwartz (1985) gave a case of how a JV failed because of its incompetent subcontractor.

Contractual Risk. Compared with the other risks, disagreement on some conditions in the contract is considered to be less critical, and it was ranked last in this group, but it is still quite critical to an ICJV because its mean score is 3.33. Building contracts deal with the relationships between parties in the contract and the allocation of risks. Contractual risks usually are caused by disagreements arising from flawed contract documents, inappropriate types of contract, improper tendering procedure, or improper contractual clauses.

Risk Group 3: External Risk Factors

TABLE 4.4. Group 3: External Risk Factors

	AVERAGE	STDEV
1. Inconsistency in government policies, laws, and regulations	3.84	1.23
2. Economy fluctuation	3.80	1.15
3. Exchange rate fluctuation	3.76	1.02
4. Force major and social disorder	3.67	0.99
5. Inflation	3.65	1.11
6. Restrictions on fund repatriation	3.43	1.19
7. Labour, material, and equipment import restriction	3.28	1.33
8. Security problems at project site	3.28	1.11
9. Language barrier	3.16	1.27
10. Different social, culture, and religious background	2.98	0.99
11. Pollution, e.g., smoke and wastes caused by project	2.83	1.17

Political Risk. Political risk includes inconsistency in policies, changes in laws and regulations, restriction on fund repatriations, and import restrictions. The inconsistency of policies, laws, and regulations is ranked as the most critical factor in this group, whereas the other two factors are ranked 6th and 7th, respectively.

Economic Risk. Macroeconomic conditions, which determine the overall performance of the construction industry, are also critical to performance of an ICJV. Risks of economic fluctuation, inflation, and foreign exchange rates are ranked 2nd,

3rd, and 5th, respectively. These factors could have a substantial impact on the profit or loss of each participant in an ICJV. Economic slowdown causes the construction market to shrink. The industry would become more competitive and the contractors' profit margin would be reduced. Foreign exchange risks exist when the ICJV formally enters a contractual agreement as a contractor with the owner. The contractor is exposed to currency fluctuations between bid and award dates. Once contractually committed to a project, the ICJV contractor does not have the flexibility that exists in other industries to shift prices and production to cope with foreign risks.

Environmental Risks. The environment has a certain critical influence on an ICJV. The environmental force major risk could cause the destruction of facilities, equipment, material and labour death. It received a critical value of 3.67 and is ranked 4th in this group. The pollution effect on an ICJV is considered least critical by the participants as receiving a value of 2.83.

Social Risk. Social risk factors include security problems, language barriers and different cultures, and religion and custom backgrounds. The survey showed that these risks are not so critical for an ICJV. The three factors are ranked 8th, 9th, and 10th, respectively, and are all less critical compared with other factors, except the problem of pollution. Construction professionals are technically oriented. Keywords and drawings are frequently used in practice and are common to the ICJV participants from different culture and language backgrounds. Thus, language and cultural factors are regarded as less important to a JV.

4.2.2. Risks in Different Phases of ICJVs

The survey shows that the criticality of a risk group changes with the development of an ICJV. In the three-phase development, the critical index of the internal risk groups starts at its highest value of 0.40 in the Start-up phase. It falls to 0.36 in the Operation phase and then continues to slip down to 0.24 in the Dismantle phase. In the Start-up phase, organizing a JV is accompanied by a large number of matters such as profitability and responsibility with potential partners. Conflicts could arise during the negotiations, and if participants cannot reach a principled agreement, the JV may be aborted. Another consideration is that in the Start-up phase, employees

from different backgrounds are unfamiliar with each other; conflict is unavoidable and this has a negative impact on the ICJV's performance.

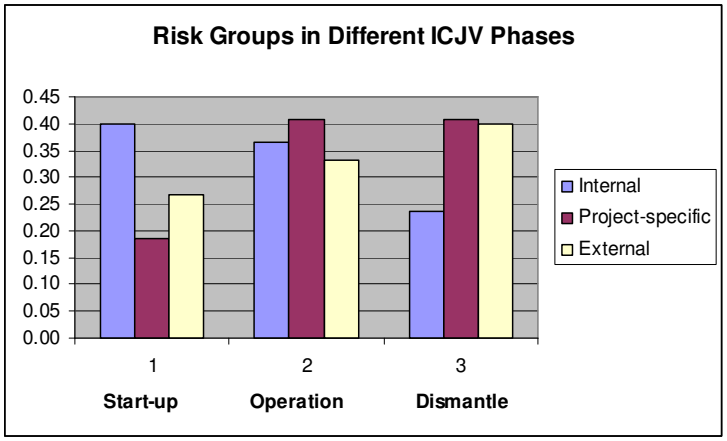

Figure 4.1. Risk Groups in Different ICJV Phases

The Project-specific risk group received a critical index of 0.19 for the Start-up phase. The risk become significant when the project is executed, reaching a peak of 0.41. This is also the most critical of all groups in all phases. Then it repeats the value of 0.41 in the Dismantle phase. Many JVs are set up for a specific project and the project characteristics have a critical influence. As the project is being executed, the JV invests more capital, equipment, and manpower in the project and its risk exposure increases substantially. When the project is near completion, the risk exposure would also be reduced correspondingly. But in our case the near completion value of risk as high as operational time. This is because the paid money in most of the projects is not in a continuous flow. Most of the money will be paid to the companies at the end of the dead-line.

The critical index of the External risk group starts at a low value of 0.27 in the Start-up phase. It rises to 0.33 in the Operation phase, and rises to the highest value of 0.40 in the Dismantle phase. This phenomenon can be explained as that during the Start-up phase, a JV is set up under government laws and regulations, hence the political, legal, and legislation factors do not become a menace to a JV. When ICJV heads into the Operation phase, the External factors would change with time and the risk level rises. When the JV finishes its task, the dismantling process is done according to the contractual agreement but the conversion of the earned money and the exchange rates causes the external risk group to rise.

Note: critical index = $(5N_5 + 4N_4 + 3N_3 + 2N_2 + 1N_1)$ /5 $(N_5 + N_4 + N_3 + N_2 + N_1)$ where N_5 = number of respondents who answered ''extremely critical''; N_4 = number of respondents who answered ''very critical''; N_3 = number of respondents who answered ''critical''; N_2 = number of respondents who answered ''fairly critical''; and N_1 = number of respondents who answered ''not critical.''

4.2.3. Analysis of Effective Management Measures

All 26 effective management measures are categorized into eight main groups, namely: agreement, partner selection, subcontract, engineering contract, employment, good relationship, control, and others. The last group consists of other unrelated elements; most of the elements in this group are less effective than others of different groups.

TABLE 4.5. Group Management Measures in ICJV

(1)Agreement	AVERAGE	STDEV
1. Define clear authority and responsibility in ICJV agreement	4.15	0.90
2. Agree on one accounting standard	3.46	1.25
3. Define transfer scope clearly before setting up ICJV	3.46	1.26
(2)Partner Selection		
4. Select partner with strong connections with host government	3.89	0.95
(3)Subcontract		
5. Employ influential local organization or individual as logistics agents	3.53	1.03
6. Engage local security firm at site	3.34	1.07
7. Subcontract to local pollution control specialist	3.24	1.21
8. Select efficient subcontractors to complement partner's shortcoming	3.08	1.40
(4)Engineering Contract		
9. Use dual-currency contracts	3.55	1.13
10. Define adjustment clause in contract	3.46	1.02
11. Specify construction extension clause in contract	3.44	0.97
12. Adopt the current international conditions of contract	3.31	1.22
(5)Employment		
13. Define each staff's scope of work	3.51	1.27
14. Select staff carefully for ICJV	3.45	1.22
15. Employ unbiased and experienced staff	3.45	1.08
16. Choose right staff from each partner for technology transfer	3.08	1.30
(6)Good Relationship		
17. Establish good relationship with host government	3.55	1.13
18. Maintain good contact in name of ICJV	3.41	1.07
19. Ask parent companies to maintain good relationship for ICJV	3.31	1.13
20. Maintain good relationship with local environmental authority	3.11	1.31
(7)Control		
21. Maintain ICJV policies by being dominant over partner in ICJV	3.05	1.27
22. Control ICJV's board of directors by parent company	3.03	1.53
(8)Others		
23. Conduct detailed feasibility study of project	3.25	1.18
24. Insure all insurable force major risks	3.19	1.17
25. Appoint independent account auditor	3.13	1.51
26. Renegotiate	3.02	1.42

Agreement. Several important factors are essential for a JV agreement. These include clear terms and conditions in an ICJV and the definition of clear authority and responsibility in the ICJV's agreement. The agreement between the local and foreign partner will be as important as the construction contract for the actual performance of the work.

In the construction industry, Cushman (1986) suggested adopting a special kind of agreement with the master and subsidiary agreements, or to draw up an additional agreement to enter the bidding process. This is the pre-bid JV agreement, which covers responsibilities on the bidding expenses and the obligations of the partners, including an agreement to enter into the JV if the alliance is the successful bidder. Upon the tender award, the post award JV agreement will form the actual agreement under which the work is done.

It is difficult to include all restrictive causes in the agreement initially. A review of the agreement may disclose that performance can be improved by changing parts of the agreement between the partners. The agreement may also need to be changed if there are changes in the environment or industry climate. Or, after starting the venture the partner's firm discovers that the original setup was incorrect or different from the original purpose.

Partner Selection. The choice of the partner is critical for completion of the particular assignment. Harrigan (1986) listed several factors that need to be considered in the selection of a suitable JV partner. Recently, William and Lilley (1993) provided a model for the process of selecting a partner, and gave a suggestion concerned with strategic compatibility, complementary skills and resources, relative size, and financial capability. In this research, it is found that selecting a partner that is credit-worthy and financially strong, and that has a strong connection with the host government, are effective measures to mitigate risks.

It is essential to ascertain that a prospective partner can provide sufficient financial resources to maintain the venture's effort. During a JV's initial stage, a substantial infusion of cash will be needed for mobilization costs associated with the work force, including camp construction and the assembly of plant and equipment. This cash should be deposited in a JV bank account with an agreement that the partner can draw on the interest until the funds are actually required. Other infusions of cash into

a JV will most likely be needed from time-to-time throughout the term of the JV as it performs its activities. In this regard, the JV agreement should have provisions for raising additional working capital.

Major construction works are often associated with governments or their agencies. In this situation, it is particularly important to select a partner with a strong relationship with the government, seek protection for security problems, or winning a preferential margin in tendering the projects or in handling other government regulation changes.

Subcontract. The effective measures that can mitigate subcontracting risk include using experienced and familiar subcontractors and suppliers, employing influential local individuals or organizations as logistics agents, engaging local security at the site, and subcontracting to a local pollution control specialist. Approximately 80–90% of the work on a construction project is performed by subcontractors (Millman 1990). It is therefore not surprising that research showed that using experienced and familiar subcontractors and suppliers is critical. The development of a subcontracting system in the construction industry in this region has resulted in a considerable number of subcontractors with various specializations. It is imperative for the local contracting firm to use keen judgment when selecting subcontractors for the project (Kwok and Hampson 1997).

Another element of subcontracting is to employ influential local organizations or individuals as logistic agents, which would reduce the problems of poor infrastructure and bureaucracy of the host community. In rural areas, it is necessary for a foreign company to employ efficient security guards at the site. Using local security firms is considered to be an effective policy for site security and helps maintain a good relationship with the local people and government. Pollution at the site is receiving greater attention these days and subcontracting pollution control to a local specialist is seen to be an effective measure. The other effective measure related to subcontracting is to select efficient subcontractors who can complement the shortcoming of the ICJV partner.

Engineering Contract. An engineering contract is the legal linkage between the client and contractor who are bound together through the allocation of risk and profit in the contract. But there is never a perfect construction contract. For the ICJV, the engineering contract must be fair or in favour of the ICJV. It is advantageous to

persuade a client to adopt current international construction contract conditions, such as the International Federation of Consulting Engineers or World Bank procurement contracts, which are familiar to most international contractors. From the survey, it is clear that the JV contractor should negotiate for an adjustment clause in the contract, particularly a reimbursement clause to mitigate the loss from inflation or a client's demand variation during the construction period. It should request payments in hard currency in countries with unstable economic conditions, and an extension of time when force major risks occur during the construction period.

Employment. One effective measure to counter staff problems and to ensure a smooth daily operation is to recruit local staff with bilingual ability. Bilingual ability can offer better communication for partners speaking in different languages. The JV partners should reach an agreement on staff position and ensure that an initial disagreement would not reappear during an ICJV operation. An effective measure is to distribute positions in different work packages according to a participant companies' expertise.

The problem of distrust could exist all the way from top management down to the operational level. To remove this obstacle, the directors could ensure staff commitment, coordination, and trust by enhancing communication quality and a conflict resolution technique (Mohr and Spekman 1994). Carefully selecting a staff for an ICJV and employing unbiased and experienced staff are effective measures to remove the distrust within the JV staff.

Good Relationship. As a foreign partner, the most important thing is to adapt to the local environment and become a good corporate citizen. Foreign corporations may think that local knowledge can be acquired quickly, but the local scene can keep changing. New players appear, as well as new attitudes, regulations, and laws. Learning must keep pace. Expatriates new to the country are often not familiar with the country and its culture. They become insulated from reality by the expatriates' community. The research of Beamish (1993) indicated that the acquisition of information about local conditions and understanding them was the most important long-term need. Local people can fill this need the best. The ICJV will appear to be more local when complying with local cultures and traditions, and it subsequently receives more trust from local communities. It is recommended as the most effective measure for setting up good relationships. Establishing a good relationship with the

host government is critical to an ICJV. Maintaining a good relationship with other departments such as the environmental authority is also useful.

It is very necessary for an ICJV to create channels of communication with other parties in the project and to maintain this channel. This communication channel should start from the top, beginning with the owner, followed by the architect / engineer, the subcontractor, and the material supplier. This can be achieved by maintaining good contact by the ICJV itself and by the parent companies.

Control. If the above-mentioned management measures could not be adopted for any reason, a common alternative measure is to consider setting up an ICJV in the form of one parent- dominant JV instead of shared management ventures. To achieve this, work is allocated to the passive partner according to its ability, which would restrict the influence of passive partner's parent company. The two measures of dominating the ICJV and controlling the board of directors by the parent company. The important feature of this set up is that the JV is managed by its dominant parents as if they were wholly owned subsidiaries. All of the ventures' operating and strategic decisions are made by executives from the dominant parent company. Statistics showed that dominant parent ventures have a much better success rate than shared management ventures. It can nevertheless be difficult for a potentially dominant parent firm to find a partner willing to play a passive role.

Others. Other management measures, such as conducting a more detailed feasibility study of the project, insuring insurable risk policies, and appointing an independent account auditor, must be adopted by the ICJV. One of the cardinal operating features of a construction JV is that the work must go on irrespective of the conflict. When the partner is unable to agree, there should be a summary procedure for permitting the work to continue. This can be accomplished by designating a person, not necessarily an arbitrator, to whom a dispute will be referred. It can be an outsider, respected individual, or a senior management person from one of the partners who can make the decision. The JV then proceeds in accordance with that decision. Nevertheless, renegotiation is very important to all of the ICJV partners.

4.2.4. Risks Associated with International Construction Joint Ventures

As we have mentioned before, there are some relative significances of risk factors according to their currency in real time. They all belong to the same main title but the

sub-titles have different importance. Here we have the tables and some explanations below them.

TABLE 4.6.1. Risks Associated with ICJV

(1) Financial risk	AVERAGE	STDEV
1. Bankruptcy of project partner	8.82	1.99
2. Difficult convertibility of YTL/USD	6.64	1.50
3. Loss due to fluctuation of inflation rate	7.55	1.81
4. Loss due to fluctuation of interest rate	6.55	2.16
5. Loss due to fluctuation of YTL/USD exchange rate	6.64	1.91
6. Low credibility of shareholders and lenders	7.64	2.11

According to the survey results the most significant financial risk is Bankruptcy of project partner. And the least significant one is Loss due to fluctuation of interest rate. Now if we have to criticize these results we have to say that in international construction joint ventures generally the sizes of the projects are very big. That is why companies use JV strategies to perform in such a project. The main considerations in JV projects are getting some extra strength about politics, finance, technology, resources and time. As I have just mentioned above finance is one of the main objective to form a JV. Therefore if your project partner gets some financial problems then your company will mostly face with the financial burden alone. This will affect the cash flow and form a potential threat to the project.

TABLE 4.6.2. Risks Associated with ICJV

(2) Legal risk	AVERAGE	STDEV
7. Breach of contracts by other participants	8.36	1.43
8. Breach of contracts by project partner	8.73	1.19
9. Lack of enforcement of legal judgment	7.73	2.20
10. Loss due to insufficient law for joint ventures	8.00	1.34
11. Uncertainty and unfairness of court justice	7.36	2.16

Secondly, the values of the sub-titles in legal risk group are so close to each other. But the highest value belongs to the “breach of contracts by project partner” and the lowest one is “uncertainty and unfairness of court justice”. There must be a trust between the partners in an international construction joint venture yet, if there is distrust then both of the partners may face some risks. The best way of performing a trust is to create a perfect agreement and contracts, then not breaching them. One of the common measures about such cases; experienced companies do not prefer a new company in JV projects because of not having references about their firm polices and moral values in an ICJV. Also here we have another clause to talk about; Loss due to

insufficient law for joint ventures. In international construction joint ventures at least one, or more, or all of the companies are foreigners. There may not be included a host company in to the JV. Especially in such a case foreign companies do not feel any local support to the local laws by a local company. Therefore if there is a change or an insufficient regulation design for joint ventures the partners have a risk like loosing all they earned. The least impressive risk factor in all groups is "problem associated with culture differences" in management risk group. Its rating is 4.45. The most important factor that helps to get a sharp decrease is the following; in Turkey people are very friendly both at work and at social life. It is also the same for Turkish companies that are working abroad. Therefore the cultural differences stay behind good relations. On the other hand "Incompetence of project management team" has the highest value. If one has no management capacity then there will be very big failures in work done.

TABLE 4.6.3. Risks Associated with ICJV

(3) Management risk	AVERAGE	STDEV
12. Change of organization within local partner	6.64	2.16
13. Improper project feasibility study	7.91	1.58
14. Improper project planning and budgeting	8.45	1.51
15. Improper selection of project location	8.00	1.18
16. Improper selection of project type	8.18	0.87
17. Inadequate choice of project partner	8.00	1.34
18. Inadequate project organization structure	7.82	1.47
19. Incompetence of project management team	8.55	1.21
20. Incomplete contract terms with partner	7.91	1.30
21. Increase in project management overheads	7.55	1.13
22. Poor relation and disputes with partner	8.18	1.94
23. Poor relation with government departments	6.73	2.10
24. Problems associated with culture difference	4.45	1.44
25. Project delay	6.64	1.86

There is always one compulsory need in JV projects. It is a team that solve problems and plan the future and finally see what is going on as of today. If the project management team is in competence then the smallest problems may stop the project operation process.

TABLE 4.6.4. Risks Associated with ICJV

(4) Market risk	AVERAGE	STDEV
26. Competition from other similar projects	6.36	1.80
27. Fall short of expected income from project use	7.36	1.63
28. Increase of accessory facilities price	6.18	1.78
29. Increase of labour costs	5.91	1.87
30. Increase of materials price	7.27	2.10
31. Increase of resettlement costs	6.73	1.74
32. Inadequate forecast about market demand	7.36	1.96
33. Local protectionism	6.36	2.01
34. Unfairness in tendering	7.55	1.81

If we consider all the risk groups the lowest average will belong to Market Risk Group. This is because there is no additional market risk in international construction joint ventures rather then domestic market. All markets have same risks and companies take some measurements to these risks at first. That is why the values are low because generally companies aware of them.

TABLE 4.6.5. Risks Associated with ICJV

(5) Policy and political risk	AVERAGE	STDEV
35. Cost increase due to changes of policies	7.27	2.00
36. Loss incurred due to corruption and bribery	6.45	1.86
37. Loss incurred due to political changes	6.36	2.01
38. Loss due to bureaucracy for late approvals	7.45	1.75

Policy and Political Risk group has also a low average rather than management and financial risk groups. Turkish companies generally have key employees to solve such political based problems with the governments. But it is a fact that however one can solve some problems with bribery there is no one to overcome losses due to bureaucracy for late approvals. This is because this has the highest rating in this group.

TABLE 4.6.6. Risks Associated with ICJV

(6) Technical risk	AVERAGE	STDEV
39. Accidents on site	6.45	2.11
40. Design changes	6.64	2.11
41. Equipment failure	6.27	2.41
42. Errors in design drawings	6.09	2.55
43. Hazards of environmental regulations	6.00	2.49
44. Incompetence of transportation facilities	5.82	2.09
45. Increase in site overheads	6.64	1.50
46. Industrial disputes	6.55	2.07
47. Local firm's incompetence and low credibility	7.00	1.55
48. Materials shortage	7.09	1.51
49. Obsoleteness of building equipment	6.27	1.74
50. Poor quality of procured accessory facilities	5.91	1.76

51. Poor quality of procured materials	6.27	1.90
52. Problems due to partners' different practice	6.55	1.44
53. Shortage in accessory facilities	5.55	2.16
54. Shortage in skilful workers	7.64	1.36
55. Shortage in supply of water, gas, and electricity	7.82	1.47
56. Subcontractor's low credibility	6.64	1.80
57. Unknown site physical conditions	6.64	2.42
58. Unusual weather and force major	5.09	2.70

Finally, in the technical risk group the highest risk value belongs to shortage in supply of water, gas and electricity and the lowest value belongs to unusual weather and force major. The highest value caused by the lack of these facilities in developing countries such as KAZAKİSTAN, KIRGIZİSTAN and so on. The lowest value also caused by working experienced local partners.

At the end of the day, the overall 4 highest values belongs to Bankruptcy of project partner, Breach of contracts by project partner, Incompetence of project management team and Breach of contracts by other participants respectively. As seen two of the highest values belong to "Legal Risk Group". Also the 4 lowest values belong to Problems associated with culture difference, unusual weather and force major, Shortage in accessory facilities and Incompetence of transportation facilities respectively. Three of the four lowest values belong to technical risk groups. These statistics may be enough to make some commends such as;

- Companies generally follow traditional methods and that is why there is no technical risk at top four.
- Problems do not occur in any group as often as legal risk group. Distrust and earning money by a short-cut are the basic problems in JV type partnerships. However there are contracts between the partners, one of the partners (generally the local partner) may breach the contracts. The general problem occurs at "accounting profit and loss" level.

5. CONCLUSIONS & SUGGESTIONS FOR THE FUTURE RESEARCH

5.1. Evaluation of The study and Conclusions

In conclusion, it is understood that the construction industry must operate in constantly changing environments and conditions. Uncertainty and imprecision are critical elements in the nature of the construction industry and such a complex industry is characterized by instability and wide fluctuations of activity. Its technology and social base also tends foster informality, personal relations and community. All these characteristics make risk management and joint venture critical issues in terms of staying competitive and alive in the market.

To minimize the chances of failure or underperformance of a JV, risk management techniques must be introduced into the construction industry. The critical risk factors must be identified before making any meaningful JV agreement. The critical risk factors can be systemically studied based on Internal, Project- specific and external risk groups, and combining with ICJV's development phases.

The three groups of risk factors go through significant changes in different phases of an ICJV. The Internal risks must be considered in Start-up and Dismantle phases. The Project-specific risk factors are extremely critical in operation phase. The External risk factors are less critical than the Project-specific risks, but they are also significant in the Operation phase.

Among all of the risk factors, those associated with financial, government policies, project relationships, economic conditions, and subcontractors are considered the most critical in ICJVs. This shows that the ''soft'' aspects of the ICJV are considered more critical than the ''hard'' aspects of engineering and construction work.

To mitigate the risk factors in ICJVs, one must develop appropriate strategies. These include the following.

1. Partner selection: The factors to consider in selecting a suitable partner are on its financial capability, relationship with the government, influence in local

communities, experience, reputation, and particular strengths to undertake such a project.

2. Agreement: The JV must be clear and comprehensive in critical areas, such as liabilities for the individual partners; type and value of contributions; method of assessing the values; management structure, control, and decision- making process; and profit distribution policies.

3. Subcontracting: Choose experienced and familiar subcontractors and suppliers, or employ influential local organizations or individuals as logistic agents to strengthen ICJV operations.

4. Engineering contract: Establish a fair engineering contract between the ICJV and the client, and a fair distribution of profit and responsibilities between partners.

5. Employment: There should be efficient site management team, and internal conflict would be reduced through trust and commitment.

6. Good relationship: The ICJV's foreign staff should comply with local culture and tradition and establish a good relationship with the host government and other authorities.

7. Control: It may be desirable to have one partner having a dominant share in the ICJV and control over the JV management.

8. Others: Conduct a thorough feasibility study to ensure that the project is workable under the ICJV, and be more patient in solving the internal conflicts.

Managing a successful JV is not easy. It is hoped that the risk analysis and risk management measures in this research would help decision makers thoroughly consider their options that may improve the performance of their ICJVs.

5.2. Suggestions for the Future Research

The findings of this research demonstrate that a relationship exists between inter organizational culture match and the successful conclusion of a joint venture. Future research should focus on which situations and by what means culture enhances success, more firmly establishing the proposed causal relationship. Even more basically, research should be undertaken to understand what creates cultural differences among firms in the A/E/C industry.

From the literature review and the results of this study, the writers recommend further study of the following aspects of conflict management and contractual arrangement related to cultural issues:

• As cultural diversity exists within a country or region, it will be more appropriate for further research to focus on the two cultural syndromes: collectivism and individualism.

• Many publications (Low 1996; Chan 1997; Singh 1998) advocate that collectivist cultures prefer mediation and procedure with animosity reduced. This position might overlook the fact that because of their ‘‘group value,’’ collectivists have very different (almost opposite) attitudes toward opponents who are in-group or out-group members when dealing with conflicts, particularly when the conflict is full-fledged. Further study may help to understand procedural preferences and contractual arrangements when dealing with international construction conflicts.

• People of two different cultures have different tolerances for uncertainty avoidance (Hofstede 1997). Such considerations should be taken into account to study the contractual arrangements that contribute to disputes in international projects.

• Project scope definition and tender assessment are factors that cause disputes. This general conclusion may apply to domestic and international construction projects and warrants further study to investigate the underlying criteria that apply only to international projects.

• An appreciation of the factors that influence international construction projects calls for a more comprehensive study of contextual factors, which include the general nature of construction projects, socioeconomic characteristics of international projects, international legal culture and the institutional setups for dispute resolution, and international socio-cultural differences in perceiving and resolving disputes. A very demanding integrative research process will be required to investigate all the influential factors and their correlations.

APPENDIX

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