

**International Project Risk Assessment:  
Methods, Procedures, and Critical Factors**

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CENTER CONSTRUCTION INDUSTRY STUDIES

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# **INTERNATIONAL PROJECT RISK ASSESSMENT: METHODS, PROCEDURES, AND CRITICAL FACTORS**

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A Report of the  
Center Construction Industry Studies  
The University of Texas at Austin

In Cooperation with and Additional Guidance Provided by:

Construction Industry Institute Project Team 181  
International Project Risk Assessment

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## EXECUTIVE SUMMARY

This document presents the initial findings of the joint Center for Construction Industry Studies (CCIS) and Construction Industry Institute (CII) research investigation of risk assessment procedures for international construction projects. The Project Management Institute (PMI) provided additional funding and support for this study. The primary purpose of this research is to better understand and to improve risk identification and assessment techniques for international capital facility projects.

During the initial stages of this research, the following tasks were performed:

1. Literature review to examine international construction trends
2. Review and critique of risk attitudes and assessment techniques used within the industry
3. Structured interviews with twenty-six individuals from various industry organizations involved with international construction projects. The interviewees had varying responsibilities with international projects and experiences with the associated risks.

This document outlines the findings from these initial tasks and provides guidance for future research activities along with specific insights for project management professionals. Among the findings were: construction in an international setting is hampered by the lack of a standardized risk assessment and management process, and risks are defined and managed differently by investors, owners, and contractors; risk compartmentalization occurs and risks are often viewed as static rather than dynamic events across the project life cycle; and a variety of disconnects exist between project teams and decision makers. These findings and the others detailed in this report also suggest the need for future research by CCIS and CII to address construction industry globalization and methods and procedures to improve international capital facility project performance.

Chapter 1 of this report provides the background on the reasons why risk assessment techniques for international construction need to be enhanced. The methodology for the CCIS/CII/PMI research project is also discussed. Chapter 2 discusses literature review results and an overview of common industry risk management practices. Chapter 3 details the results of the structured interviews. Chapter 4 reviews the key risk issues for international projects, provides conclusions, and recommendations for future study.

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## CHAPTER 1

### BACKGROUND AND SUMMARY OF RESEARCH

#### 1.1 Overview

Facility construction involves a wide variety of risks. International projects — defined as those where the owner and/or contractor are from a country different to that of where the project is situated — typically involve a wider range of issues than domestic projects and in effect, moving outside of one's usual business jurisdiction interjects many unknowns. Factors impacting owner investment decisions with international capital facilities can be quite complex and may vary significantly from region to region and project to project. Contractors face similar difficulties when they consider working outside of their resident jurisdiction. International projects differ from domestic work in areas such as legal requirements, construction systems, technology, and management techniques. The success of a specific venture, and in some cases the viability of an organization, can hinge on an understanding of the risks associated with such projects. International projects that fail to meet scope, budget, and schedule can result in a host of impacts with serious economic, social, and political ramifications.

Historically, U.S. companies have been significant participants in most global markets and U.S.-based contractors have a long tradition of overseas work. In recent years U. S. owners and contractors have aggressively pursued international business opportunities and projects. While international projects may appear as attractive investments, such projects usually involve an elevated level of risks, and the successful delivery of such projects has proven to be difficult for owners, contractors, and to the growing number of other participants that include investors and insurance interests.

Organizations are more likely to successfully plan and deliver international ventures when they have a more comprehensive understanding of the commercial, political, construction and operations uncertainties and risks with such project. Political, social unrest, and currency exchange are some of the concerns that add to the complexity of international ventures. However, efforts to identify and assess the risks associated with capital facilities are difficult to perform and few management tools or techniques exist to identify, assess, and help manage the risks.

#### 1.2 Participants

The Center for Construction Industry Studies (CCIS) is multi-disciplinary research program studying the construction industry and was created with a grant from the Alfred P. Sloan Foundation and the Construction Industry Institute (CII). It was created to perform multi-disciplinary, long-range studies addressing construction industry challenges in order to complement the traditionally short-term research process employed by CII and others.

CII is a research organization whose mission is to improve the competitiveness of the construction industry. CII is a consortium of approximately 90 leading owners and contractors

who have joined together to find better ways of planning and executing capital construction programs.

CCIS and CII with additional assistance from the Design, Procurement and Construction Specific Interest Group of the Project Management Institute (DPC-SIG) funded a research study to improve risk assessment procedures for international construction. PMI participation with this research effort was promoted by the interdisciplinary scope of the research, and the desire to continue its efforts to evaluate the changing nature of the project execution process and the implication of these changes on the industry.

The goal of this collaborative research effort is to develop a risk management process to increase the success of international capital facilities for owners and contractors, with project success defined as budget and schedule achievement, and meeting technical and operational objectives. Principal beneficiaries of the results will be to the industrial, building, and infrastructure sectors, including both private and public organizations that conduct international operations and activities. The tools and techniques that are developed could also be relevant to organizations outside of construction given that many project risk issues and factors are generic and systemic.

Participants in the CCIS/CII/PMI research included those listed in Appendix A as members of CII project team 181 (PT 181) - Risk Assessment for International Projects. PT 181 is the ad hoc committee responsible for developing and conducting the literature review, and developing and deploying the structured interview instrument to capture information on why organizations pursued international capital facilities and investments, current risk assessment procedures, and the effectiveness and results of risk assessment and management practices. In addition, CII's Globalization Committee, the DPC-SIG of PMI, and other non-CII companies involved with international work participated in this initial phase of the research effort. In total, 47 individuals from 38 organizations participated including: facility owners, contractors, international financial institutions, lawyers specializing in international work, insurance companies, professional consultants, and academic faculty.

### **1.3 Purpose**

The purpose of this report is to document the initial findings of the joint Center for Construction Industry Studies (CCIS) and Construction Industry Institute (CII) research investigation of risk assessment procedures for international construction. The primary purpose of this research is to better understand and to improve risk identification and assessment techniques for international capital facility projects. The objectives of the study were to:

1. Develop a comprehensive international capital project risk management process/approach
2. Develop tool(s) to help the team identify and assess the level of risk
3. Develop international project performance metrics
4. Produce documents to assist project teams in these issues, including risk mitigation methods

During the initial stages of this research, the following tasks were performed:

1. Literature review to examine international construction trends

2. Review and critique of risk attitudes and assessment techniques used within the industry
3. Structured interviews with twenty-six individuals from various industry organizations involved with international construction projects. The interviewees had varying responsibilities with international projects and experiences with the associated risks.

This document outlines the findings from these initial tasks and highlights the issues of focus for the CCIS/CII project team 181 research team. These findings also suggest future research by CCIS and CII to address construction industry globalization issues and methods and procedures to improve the performance of international capital facility projects.

This investigation is part of CCIS's effort to investigate the economic, financial, and legal issues facing the construction industry. The results of this study will also assist CII with implementing its strategic plan to improve owner and contractor performance on international projects.

## **1.4 Issues**

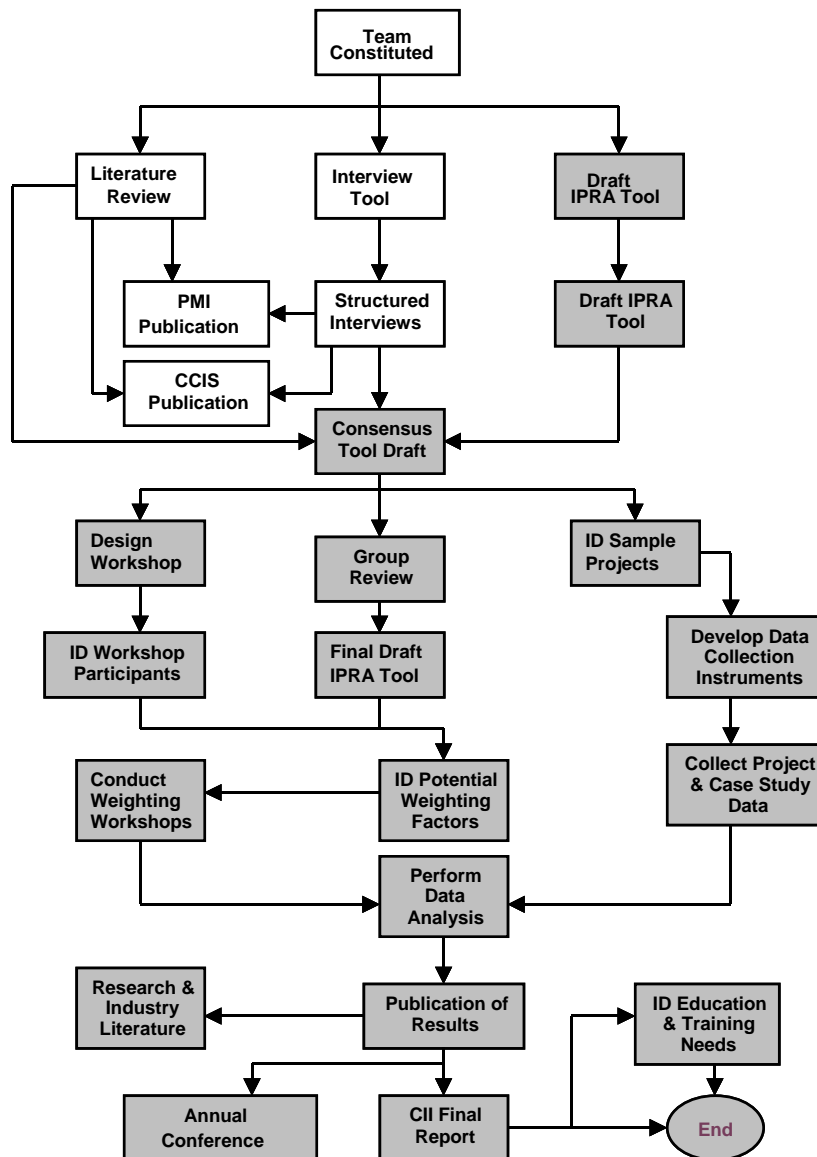
Construction that is performed in an international context can be very complex and the risks involve a host of issues. A wide-range of locations, diversity of project types, and the number of organizations involved make it difficult to define what is, and what is not an international project. International construction for this research project is defined as North American companies performing work outside of their home country. This geographic distinction is mostly due to the national origins of CII companies—12 of the world's 100 largest transnational corporations and 26 of the largest 100 international contractors are from North America (Forbes 2002, ENR 2003), as well as the North American sponsorship of this research investigation.

Although the need for international project risk assessment is apparent, a limited body of research and non-proprietary management tools exists to address these issues. Current efforts to evaluate the portfolio of risks associated with international construction are fragmented and fail to address a wide range of risk issues for contractors and owners at both the project and senior management level. The lack of the continuity between project parties, who are typically pursuing the same goal to manage risks, is compounded when the frequency and scope of the risk assessment does not carry through from project development to operations across the life of the facility.

## **1.5 Research Project Methodology**

The research project revolves around the hypothesis that international projects going through a systematic risk assessment and management process and associated decision-making steps would perform significantly better than projects that do not. This report outlines the initial portion of the investigation including results from the literature review and structured interviews and is shown as the non-shaded areas in Figure 1. The proposed research methodology to define and test such a hypothesis follows the task flow as shown in Figure 1, and summarized is the following:

1. Perform an extensive literature review including information gleaned from CII's globalization forums and industry/academic research.
2. Develop and deploy a questionnaire and interview guide for selected CII members and other organizations that will identify and assess specific issues and the approaches to manage the risks incurred on international projects.
3. Based on this input, develop an international projects risk tool targeted towards project management staff that would identify and rank risk areas such as political, economic, cultural, environmental/regulatory, experience, legal, and technical areas.
4. Conduct a series of workshops with industry representatives to gather further input on what is needed to improve risk identification and assessment technique.
5. Conduct several case study evaluations with selected owner and contractor organizations to validate initial findings.



**Figure 1** Flow Diagram of Research Project Tasks

From the beginning the research team felt that identification of key industry-wide issues would provide the basis for a comprehensive analysis of risk assessment techniques. Through the literature review, structured interviews and input from the research committee, this report identifies the high-level risk issues concerning the development of international capital facilities.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Overview**

An extensive review of international project risk assessment was conducted during the initial phase of the research effort. In general, there is an absence of literature that has focused on the practices, results or development of risk assessment techniques for international projects. Much of what exists is specific in nature and can be categorized under the following topics:

- International construction market and its participants
- Risks associated with construction and the project life cycle
- Allocation of risk issues when conducting international work
- Country, industry, or project-specific related risks

The literature review that follows is structured using the above topics. Attention is given to developing a better understanding of the purpose, structure, and participants involved with international projects as well as the risks encountered and the practices used to assess and manage those risks.

#### **2.2 International Construction**

Construction is a major worldwide industry accounting for approximately \$3.4 trillion USD, or almost ten percent of global Gross Domestic Product (ENR 2000; Batchelor 2000; Bon 2001). Proportionally, the majority of international construction activity is conducted by local, regional, or national entities, yet an increasing percentage of industry participants operate on an international level (Bon 2001). Although the United States is the largest construction market—estimated at over \$800 billion USD—projects completed outside of the domestic market, have long been and have become an even greater part of the capital investment portfolio of U.S. owners and the work performed by American contractors. The growth and activities of multinational corporations has been a major contributor to the creation of an international construction market (United Nations 2001).

#### **2.3 Participants**

Most industry analysts agree that international business opportunities will continue to attract U.S. foreign investment and the international construction market will attract U.S. contractors. U.S. Owners aggressively pursue international opportunities to seek out new markets or improve cost effectiveness in manufacturing operations. The globalization of international construction markets provides tremendous opportunities for contractors to expand into new foreign markets (Hann and Diekmann 2002). Respondents to a survey on the future of international construction markets for the next 25 years agreed that American firms in specialized construction services possess a competitive advantage, and will continue to export construction services (Bon 2001).

Takeovers, mergers and acquisitions continue to impact the global contracting community. Mergers and acquisitions have reshaped the industry into fewer, larger companies of increased complexity. Revenues for the world's 25 largest contractors topped more than US \$200 billion in 2001 (Accenture 2003). Competition among contractors is keen and profit margins are thin. Approximately 20 percent of the top 400 U.S. contractors undertake international projects (ENR 2001; Han and Diekmann 2001). For sustained competitiveness and growth in a global market an understanding of the risks involved with international projects is required (CII 1993).

## **2.4 Risk Management**

A myriad of risk and risk-related definitions are applied to construction projects, and no standard definitions or procedures exist for what constitutes a risk assessment. In the construction industry, risk is often referred to as the presence of potential or actual threats or opportunities that influence the objectives of a project during construction, commissioning, or at time of use (RAMP 1998). Risk is also defined as the exposure to the chance of occurrences of events adversely or favorably affecting project objectives as a consequence of uncertainty (Al-Bahar 1990). Dias and Ioannou (1995) concluded that there are two types of risk: 1) pure risk when there is the possibility of financial loss but no possibility of financial gain, and 2) speculative risk that involves the possibility of both gains and losses. CII's definitive work on construction risks (CII 1988) uses classic operations research literature to distinguish the concepts of risk, certainty, and uncertainty, and is consistent with the literature (ASCE 1979; CIRA 1994; Kangari 1995; Hastak and Shaked 2000; PMI 2001; Smith 2001) on what is considered as the sequential procedures for construction risk management: 1) identification, 2) assessment, 3) analysis of impact, and 4) management response.

Increased concerns about project risk have given rise to various attempts to develop risk management methodologies. An example of such is the Risk Analysis and Management of Projects (RAMP) method produced by the Institute of Civil Engineers and the Institute of Actuaries in the United Kingdom (RAMP 1998). This method uses a project framework to identify and mitigate risk by using the accepted framework of risk identification and project controls by focusing on risks as they occur during the project life cycle. It requires users to follow a rational series of procedures and to undertake this analysis at scheduled intervals during the life cycle of a project. RAMP applies to all types of project but does not focus on international issues.

Traditional risk assessment for construction has been synonymous with probabilistic analysis (Liftson 1982, Al-Bahar 1990). Such approaches require events to be mutually exclusive, exhaustive, and conditionally independent. However, construction involves many variables, and it is often difficult to determine causality, dependence and correlations. As a result, subjective analytical methods that rely on historical information and the experiences of individuals and companies have been used to assess the impact of construction risk and uncertainty (Bajaj, Oluwoye, and Lenard 1997).

## *Risk Allocation Issues*

Although contracts are the mechanism to allocate liabilities and responsibilities of project participants in construction, contract language alone is insufficient to specify and appoint all the risks (ACEC/AGC, 1992, Rahman and Kumaraswamy 2002). An ideal process would address the individual needs of each organization and each project (Chapman and Ward 1997).

The distribution of risk between the client and contractor tends to overshadow effective management strategies and investigations show that contractors and owners give minimal consideration to risks outside the realm of their own concerns (Kim and Bajaj 2000, ENR 2002). Although the owners project team must identify with the business mission of the company, there are often disconnects. CII research has shown the failure to align business goals and specific project goals due to poor pre-project planning is a major industry challenge (CII 1997).

Determination of risk responsibilities and ownership is critical yet can be difficult to determine for international projects. The Fédération Internationale des Ingénieurs Conseils (the International Federation of Consulting Engineers, FIDIC) and the International European Construction Federation (FIEC) publish two well-known and widely-accepted forms of conditions of contract for international construction projects (the Red and Yellow Books) that include provisions on the fair and equitable risk sharing between the owner and the contractor as well as risk responsibilities, liabilities, indemnity, and insurance. A discussion on risk sharing is included in an analysis of the FIDIC Red Book (Bunni 1997) that includes a series of flow diagrams of the risks in construction, and their ensuing responsibilities, liabilities and how these are dealt with by the Red Book (Conditions of Contract for work of Civil Engineering Construction).

## *Risk and the Project Life Cycle*

Understanding the relationship between risk management and project phases for capital projects can be a difficult task. International projects are often first- or one-time efforts where project progress and phasing decisions can be isolated from risk management. For most international projects, different participants are responsible for and control the various phases of a project's life cycle. In many cases, the project owner is largely responsible for program analysis, a third-party is often hired to manage and control design and engineering to meet the initial constraints set by the owner, and a contractor is hired to construct the project, who turns the results over to the owner for operations or production.

Structuring projects with distinct phases and responsibilities can increase risk by isolating the project participants in such a manner that minimal attention is given to overarching project concerns. Individual project participants become concerned with only their own project risks and either willingly or unwillingly try to transfer these risks to other project participants (Kim and Bajaj 2000).

Mitigating risk by lessening their impact is a critical component of risk management. Implemented correctly, a successful risk mitigation strategy should reduce adverse impacts. In essence a well planned and properly administered risk mitigation strategy is a replacement of

uncertain and volatile events with a more predictable or controlled response (Chapman and Ward 2002).

The uncertainty of a risk event as well as the probability of occurrence or potential impact should decrease by selecting the appropriate risk mitigation strategy. Four mitigation strategy categories commonly used are:

- **Avoidance** – when a risk is not accepted and other lower risk choices are available from several alternatives
- **Retention/Acceptance** – when a conscious decision is made to accept the consequences should the event occur.
- **Control/Reduction** – when a process of continually monitoring and correcting the condition on the project is used. This process involves the development of a risk reduction plan and then tracking the plan. This mitigation strategy is the most common risk management and handling technique.
- **Transfer/Deflect** – when the risk is shared with others. Forms of sharing the risk with others include contractual shifting, performance incentives, insurance, warranties, bonds, etc.

### *Focused Efforts*

Successful project management requires the identification of the factors impacting project scope definition, cost, schedule, contracting strategy and work execution plan. However much of the research related to risk identification, assessment and management for constructed facilities is focused on specifics such as location, categories of risks aspects, or types of projects. For example lists of relevant construction project risks have been developed (Kangari 1995, RAMP 1998, Smith 1999, Hastak and Shaked 2000, Han and Diekmann 2001) as well as political risk are available (Ashley and Bonner 1987, Howell 2001).

The value of systematic risk management of project activity is not fully recognized by the construction industry (Walewski, Gibson, and Vines 2002). Since no common view of risk exists, owners, investors, designers, and constructors have differing objectives and adverse relationships between the parties are common. Attempts at coordinating risk analysis management between all of the project participants have not been formalized and this is especially true between contractors and owners.

International project risks are sometimes overlooked or assessed haphazardly. Such risks include war, civil war, terrorism, expropriation, inability to transfer currency across borders, and trade credit defaults by foreign or domestic customers (Wells and Gleason 1995, Hastings 1999). Although risks such as civil unrest and economic stability are typically outside the scope of normal business, understanding and dealing with these risks are critical for companies working internationally. A 2001 study by Aon Trade Credit discovered that, in the Fortune 1000, only about 26 percent of companies had in place systematic and consistent methodologies to assess political risks (AON 2003). Working in an international setting often requires a much wider view of the project's context than with domestic projects (Miller and Lessard, 2000; Mawhinney 2001).

For international construction, the purpose of risk management is to mitigate risks by planning for factors that can be detrimental to project objectives and deliverables. Although risk management is a relatively known and practiced process, few organizations have conquered its

successful implementation. Much of what is practiced is based on intuition, personal judgment. The need to manage risks is important to all project stakeholders and critical for project success.

## **2.5 Summary**

Not all organizations undertaking international projects fully understand that in general, international projects are more complex and difficult to deliver and involve risks where the severity of impact far exceeds those of typical projects. International project participants are often segmented into phases that create information and communication disconnects that combined with historically adverse owner contractor relationships magnify difficulties.

Few project participants have an understanding of all the risks involved and few organizations consider the entire portfolio of risks that can occur across the life cycle of a project. Compartmentalization of the risks occurs when participants only identify, assess and/or manage risks within a specific perspective. A structured process for risk management is needed across the entire life cycle.

## Chapter 3

### Structured Interview Analysis

#### 3.1 Purpose

Twenty-six structured interviews were conducted with industry executives and project management personnel with international project experience. Two primary purposes drove the interviews. First, the authors hoped to gather industry input on risk assessment attitudes, and concerns and general trends in pursuing international projects. With the formation of the CII research team and initial discussions within the research team, there was a working assumption that risk identification, assessment, and management of international projects was an issue of concern for CII members. Following this assumption the research team drafted a structured interview questionnaire that, in addition to gathering risk assessment attitudes and concerns, was expanded to include background information on typical international project, risk management procedures and practices, and the purpose, reasons and value of performing risk assessments on international projects. The second purpose of the interviews was to solicit industry input on current practices, and to seek out example formats and techniques, as well as to allow input from interview participants to suggest improvements.

#### 3.2 Interview Participation and Limits

The twenty-six interviewees from 22 organizations who participated in the structured interviews are shown in Appendix B. Originally the interviews were limited to contractors and owners. It was made clear from the first few interviews that participation should be expanded to those playing an increasing role in international capital facility development. Those suggested included representatives from the insurance industry, lawyers, financial institutions and the insurance industry. As a result, this convenience sample of interview provided a cross-section of organizations and individuals typically involved with international facilities. Their views also represent the perspective of those at senior-level positions.

The small number interviews and the structure of the questionnaire does not allow for statistical analysis. Responses to the interviews have been used to identify consistent themes, common practices, and insight provided by active and influential project participants that would provide additional guidance and assistance to the research team. The conclusion section of this chapter as well as Chapter 4 provide further details as to how the committee used the interview results as a basis for moving forward with the second phase of the study.

#### 3.3 Questionnaire Structure

The structured interview questionnaire is shown in Appendix C. The questionnaire was developed with input from the research team with brevity an intended goal. The questionnaire was tested within the committee for clarity, ease of use, and value of the information that could

be gathered. The structure of the questionnaire and format of the interviews is broken down into the following major sections:

- General information
- Risk process and procedure information
- Purpose and value of risk assessment
- Example procedures

The interviewer was free to ask additional questions that focused on issues arising during the course of the interview. The freedom to follow the interviewee, to ask for clarifications, and to focus on specific projects, risk practices and knowledge, made the interviews insightful. The interview structure is used to frame the results of the structured interviews in the following sections.

### **3.4 Interview Results**

The backgrounds of the twenty-six interviewees varied but most were mid- to upper-level management with eight from contractor organizations, eight from owner organizations, and the remainder in the “other” category distributed among law firms, professional consultants, academics, and financial and insurance entities. Most respondents had management responsibilities or provided professional services for international projects. Industry sectors represented included heavy industrial and processing, light industrial, general building, and infrastructure and transportation. Professional services represented included financial, legal, insurance, and management consulting. Construction industry experience of individuals ranged from 20 to over 50 years and all participants had at least 10 years of experience with international projects. Participants had worked on projects that ranged in size from \$25,000 renovation projects to industrial facilities of over \$2 billion in scope.

Contractors and owners undertook projects in a variety of countries and no one region dominated where organizations worked or would potentially work. Some respondents indicated that certain countries were considered “out of bounds” for their companies due to market conditions, security issues, cost, or factors specific to their industry or organization. The cost difference between similar domestic and overseas projects varied depending on the country and the current civil and economic climate in the region. Participants noted that labor is typically less expensive per hour in Asia, but productivity and quality can sometimes offset this lower cost and some savings may be attributed to a lower emphasis on schedule for some contractors. Europe is for the most part similar to the U.S., and along with Europe have more governmental regulations may require more front end planning.

Almost all of the owner organizations had decades of international project experience, with some organizations setting up semi-, long-term, or permanent overseas operations. A few owners reported that the work they do in Asia or third world countries is with an in-country partner or joint venture.

Respondents were asked to identify the reasons why they pursued international projects. For owners, the responses fell generally into two categories. First and most often cited was that expansion into foreign markets has been to pursue new markets or additional customers. Second,

in certain industries foreign locations resulted in lower production and product costs. Contractors reported that their major reasons to pursue international work were to seek-out business opportunities and to pursue work with existing clients that were conducting work overseas.

Most owner participants reported an increase in their total overseas investments, and survey participants reported that the total number of international projects undertaken over the past ten years had increased with the majority of that occurring in the past five years. The percentage of international projects compared to total projects undertaken varied considerably between respondents. Some firms experienced most of their project activity and growth internationally whereas for others, international projects were a small percentage of their overall work.

### *Procedures and Value*

For almost all of those interviewed, some level of risk assessment and management was performed when undertaking international projects, and about a third of the companies reported a structured process carried out by a specific company unit or group. If a process existed, company practice rather than policy dictated its use. Few organizations had requirements that a set process was to be used to identify, assess, and manage risks. A number of firms undertook risk assessments on an ad hoc basis where location or project size dictated whether an assessment or analysis would take place. It appeared that larger projects had a much greater chance for a formal risk assessment.

The interviewed financial and insurance representatives were familiar with the use and applications of quantitative and financial techniques for assessing the impact of risk, but expressed the difficulties with transforming the results to risk management strategies for project managers or for use on specific projects. These organizations were very knowledgeable of risk management theory, concepts, and principles, however they noted the difficulties of determining the relevance of issues and what risks are of most significant for their own concerns as well as for other project participants.

Investors, owners and contractors reported that they will at times use consultants to perform specific tasks that focus on issues such as political, currency, and insurance risks. A few firms reported ongoing relationships with political risk assessment services—such as receiving general country information on a monthly basis, but the majority used such service on a project-by-project basis.

The attorneys interviewed made it clear that contracts and contract language were viewed by many of the owners, contractors, designers, and investors as the most important method to control and allocate international project risks. They also noted that they dealt with few organizations that fully understood how risks should be allocated by contract. Project owners responded that contracts were seen as the mechanism to avoid or shift risks to the contractor and in their opinion, there was a mutual understanding that they were paying contractors to accept this risk.

Respondents were asked to judge the effectiveness of their risk assessment practices for international projects. Only one respondent noted that their current process and practices were completely adequate in identifying and assessing the portfolio of risks for international ventures. The majority of respondents identified their on-going risk assessment practices as only fairly adequate or inadequate as a mechanism to identify and prioritize risks. Many interviewees described their procedures as either too subjective or too quantitative, and most noted that analysis results could not be used from project to project. About one-third of the respondents reported the use of quantitative methods to assess project risk, with the majority relying on subjective judgment. A reported disconnects between decision makers and project personnel that were often severe enough to impact outcomes.

Conducting detailed analyses of economic, competition, and market trends were relatively standard activities for investors, owners companies, and contractors. However determining the likelihood and impact of current and future political and country risk situations is difficult to do. According to most respondents, decisions on country-specific risks were often made by top management and separated from other business, technical and operation risks of the project. Some noted an increasing tendency to seek out mechanisms to transfer country and political risks – such as government-backed insurance – rather than pursuing the traditional method of retaining and absorbing the risk. One interviewee remarked that the attitude of “betting the farm” by not transferring political uncertainty was no longer a viable strategy.

### *Critical Factors and Benefits*

Interviewees were asked to identify, based on their own experience, the critical risk factors to consider when developing international projects. The issue identified as most important by nearly all respondents was the financial stability and funding sources for the project. Owners stated that it was critical to make sure the business case, economic model, and marketing effort aligned. Owners also reported that they should be concerned about long-term risks and viability of producing and selling products. Owners were also concerned with potential problems with political changes, social unrest, and issues of security and safety. They also noted the importance of dealing with reputable and qualified contractors.

Investors and insurance respondents made the point that they often require regular monitoring of risks by studying the likelihood of specific events or trends at the beginning of a project and/or during its progress. Interviewees involved with such analyses reported that they usually had limited input from key members of the project team, results were often closely guarded as proprietary, and information was rarely shared with other project participants. The interviews with those representing insurance companies revealed that as a whole, and not surprisingly, the industry has a variety of techniques and practices to identify and assess risk their clients will encounter. What is not clear is how the insurance industry uses its knowledge of risk to improve project performance.

Legal experts and investors noted the difficulties they encounter with project participants linking projects to specific business strategies, recognizing what risks are involved, and determining responsibilities and management. They also noted that country and political issues tend to augment already complex business relationships and financial structures common to large-scale international projects. Investors, lawyers, and insurance representatives noted the

increasing complexity of funding mechanisms and expanded participants because project financing is often done with a consortium of banks or other financial institutions. The lawyers interviewed as well as the engineering consultants and insurance companies reported that advice was obtained from experts when dealing with complex political, environmental, technical and financial topics to minimize their own or their clients risk exposure.

Contractors repeatedly emphasized their concerns on receiving guarantees for payment and understanding the financial stability of their clients. Contractors identified the importance and difficulty of dealing with human resources issues in an international environment. Workforce availability, skill levels, and the ability to use expatriate labor were among the most common labor related concerns for contractors.

Respondents were asked to identify the benefits of undertaking risk assessment and management for international projects. Responses fell into two discrete groups: those with tangible benefits related to decision-making, contingency determination, etc., that could be quantified; and intangible benefits related to people issues. Tangible benefits include:

- Improved understanding of the project, resulting in better control of resources
- Increased knowledge of risk impacts and a strategy to manage and control
- Better use of contracts to identify and allocate risk
- Improved assessment of contingencies that reflect the risks

Examples of intangible benefits:

- Facilitation of rational risk taking, including an understanding of the benefits gained from risk taking
- Promotion of a team environment
- Improvement of communication
- Providing an early warning system for extreme risks

Some interviewees stated that a well-planned risk management program would encourage a more proactive approach to dealing with risk rather than seeing risks as only a detriment to project performance. By taking such a view, the links between risk and project management are emphasized and risk management becomes part of the project management process as opposed to an isolated activity.

### **3.5 Summary**

Although a variety of techniques and practices exist to identify and assess risks that occur on international projects, there is no standard technique or practice specifically targeted for such projects. Decisions on country-specific risks were often made by top management and separated from other business, technical and operation risks of the project. Few project participants have a complete understanding of the portfolio of risks that happen on such projects, and a life cycle view of risks is uncommon. As such, compartmentalization of the risks occurs when participants only identify, assess and/or manage risks using a specific perspective. International project are often organized and managed in ways that create information and communication disconnects.

Contracts and contract language are often viewed as the most important method to control and allocate international project risks, but few organizations understand how risks should be allocated by contract. Misconceptions and assumptions about who owns and controls the risk are common. As a result, interviewees were receptive to the development of a structured risk identification, assessment, and management process that gives consideration to the entire life cycle of international projects.

## Chapter 4

### Key Findings Regarding International Project Risk Assessment and Path Forward

#### 4.1 Overview

The proceeding two chapters have outlined the purpose and results from the literature review and structured interviews. The research team felt that these activities were necessary to identify key industry-wide issues and provide the basis for a comprehensive analysis of risk assessment techniques. This chapter outlines the findings from these initial tasks, provides guidance for project management professionals, and suggests a path forward for future research activities along with specific insights.

#### 4.2 Literature Review and Interview Findings

The interviews, committee deliberations and other activities—resulting in contributions from over 38 industry organizations—have highlighted the complexity of international project, participants' concerns, and the diversity of risk assessment and management techniques employed by owners, contractors, and others associated with the construction industry.

Overall, most contractors and owners engage in some type of risk assessment, although the depth and quality of these efforts vary, and are often conducted as a solitary one-time effort at the onset of a project. Even if organizations have an in-house risk assessment/management program, no standard terminology exists and typically there are no procedures in place to carry lessons learned forward.

Systematic risk management of project activities is not fully recognized as valuable by practitioners in the construction industry. No common view of risk exists since the owner, investor, designer, and constructor have differing project goals and objectives, and historically adverse relationships are common.

Coordinating risk management between project participants is not typically done in a formalized manner and this is especially true between contractors and owners. The value of identifying and managing project risks rather than each participant giving exclusive consideration to only their risks was acknowledged by many but practiced by few. Most organization reported a process in place for early identification of hazards and opportunities although few were able to translate this to management actions such as establishing ownership of risks and risk mitigation actions. Few organizations used their initial assessment of risk to create or enhance risk-based decision-making.

Project participants are often segmented into phases that create information and communication disconnects between project participants. Combined with historically adverse owner contractor relationships, difficulties are often magnified. Many times this is exacerbated by disconnects between the project team and executive management.

Risks can run across the life cycle of a project or they can appear at various times throughout the project. Compartmentalization exists where participants only look at risks with a specific perspective—not project lifecycle and with own intentions in mind and irrespective of other project parties. For instance, little work was found in the literature acknowledging the importance of operational risk assessments as part of facility planning.

Few project participants have an understanding of all the risks involved, and few organizations have the ability to knock down the traditional barriers between the owner and contractor to improve efficiency and productivity.

Interviewees reported that many of the risks that influence international project fall outside of those typically found on domestic projects. As such, almost all participants in the research investigation agreed that an improved process is needed to identify and assess international risks and there would be benefit of having a structured tool/process.

### **4.3 IPRA Development**

Based on the literature review and insight gained from the structured interviews and the input from a variety of sources, the research team has proposed and is developing the International Project Risk Assessment (IPRA) tool based with the following attributes:

- A process to identify and assess risks specific to international projects using standard terminology.
- A list of risk elements specific to international projects.
- A structured process to help identify, measure, and track risks from an early stage of project development through operation of the facility.

The IPRA has been tailored to address the specific issues typically encountered by those working in an international setting. The tool focuses on the international aspects and does not address issues considered to be basic project management.

PT 181 research committee has recently completed development and is validating the International Project Risk Assessment (IPRA) Tool and IPRA Element Descriptions to improve risk analysis procedures for international construction. The IPRA consists of four major sections (commercial, country, facilities and operations), made up of 14 categories. The 14 categories are further broken into 82 specific risk elements. Each section, category, and element has a corresponding detailed description and examples are provided to assist with the understanding of each issue related to international risk. The IPRA Element Descriptions and Tool would be used in tandem by a project team to identify and assess the impacts of individual risk factors (elements).

### **4.4 Conclusions**

The international construction market has always been and continues to be risky. Yet owners and contractors expend little time and effort on assessing and strategically planning for

known, probable, or even unknown risks. Without a proactive risk management process, problems that occur on a project are likely to increase delays and costs.

Identifying, allocating, and managing risks at the front end of the project planning process can improve project performance. International project risk assessment planning is a process that assists all project participants to handle risks before they become significant problems.

Although a project can be divided into a number of separate phases and the risks assessed and managed as such, there is a need to manage risks as a continuum over the project life cycle. Maximizing the process of assessing and managing project risks requires initial recognition combined with a systemic method of monitoring changes and impacts over time.

Risks and their impacts have a greater tendency to vary over the life cycle of international capital projects. Some risks remain constant while other arise and diminish as projects progress. Improvements in project performance can be achieved by recognizing which risks occur across the entire project life cycle and giving them due consideration. Within the project life cycle, optimal risk identification and assessment procedures and timing, as well as the identification of the most favorable decision points need to be outlined. Few owners and contractors have developed a process to optimize the portfolio of project risks across the entire project life cycle. As a result, current assessments of international risk often fail to give adequate consideration to how they may change over time.

#### **4.5 Path Forward**

Based on the work completed to date, the following observations will guide the actions of practitioners and the research team to effectively develop and implement the risk analysis and management tool:

1. Risk analysis and management is most effective when deployed early.
2. A properly structured risk identification, analysis, and mitigation process can moderate the risks associated with international construction projects.
3. Risk assessment and management is not a substitute for adequate pre-project planning, project controls, or other management and technical requirements. The most effective risk management process is coordinated with all aspects of project development and management.
4. Traditional relationships between owners, investors, and contractors working in international settings make it difficult to assess and manage risks.
5. Projects with certain characteristics (new technology, multiple participants, unstable political situation, etc.) will likely be exposed to increased levels of risk.
6. The risk management process should capture usable data and be kept as simple as possible.
7. Documentation is critical, and properly recording the identification, analysis, and risk mitigation plans and results for each risk element allows for lessons to be learned, and actions to be taken if necessary.

This effort will move forward by following the project proposal tasks and schedule. The team's immediate focus is to further develop the assessment tool using case study evaluations from owner and contractor organizations to identify specific risk approaches to risk areas such as political, economic, cultural, environmental/regulatory, experience, legal, and technical areas. This research has exposed globalization issues as an area of significant industry concern, yet an area that has experienced little research. Globalization is emphasized in CII's recently revised Strategic Plan and also recognized as important by such organizations as the individual Sloan Industry Centers, the Building Futures Council, and the American Society of Civil Engineers.

Industry associations such as CII have noted the lack of creditable research in this field, acknowledged the significant value of the current research, and support additional investigation of construction-related globalization issues. Globalization issues warrant a continuation of the current research and additional exploration is needed to identify topics of highest concern given the significant role that the development and construction of capital facilities has for almost every industry operating in the global economy. Accordingly, the authors and the research team wish to build upon and enhance the current work supported by CCIS, CII, and the PMI. Initially, this will be with the continued development of the IPRA tool, and validation of it on projects outside of North America to observe its effectiveness and usefulness in helping project teams conduct risk assessment activities. Based on previous work, applying the IPRA tool to on-going international projects and monitoring its accuracy is the most desirable method to validate the model.

The authors would like to apply and focus the IPRA on a specific industry. Because most Sloan Centers investigate industries that have global activity, one or more of the Centers could be assessed. For example, current research shows that growth in the pharmaceutical industry is global and facilities are high-risk investments. Owners and contractors of such facilities would benefit by using the IPRA tool to identify potential areas of risk during the early phases of project development that may otherwise go undetected and ultimately result in severe negative consequences.

The global economy requires that firms plan for, construct, and operate facilities in many different business, cultural, and economic settings. Current CCIS research is beginning to address globalization issues facing the construction industry, and this report has highlighted that a significant amount of work remains.

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**Appendix A**  
**Membership of Construction Industry Institute Project Team 181**

Ellsworth F. Vines	(Chair) Dick Corporation
Bretislav Borak	Department of State
Charles R. Domanico	Abbott Laboratories
Michael Dinneen	Washington Group International
G. Edward Gibson, Jr.	The University of Texas at Austin
Yamile Jackson	Ringstones Consulting International
Douglas J. Kaiser	EXXCEL Project Management
Libby Lace	Jacobs Engineering Group
Egon J. Larsen	Air Products and Chemicals
Frank J. Mignoli	Kellogg Brown & Root
Matthew Nixon	ConocoPhillips
Corrie E. Reid	Aramco Services Company
Graduate Students:	
Guy Dudley	The University of Texas at Austin
John Walewski	The University of Texas at Austin

## **Appendix B**

### **Structured Interview questionnaire**

#### **CONSTRUCTION INDUSTRY INSTITUTE PROJECT TEAM 181 RISK ANALYSIS FOR INTERNATIONAL PROJECTS**

##### Project Risk Analysis Questionnaire

#### **General Information**

1. Background information (name and location of company and/or operating group, contact name and information concerning interviewee's scope of responsibility).
2. What type and how many projects has your organization done in the past year, 5 years, 10 years? How many (or percent) were international? Does your organization have regular operations in foreign jurisdictions? Where outside the United States have you done projects?
3. What has been the range of total installed cost for these international projects and the average cost (or revenues) that your organization has booked as a result of its involvement with these projects (as a percentage of total installed cost, or as US\$)?
4. In your opinion, does the location, nature and value of the project, or the industry/government entity in which the project owner operates appear to most materially affect project duration? Is project duration principally a function of market conditions and/or perceived need, or of project complexity and/or location? Are you aware of any other factors that materially affect project duration? How long, as a percent of total project duration, is your organization involved in international projects? At what stage in the project does your involvement usually begin; at what stage does it usually end?
5. Do you use CII products such as Pre-Project Planning (PPP), Project Definition Rating Index (PDRI), or other research reports to identify project risks?

#### **Process/Procedure Information**

6. Does your organization have a risk analysis/management process in place? If so, is there a separate process for international projects? Does the process evaluate at the business decision level, and/or at the project level? Please describe the scope of the risk analysis.
7. Would you be willing to share your process with us-confidentially?
8. If a process exists, is there a company policy that requires its use? If so, how was this process developed and have the results been documented? How long has the process been used?
9. Does the process evaluate risks in a qualitative and/or quantitative manner?

10. From your experience, how does the total installed cost of international projects relate to similar U.S.-based projects; how do installed unit costs (e.g. square feet, lineal feet, cubic yard, tons, installed equipment items, etc) of the facility compare to similar US projects? Does the proportion of cost elements (e.g. material, installed equipment, craft labor, supervision) differ materially from projects performed in the US? Does the time needed to complete and the management effort differ for international projects? Are there any special resources, expertise, or facilities you consider essential to successful performance of foreign projects?
11. Has your firm ever used a risk analysis/management consultant? If so, was the experience a success? Does your organization employ any nonproprietary, commercially available risk assessment tools, or “jurisdiction specific” information (related to licensing/registration, taxation, importation, immigration, labor supply, material/equipment availability, etc) as part of international project performance?
12. Does your organization consult with or employ residents of the jurisdiction where the project will be performed as part of its risk analysis process and/or project performance? How would you categorize the nature of such consultation (accounting, tax, legal, logistical, political, technical, etc.)? Do you believe employment of, and/or reliance on foreign nationals mitigates or exacerbates project risk?
13. Does your firm have and use a lessons learned program or a process to follow-up on project performance?
14. What types of project delivery methods (design-bid-build, design-build, etc.) have been used on international projects and which have been most successful? Do you have a preference? To what extent does your firm use joint ventures for international projects?
15. What are the most important contract terms and conditions needed for international projects?
16. How have you financed international projects and detail their alignment with the construction contract?
17. How do you translate risks into the project evaluation process? Do you add money, time, as contingencies?

**Purpose/Reason/Value For Risk Analysis**

18. What is the major reason for your company to pursue international projects?
19. Do international projects have a lower, the same, or higher expected ROI than domestic projects?
20. What would you consider the key (most important) risk factors related to international projects (rank order the top 5)? Do these risks differ from those for domestic projects?
21. Are risks that pertain to political instability, bureaucratic obstacles, external/internal conflicts a concern for your business/project development?

22. Are economic and financial risks such as inflation and currency control considered?
23. What laws and regulations, if any, have a specific impact?
24. What recommendations would you make as a risk management consultant to an owner company interested in developing a series of projects overseas? Would your recommendations differ for a contractor pursuing international opportunities?
25. What sources of information, research, and data have you used to assess risks before undertaking international projects?

## Appendix C

### Structured Interview Participants

	<b>Name</b>	<b>Company</b>	<b>Business Type</b>
1	King, Dennis	Enron	Owner
2	Murphy, Richard	Enron	Owner
3	Fernie, Pete	SMS-Demag	Contractor
4	Pascuzzi, Rob	Kvaerner	Contractor
5	DeLoach, Jim	Arthur Andersen	Consultant
6	Leo, Huiwen	The World Bank	Investor
7	Edmister, Dick	Washington Group Int.	Contractor
8	Hartsfield, David	Washington Group Int.	Contractor
9	Wong, Freddie	Aramco Services	Contractor
10	Gilbert, Paul	Parsons Brinkerhoff, Q&D	Contractor
11	Aldrete, Rafael	Booze-Allan Hamilton	Consultant
12	Mallon, Gregory	Marsh USA, Inc.	Insurance
13	Larson, Egon	Air Products & Chemicals	Owner
14	Slater, Richard	Jacobs Engineering Group	Contractor
15	Vitale, Robert	Cadwalader Wickersham & Taft	Lawyer
16	Schneider, Jochen	Kellogg Brown and Root	Contractor
17	Shen, Li	Hong Kong Poly/REPM	Academic
18	Will, Tom	Rohm & Haas	Owner
19	Kaiser, Barry	ChevronTexaco	Owner
20	Anderson, Steve	ChevronTexaco	Owner
21	Domanico, Chuck	Abbot Laboratories	Owner
22	Farrow, Rupert	Philips Petroleum	Owner
23	Person, John	Person & Craver LLP	Lawyer
24	Jones, Peter	World Bank -MIGA	Investor
25	Ehr, Tom	Booze-Allan Hamilton	Consultant
26	Ford, Tony	AON Risk Services	Insurance

## **Point of Contact**

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