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RISK ASSESSMENT ON
INTERNATIONAL PROJECTS:
A MANAGEMENT APPROACH

Construction Industry Institute

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Risk Assessment on International Projects: A Management Approach

**Prepared by
The Construction Industry Institute
Risk Assessment for International Projects Project Team**

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Executive Summary

U.S. owners and contractors are aggressively pursuing international business opportunities and projects. While international projects may appear as attractive investments, such projects usually involve elevated levels of risk. The successful delivery of such projects has proven to be difficult for owners, contractors, and other participants to the process, including investors and insurance interests.

Assessing and managing risk is a complex and critical task for international construction projects. Risk assessment includes the identification, cataloging and evaluation of specific hazards and uncertainty. Risk management is the entire spectrum of activities associated with identification, evaluation, and the control or mitigation of risk. Previous CII research has documented the need for risk assessment and management procedures. When properly conducted, risk assessment and management yields:

- Early identification of hazards and opportunities
- Communication of risks between project participants
- Identification and management of uncertainty
- Acknowledgement of risk issues and mitigation actions
- Enhanced risk-based decision-making

CII formed the International Project Risk Assessment Project Team to develop a management tool to identify and assess the risks associated with international capital projects. The scope of this research was risk assessment for international projects; however, given its importance, the project team considered, to a limited extent, risk control and mitigation.

This summary provides an overview of the IPRA research findings, research and IPRA tool development, and an explanation of how to use the tool. Also included are recommendations to practitioners who are pursuing international projects.

Introduction

Most construction industry participants agree that risk management is a necessary process when undertaking international projects given the diverse set of political, geographic, economic, environmental, regulatory, and cultural risk factors. Nevertheless, few organizations have developed an effective process to identify, assess, and manage risks and the potential impacts associated with such projects. In addition, international projects tend to be more complex, larger in size and cost, with higher uncertainty than domestic projects.

In order to address these issues, the CII International Project Risk Assessment Project Team (PT 181) first defined for the purpose of this research an “international project” as one performed by North American investors, owners, and/or contractors that is located outside North America. PT 181 then established the following objectives:

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

To enhance the identification and assessment of international project risks, PT 181 developed a structured risk identification and assessment process known as the International Project Risk Assessment (IPRA). 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 basic to the project. As outlined in this summary, research

has shown that the tools and techniques developed by the project team can assist in improving the overall success of international capital projects.

The International Project Risk Assessment (IPRA) tool focuses on the risks typically encountered during the life cycle of international capital projects.

The activities and findings of the project team are summarized in this document. Chapter 2 discusses the development, testing, and usage of the IPRA. Chapter 3 outlines how to use the IPRA as a project management tool. Benefits of using the IPRA and recommendations are given in Chapter 4.

The International Project Risk Assessment (IPRA) Tool

Background

The project team initiated its investigation by performing an extensive literature review on the topics of risk identification, assessment, and management, as well as issues related to international construction. To gain additional insight on these issues the team also used information gleaned from CII's globalization forums and industry practices for assessing international project risks.

To further evaluate the approaches that organizations use to manage the risks incurred on international projects, the team conducted 26 structured interviews with mid- to upper-level management personnel, including eight each from contractor and owner organizations, and the remainder distributed among legal, professional service, financial, and insurance experts. Construction industry experience of interviewees ranged from 20 to over 50 years, and all participants had at least 10 years of working experience with international projects of various types and sizes.

The researchers found that a variety of techniques and practices exist to identify and assess risks that occur on international projects, but there was 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 the risks is uncommon. As such, compartmentalization of the risks occurs, and international projects are often organized and managed in ways that create information and communication disconnects.

Development of the Tool

A detailed list of the risk elements that impact the project's life cycle (planning, design, construction, and operations) of international facilities was developed with five primary sources: the expertise of the project team, literature review results, the structured interviews, input from 10 CII Globalization Committee members, and further review by industry representatives. Initial topic categories were gathered from previous research and the structured interviews and screened using the project team's expertise. The final list of international risks was further refined and an agreement reached regarding exact terms and nomenclature of element definitions. Once this was completed, separate reviews were performed by Globalization Committee members and vetted again by participants during a series of workshops.

The final list consists of 82 Elements grouped into 14 Categories and further grouped into four main Sections that reflect the project's life cycle. This list, which forms the basis of the International Project Risk Assessment (IPRA) tool, is presented in Table 1. Each Section, Category, and Element of the IPRA has a corresponding detailed description to assist project participants in gaining an understanding of the issues related to that component of the risk being considered. (Appendix A provides an example of the structure, hierarchy, and content of a typical IPRA risk element description.) Assessment sheets are used to rate the likelihood of occurrence and relative impact for each element. The IPRA Assessment Sheets and Element Descriptions are used in concert by the project team to identify and assess specific risk factors.

The project team hypothesized that all elements are not equally important with respect to their relative impact on overall project success. Certainly these issues are different depending on the project type and location as well. Members of PT 181 believed there would be significant benefit if a standard baseline (impact) risk value could be determined for each element. A standard guidance value of a risk's effect on the project would be of assistance when the risk is unknown by project participants, and would also provide a framework to rank-order risk elements on the project for subsequent mitigation.

Table 1. IPRA Structure

SECTION I – COMMERCIAL

I.A. Business Plan

- I.A1. Business case
- I.A2. Economic model/feasibility
- I.A3. Economic incentives/barriers
- I.A4. Market/product
- I.A5. Standards and practices
- I.A6. Operations
- I.A7. Tax and tariff

I.B. Finance/funding

- I.B1. Sources & form of funding
- I.B2. Currency
- I.B3. Estimate uncertainty
- I.B4. Insurance

SECTION II – COUNTRY

II.A. Tax/tariff

- II.A1. Tariffs/duties
- II.A2. Value added tax
- II.A3. Legal entity establishment
- II.A4. Application of tax laws and potential changes
- II.A5. Technology tax
- II.A6. Personal income tax
- II.A7. Corporate income tax
- II.A8. Miscellaneous taxes

II.B. Political

- II.B1. Expropriation and nationalism
- II.B2. Political stability
- II.B3. Social unrest/violence
- II.B4. Repudiation
- II.B5. Government participation and control
- II.B6. Relationship with government/owner
- II.B7. Intellectual property

II.C. Culture

- II.C1. Traditions and business practices
- II.C2. Public opinion
- II.C3. Religious differences

II.D. Legal

- II.D1. Legal basis
- II.D2. Legal standing
- II.D3. Governing law/contract formalities and language
- II.D4. Contract type and procedures
- II.D5. Environmental permitting
- II.D6. Corrupt business practices

SECTION III – FACILITIES

III.A. Project scope

- III.A1. Scope development process
- III.A2. Technology
- III.A3. Hazardous material requirements
- III.A4. Environmental, health, and safety
- III.A5. Utilities and basic infrastructure

III.A6. Site selection and clear title

III.A7. Approvals, permits and licensing

III.B. Sourcing and supply

- III.B1. Engineered equipment/material/tools
- III.B2. Bulk materials
- III.B3. Subcontractors
- III.B4. Importing and customs
- III.B5. Logistics

III.C Design/engineering

- III.C1. Design/engineering process
- III.C2. Liability
- III.C3. Local design services
- III.C4. Constructability

III.D. Construction

- III.D1. Workforce availability and skill
- III.D2. Workforce logistics and support
- III.D3. Climate
- III.D4. Construction delivery method
- III.D5. Construction permitting
- III.D6. General contractor availability
- III.D7. Contractor payment
- III.D8. Schedule
- III.D9. Insurance
- III.D10. Safety during construction
- III.D11. Communication and data transfer
- III.D12. Quality

III.E. Start-up

- III.E1. Trained workforce
- III.E2. Facility turnover
- III.E3. Feedstock and utilities reliability

SECTION IV – PRODUCTION/ OPERATIONS

IV.A. People

- IV.A1. Operational safety
- IV.A2. Security
- IV.A3. Language
- IV.A4. Hiring/training/retaining
- IV.A5. Localizing operational workforce

IV.B. Legal

- IV.B1. Governing law/operational liability
- IV.B2. Permitting
- IV.B3. Insurance
- IV.B4. Expatriates
- IV.B5. Environmental compliance

IV.C. Technical

- IV.C1. Logistics and warehousing
- IV.C2. Facilities management and maintenance
- IV.C3. Infrastructure support
- IV.C4. Technical support
- IV.C5. Quality assurance and control
- IV.C6. Operational shutdowns and startup

In practice, the likelihood of occurrence for a particular risk is usually not known with absolute precision because of a lack of information or uncertainty. As a result, the project team agreed that looking back to the time of contract formation (i.e., the point in time when the facility owner contracted for detailed design and/or construction) on completed projects would be the most useful strategic point to determine the level of risk that existed. However, when taking a *retrospective* view of risk at a given point in time, uncertainty is no longer an issue because the event has either taken place or not occurred, and the likelihood of occurrence component of risk assessment is no longer an unknown being assessed in a predictive manner. In essence, the retrospective look at risk leads to a determination of relative impact to the project. With adequate input from experts across a multitude of international projects, an aggregate baseline impact factor could be developed for each IPRA element. Then, as a predictive tool, likelihood of occurrence would always have to be assessed and the impact component of risk would be either this predetermined aggregate baseline level or a self-determined level by project participants.

Workshops

The project team determined that the best way to develop reasonable and credible relative impact values for each element quickly was to rely on the expertise of a broad range of construction industry experts. From September 2002 to January 2003, PT 181 hosted four risk assessment workshops. These workshops were held in various locations in North America and, along with Globalization Committee's assistance, a total of 44 industry executives with extensive international experience reporting results on approximately \$23 billion worth of projects from 20 different countries were involved. Participants represented 25 organizations and were made up of 26 contractor and 18 owner representatives. In addition to having an owner/contractor balance, a fairly equitable distribution of project types and locations was achieved. Information regarding workshop participation is summarized in Table 2. (More details are provided in Appendix B.)

Table 2. Summary of Workshops

Location	Date	Number of Participants
Houston, TX	September 27, 2002	16
Pittsburgh, PA	November 4, 2002	9
San Juan, PR	November 18, 2002	8
Houston, TX	January 14, 2003	11

Each participant completed a series of documents at the workshops. In addition to personal history, participants were asked to consider and document a typical international project that they had recently completed for the organization they represented. The projects used for the effort are given in Appendix B.

Workshop participants proceeded in order through the 82 elements with each IPRA element description reviewed in the context of their project. Workshop participants were asked to rank the severity (impact) of the individual IPRA risks elements by allocating 100 points (or percentage) to the elements within each category for their project. Participants were then asked to rank the severity of category risk by allocating 100 points to the different IPRA categories within each section. Finally, each participant allocated 100 points between the four IPRA sections based on their perception of the risk on their project at the time of contract formation. This level of risk took into consideration the known or assumed likelihood of occurrence combined with the impact (i.e., how did this issue actually impact their completed project?). The workshops concluded with critiques of the scoring methodology and usefulness of the tool. These comments were subsequently evaluated and several minor modifications were made to the tool.

For 36 workshop projects (eight score sheets from the first Houston workshop were not usable), mean values were calculated for each IPRA element, category, and section based on participant allocations as noted above. A weighted value for each IPRA element was created by multiplying the element mean (percentage) value with the category mean (percentage) value, and then multiplying this value with the section mean (percentage) value to create an overall score. A Pareto

analysis of the data created a rank-order of the IPRA elements by their relative impact and these were sorted from 1 to 82.

Relative Impact designations were developed statistically for the 82 IPRA elements. The overall rankings were broken into five levels of corresponding Relative Impact that were given letter designations ranging from A to E, with A = Negligible, B = Minor, C = Moderate, D = Significant, and E = Extreme. (The Baseline Relative Impact values that were created are given in Appendix C.)

In summary, responses from the workshops were evaluated and the collective input was used to develop a Baseline Relative Impact value for each IPRA risk element. The Relative Impact value is composed of the element's rank based on its potential impact to the project within its category, section, and the overall IPRA tool. Several statistical tests were performed and the Relative Impact values were incorporated into the final version of the IPRA worksheets.

Likelihood of Occurrence values were also developed by dividing probability that the identified risk will occur into the following five designations (with numerical range from 1 to 5): 1 = Very Low (<10%), 2 = Low (10% to <35%), 3 = Medium (35% to <65%), 4 = High (65% to <90%), and 5 = Very High (90% or greater). These designations are based on the project team's review and assessment of the literature and industry practices in determining and assigning risk probabilities.

As a supplement to the workshops, the October 2002 CII Emerging Markets Forum in Baltimore, Maryland, provided an opportunity for 29 industry representatives to test the mechanics of using the IPRA Tool and Element Descriptions on a case study cement production facility located in Bulgaria. Forum participants were also asked to assess and comment on the theory, structure, and usefulness PT 181's work. Introducing the IPRA to the Forum participants and having them participate in this case study evaluation provided value.

The case study issues and expectations of Forum participants were well-defined during an introduction to the IPRA. These factors combined with an interactive group discussion on assessing the project risks and