

Factors Affecting International Construction

Suat Gunhan¹ and David Arditi²

Abstract: A construction company's decision to expand into international markets must be based on a good understanding of the opportunities and threats associated with international business, as well as the development of company strengths relative to international activities. These factors were evaluated in this study by surveying the executives in charge of international construction of large United States based contractors. The information was collected by means of two rounds of a Delphi survey, the results of which were used as input in an analytic hierarchy process (AHP). The findings indicate that track record, specialist expertise, project management capability are the most important company strengths; loss of key personnel, shortage of financial resources, and inflation and currency fluctuations are the most important threats relative to international markets; and increased long term profitability, the ability to maintain shareholders' returns, and the globalization and openness of the markets are the most important opportunities available in international works. This study is of relevance to practitioners as it systematically highlights the factors that affect international construction for the benefit of executives of medium-to-large size construction companies who are considering expanding into overseas markets. It is of relevance to researchers too as it demonstrates the successful use of the combined Delphi and AHP.

DOI: 10.1061/(ASCE)0733-9364(2005)131:3(273)

CE Database subject headings: International factors; Construction industry; Delphi method; Change management; Project management; Risk management; Foreign projects.

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

¹Turner Construction Co., 55 East Monroe St., Suite 3100, Chicago, IL 60603.

²Professor, Dept. of Civil and Architectural Engineering, Illinois Institute of Technology, Chicago, IL 60616. E-mail: arditi@iit.edu

Note. Discussion open until August 1, 2005. Separate discussions must be submitted for individual papers. To extend the closing date by one month, a written request must be filed with the ASCE Managing Editor. The manuscript for this paper was submitted for review and possible publication on August 18, 2003; approved on May 11, 2004. This paper is part of the *Journal of Construction Engineering and Management*, Vol. 131, No. 3, March 1, 2005. ©ASCE, ISSN 0733-9364/2005/3-273-282/\$25.00.

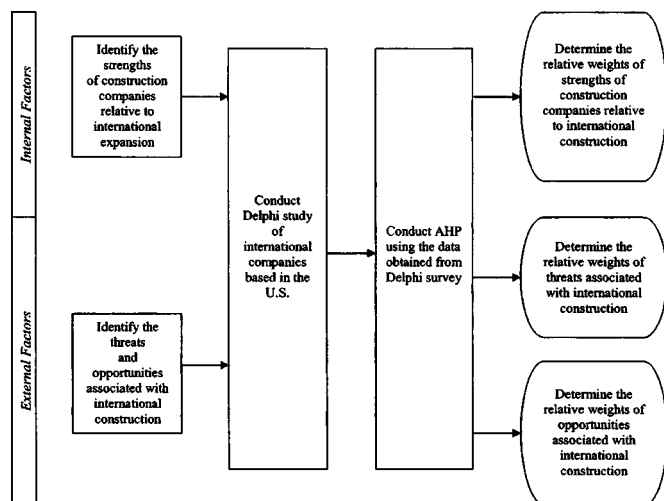


Fig. 1. Flowchart of study

2000). The objective of this study is to evaluate the relative importance of company strengths associated with international expansion, and the threats and opportunities inherent in international markets.

Methodology

The analysis is conducted at two levels (Fig. 1). First, an internal analysis is conducted that consists of assessing a company's strengths associated with international construction. The strength factors identified after a thorough literature review include project management expertise, financial strength, specialist expertise, international-network, equipment/material/labor support, track record, and technological advantage (Friedman 1984; Quak 1991; Pheng 1996; Crosthwaite 1998). Opportunities and threats associated with international construction are then assessed in an external analysis. The likely threats were identified in the literature as inflation and currency fluctuations, interest rate increases, shortage of financial resources, bribery in the host country, foreign competitors in the host country, cultural differences, and loss of key employees (Friedman 1984; Strassmann and Wells 1988; Arditi and Guitierrez 1991; Barco 1994; Ramcharan 1998), whereas the opportunities include chances to take advantage of the globalization and openness of markets, availability of new service areas, increased long-term profitability, chances to take advantage of the privatization programs in emerging economies, chances to take advantage of beneficiary international agreements, ability to maintain shareholders' return, and chances to achieve technological advancement (CII 1993; Crosthwaite 1998; Raftery and Pasadilla 1998; Ramcharan 1998).

The combined use of the analytic hierarchy process (AHP) and Delphi is an original approach that was explored in this study. The AHP is a general theory of measurement. It is used to derive ratio scales from both discrete and continuous paired comparisons. The AHP enables decision makers to represent the simultaneous interaction of many factors in complex, unstructured situations. It helps them to identify and set priorities on the basis of their objectives and their knowledge and experience of each problem. It reflects the simple, intuitive way to deal with problems, and it streamlines the process by providing a structured approach to decision making (Saaty 1999).

Table 1. Ratio Scale of Analytic Hierarchy Process (Saaty 1999)

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one activity over another
5	Strong importance	Experience and judgment strongly favor one activity over another
7	Very strong or demonstrated importance	An activity is favored very strongly over another, its dominance demonstrated in practice
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation

The Delphi method, on the other hand, is an exercise in group communication among a panel of geographically dispersed experts. Delphi replaces direct confrontation and debate by a carefully planned, orderly program of sequential individual questionnaires sent to a preselected panel of experts (Brown 1968). The series of questionnaires is interspersed with feedback derived from the respondents (Mitchell 1991). These questionnaires are designed to elicit and develop individual responses to the problems posed and to enable the experts to refine their views (Adler and Ziglio 1996). The use of a statistical group response assures that the opinion of every member of the group is represented in the final response (Dalkey et al. 1972).

The Delphi process was administered to solicit information about the pairwise comparisons required by AHP. Experts were asked to make relative comparisons between pairs of factors using the AHP scale. The fundamental AHP scale of absolute values for representing the intensities of judgments is shown in Table 1. Human ability to make qualitative distinctions is well represented by five attributes: equal, moderate, strong, very strong, and extreme. Compromises can be made between adjacent attributes when greater precision is needed. The totality requires nine consecutive values. This scale has been validated for effectiveness in many applications and through theoretical comparisons with many other scales (Saaty 1996). Respondents are asked to transform their real life comparisons to the nine-value AHP scale.

Fifty four United States-based international construction companies with minimum \$10 million in revenue ranked in the top 225 international contractors listed by *Engineering News-Record* (ENR) in 2000 were invited to participate in the Delphi survey. Seventeen companies accepted the invitation and were sent a mail-in questionnaire. Twelve of the 17 returned the questionnaire administered in the first round, effectively constituting a rate of response of 22% of the original population of 54 companies. Considering the fact that company executives were asked to respond to an eight-page questionnaire composed of cumbersome pairwise comparisons, the response rate of 22% is quite satisfactory.

All participants had positions at an executive level. They were either general managers or vice presidents in charge of international business development. The experts were first asked to conduct pairwise comparisons of the strengths of their respective companies relative to international construction. For example, if a respondent thought "project management capability" is six times more important than "financial strength" in conducting international business, the response would be

6 Project management capability Financial strength

If a respondent thought “financial strength” is four times more important than “project management capability” then the response would be

Project management capability 4 Financial strength

The respondents were then asked to conduct pairwise comparisons of threats and opportunities associated with international construction.

In the second round, the questionnaires were remailed to the same 12 respondents along with the median values of the results obtained in the first round. The experts on the panel were also supplied with their own answers to the questions in the first round. They were asked to reconsider their answers in the light of the information collected in the first round. Ten out of the 12 original respondents responded to the second round.

Convergence between the responses obtained in the two rounds was checked to see if consensus was achieved in expert opinions. Consensus simply means a general agreement in responses. Several studies have examined how many rounds are required for responses to stabilize. Brockhaus and Mickelsen (1977) report that most studies contain three or fewer iterations. According to Dalkey et al. (1972), the greatest change in group performance between rounds is the decrease in response variability from the first to the second round. Dietz (1987) reports that forecasting error decreases over successive iterations, but that the decrease between round one and three was only 10%. It appears that most changes in Delphi response occur in the first two rounds and that not much is gained in conventional Delphi by iterating more than twice. In fact, a highly suggestive outcome of Dalkey et al.'s (1972) experiment was that answers were most accurate on round two and actually became less accurate on subsequent rounds. There is, then, a move away from multiple-round Delphi toward a view that two rounds are sufficient. The number of rounds needs to be as few as possible; otherwise fatigue and time pressure will result in high panel attrition (Mitchell 1991).

To assess the degree of convergence between two rounds, the significance of the differences between the means of the standard deviations obtained in each round were tested using the *t*-test (Blalock 1972; Dalkey et al. 1972).

The median values obtained in the second round of the Delphi survey were used as input into *Expert Choice*, a group meta decision support software product based on AHP. Expert Choice calculated the relative weights of the factors. In paired comparisons, the smaller element “*i*” is used as the unit and the larger element “*j*” is estimated as a multiple of that unit in the form $(w_i/w_j)/1$. An estimate of the ratio w_i/w_j is taken from a fundamental scale of ratings such as the scale in Table 1. After priorities are set for the criteria, pairwise comparisons are made between the ratings to set priorities for them under each criterion, and each of their priorities is divided by the largest rated criterion. Finally, alternatives are scored by checking off their respective ratings under each criterion and summing these ratings for all the criteria. This produces a ratio scale score for each alternative. The scores thus obtained for the alternatives can, in the end, be normalized by dividing each one by their sum (Saaty 1996). This is how the relative weights are obtained in AHP.

According to Saaty (1999), the consistency ratio of the results should be 10% or less. If it is not, the quality of information should be improved—perhaps by revising the manner in which

the questions are posed to make the pairwise comparisons. The reason why a Delphi survey was conducted to collect information in this study was to ensure that the lowest possible consistency ratio was obtained. The expectation was that convergence in responses will be reached through the Delphi process and this information in turn will result in consistent findings. If these measures fail to achieve consistency, it is likely that the problem has not been accurately structured—that is, similar elements have not been grouped under a meaningful criterion. It is important that consistency ratios in AHP modeling are below 10% as consistency reflects the quality of judgments.

Strengths of Construction Companies Relative to International Construction

The mean standard deviations of company strengths were computed for each Delphi round and compared with each other. Most of the differences in the standard deviations were in the expected direction, such that convergence occurred between the first two rounds in 20 pairwise comparisons out of 21. In order to test the statistical significance of the convergence, the *t*-test was used to compare the mean standard deviation in the first (μ_{SD1}) and the second (μ_{SD2}) rounds. The computed *t* statistic shows that the difference between the means is not significant at the $\alpha=0.01$ level. The degree of convergence obtained in the second round appears therefore to be sufficient for consensus.

The median values obtained from pairwise comparisons of company strengths were input into Expert Choice. An overall consistency ratio of 0.06 was obtained. This consistency ratio is less than the 0.10 threshold recommended by Saaty (1999) and proves that all judgments are logically consistent. The factors are discussed in the following paragraphs in order of importance.

Track Record

The most important strength of a company relative to international construction is “track record” with a relative weight of 23.80% computed by Expert Choice. Companies with a strong track record are considered to have a competitive edge. An experienced firm has either a ready solution or a cheaper one to a technical problem because it has encountered a similar problem in the past and has invested in its solution. It has demonstrated through previous performances that it has the organization and technical know-how and experience to overcome technical challenges that may emerge in the course of a construction project (Quak 1991). United States based companies continue to share international market. According to the ENR's list of the top 225 international contractors, there were 64 United States based construction companies in the list in 1998, 74 in 1999, 73 in 2000, and 79 in 2001, but only 34 appeared in the four consecutive years (The Top 225 International Contractors 1999, 2000, 2001, 2002). Only 16 Japanese and 2 British companies were listed in the 4 consecutive years. It appears that not every company has a strong track record in international markets.

Track record is most important in specialist engineering contracts, project management contracts and large contracts. Track record in the form of reference projects markets a firm through its past successes, creates goodwill and provides the conditions for a reactive entry strategy. Since some construction companies are considering expanding into international markets for the first time, it is expected that these companies may lack a suitable track record. A firm that lacks a suitable track record has to pursue an

aggressive entry strategy, or find itself a strategic ally that possesses the necessary track record (Quak 1991). On the whole, a firm with a track record will be in a better position to market its expertise to prospective international clients and consortium partners. The top AHP ranking of "track record" supports Neo's (1976) finding that a contractor's overseas experience in work of similar scale and type is the most important criterion considered by consultants.

Specialist Expertise

The second most important company strength computed by Expert Choice is "specialist expertise" with a relative weight of 19.40%. In the international arena, United States based companies have a major share of the power, industrial/petroleum, hazardous waste, and sewer/waste markets. For conventional buildings and well-known types of infrastructure, American construction firms do not have a cost advantage. For relatively conventional projects throughout the world, the high salaries of Americans make their employment overseas prohibitively expensive. American firms that specialized in highways, dams, urban infrastructure, housing, office buildings, and other traditional projects were able to win contracts in the Middle East during the peak of the oil boom, but because of their higher costs, they can no longer meet the competition in shrinking markets.

Specialist technologies enable smaller companies to carve a niche for themselves in the international market by competing for specialist subcontracts or as a desired consortium partner (Quak 1991). The provision of new technologies is a method for obtaining work in an environment where low cost pricing may favor a local construction firm. To be competitive, knowledge of a special character is to be incorporated in structures and equipment that is novel to the receiving country. For example, the needs of energy-efficient buildings and the requirements of the telecommunications age have to be addressed. Modern management methods have to be used to achieve on-schedule and within-budget project completion of increasingly large and complex infrastructure projects. The need to provide current technologies to overcome commodity type, low cost pricing is a major challenge in foreign markets (Sillars and Kangari 1997). The special expertise for United States companies comes from technology based projects (Strassmann and Wells 1988). Results show that having a special expertise can be one of the major strengths for a company that looks for opportunities in international markets.

Project Management Capability

The third most important strength that a company should have in international competition is "project management expertise" with a relative weight of 16.90% computed by Expert Choice. The importance of project management expertise in international construction was also observed by many researchers. For example, according to Strassmann and Wells (1988), the principal American competitive edge is not in using familiar building methods for well known types of structures. Rather, it lies in efficient project management. American contractors win contracts abroad, not only because of their experience with advanced technologies, but also because of their organization and management skills. According to ENR (The Top 225 International Contractors 2002), United States based companies undertook \$1,468.2 million worth of construction management-for-fee work and \$2,857.5 million worth of construction management at-risk in international markets

in 2001. This constitutes 19.5% of the total international volume of work undertaken by the United States companies listed in the top 225 international companies by ENR.

International projects are likely to be very complex, including conditions such as multiple ownership, elaborate financial provisions, and different political ideologies. These projects are more difficult to manage than domestic projects as the risks involved are more numerous and less predictable. Very often, the expertise that is required to bring these projects to fruition requires a new breed of project manager who is both businessman and technician. The business role is of great importance as project financing has already become an important factor in export project development than technological excellence (Stallworthy and Kharbanda 1983).

International Network

An international marketing network enables a firm to secure information on technology, forthcoming projects, buyers, potential competitors, and potential coventurers. This information allows a construction company to formulate an appropriate competitive strategy (Quak 1991). "International network" was rated fourth with a relative weight of 13% computed by Expert Choice. A formal or informal association with a local construction company, financial institutions that fund overseas projects, local government agencies in charge of construction investments can lead to valuable information. Similarly, engaging the services of a local consulting firm that can systematically scout the local markets and submit periodic reports is sometimes considered a worthwhile investment.

Construction firms interested in exploring foreign markets may participate in overseas trade missions in order to establish international contacts. These trade missions are generally organized by trade associations or by the government. Trade missions enable participants to have first-hand knowledge of the operating environment in a foreign land and, where appropriate, allow business contacts to be made.

Construction firms may also contract with nonconstruction related companies from their own country to build in overseas locations. This arrangement can be realized easily if overseas investors, having dealt satisfactorily with a particular contractor in their domestic market before, indicate a preference for their foreign development to be built by the same contractor (Pheng 1996). It follows that an effective marketing network should include not only foreign parties but also local parties interested in investing and/or constructing overseas.

Technological Advantage

Technological advantage is defined by the extent of the knowledge and expertise used in technically sophisticated projects. This factor was ranked fifth with a relative weight of 11% computed by Expert Choice. The demand for sophisticated projects such as chemical plants, refineries, power plants, and industrial complexes in the international market emphasizes to the merits of sophisticated technology (Neo 1976). Also, globalization is accompanied by an increase in the rate at which new technologies are introduced, changing the strategies required by industry members to remain competitive.

Technology is often one of the most effective weapons that enables a construction company to penetrate into foreign markets. This is particularly true for projects in developing countries where there is an urgent need to possess the best and the latest. The new

technologies in less developed countries are provided by companies from industrialized countries where research and development have been emphasized more (Pheng 1996). The possession of advanced technologies has been an advantage in the international market, evidenced by the large market share of the companies based in more advanced countries. Despite the entry barriers that many developing countries impose on foreign firms to protect their infant construction industry, United States, European, and Japanese construction firms continue to dominate these markets as a result of their technological edge. For example, in 2001, the United States, European, and Japanese construction companies' combined market share was 71% in the Middle East, 70% in Asian countries, 79% in Africa, and 89% in Latin America (The Top 225 International Contractors 2001).

Financial Strength

According to the literature, financial strength is one of the important company strengths in international construction. The general wisdom dictates that the stronger a company's financial position, the better its capacity to carry out far-reaching and ingenious strategic plans. It can also take higher risks with prospects of higher returns. It enjoys a higher credibility and reputation among its clients and suppliers. For these reasons, Warsawski (1996) considers the financial strength of a company to be an important strategic asset. According to Pheng (1996), the ability to provide attractive financing packages to potential clients will often determine which international contractor will win the contract, and the first prerequisite to secure attractive financing packages from financial institutions is a solid balance sheet. Despite the generally acknowledged importance of a construction company's financial strength in international competition, this factor was rated sixth out of seven with a relative weight of only 8.10% computed by Expert Choice. The reasoning of the respondents may be that the investor in a construction project is the owner and not the contractor. The contractor pays subcontractors, material dealers, and others out of the monthly payments received from the owner. Therefore the financial strength of a construction company is closely related to the strength of its working capital and to the adequacy of its cash flow but the size of the contractor's working capital is significantly smaller than the owner's investment in the project (Price 1995).

Equipment, Material, and Labor Support

Friedman (1984) lists equipment and field resources as a primary strength for construction companies. A contractor's capabilities with respect to qualified personnel, equipment, and plant constitute important factors considered in the assessment of potential bidders in international construction (Neo 1976). However, this factor was ranked last with a relative weight of only 7.20% computed by Expert Choice. The little importance attached to this factor by the respondents may be explained by the fact that most construction companies operating overseas typically procure their equipment and materials from local markets. Similarly, while key administrative personnel are members of the company who temporarily reside in the host country, most of the operational personnel is probably hired locally.

Threats Associated with International Construction

The inclusion of overseas markets into a company's portfolio inevitably brings along a certain element of risk and uncertainty.

Indeed, operating abroad presents very substantial risks such as commercial risks, currency risks, and investment risks, particularly to those firms unprepared to cope with numerous unfamiliar customs and legal requirements that can frustrate even the best organization and management (McConville 1996). Project financing for international construction also harbors completion risks, operational risks, and political as well as regulatory risks.

Convergence occurred between the two rounds of the Delphi process in 20 pairwise comparisons out of 21. The computed t statistic shows that the difference between the mean standard deviation in the first (μ_{SD1}) and the second (μ_{SD2}) rounds is significant at the $\alpha=0.01$ level, indicating that the experts changed their minds considerably between the first and the second rounds. Given the recommendation that convergence after the second round is typically negligibly small, a third round was found to be unnecessary.

An overall consistency ratio of 0.09 was obtained with Expert Choice, which indicates that the respondents' judgments are logically consistent. The factors are discussed in the following paragraphs in order of importance.

Loss of Key Employees

Losing experienced and talented staff is the most important threat associated with international construction with a relative weight of 24.60% computed by Expert Choice. A company's personnel is probably the most important resource in a competitive environment and key to its success.

A construction company performs two different types of managerial tasks: (1) tasks with a technological content such as project planning, management, selection of construction method, estimating, budgeting, and control; all of these tasks require a solid engineering background and (2) tasks with business content such as financial management, marketing, accounting, procurement of products, and services. The distinction is not always clear-cut. Tasks of marketing or procurement may sometimes require a good understanding of engineering, while project management, on the other hand, may require proficiency in business methods (Warsawski 1996). Besides these factors, international construction business requires additional talents in individuals. Foreign language, familiarity with the region, ability to adapt to foreign cultures, and strong emotional characteristics are desired positive factors.

Construction firms' primary asset is their people. They are on the front lines building a structure and interacting with several parties on a daily basis. They create the source of competitive advantage. When considering international expansion, personnel planning is one of the core elements of strategic planning. It is not easy to find the right people when needed. Losing talented key employees in a specific overseas assignment may hamper communication with local entities, exacerbate the clash of cultures, lead to misunderstandings of the risks involved, and consequently may influence the project in a negative way.

Shortage of Project Owners' Financial Resources

The second most important factor is the "shortage of project owners' financial resources" with a relative weight of 19.10% computed by Expert Choice. There is no shortage of international construction work needed, only a lack of capital, or a lack of ability on the part of owners to balance financial resources against construction needs. Finance for construction work may come from a variety of sources such as the World Bank, supranational

bodies such as the Commission of the European Economic Communities, national governments, local authorities, and public corporations. Any one of the numerous private undertakings or individuals may also initiate a project or provide funds (Cox 1982).

'Financial engineering' has become very important in international contracting (Arditi and Gutierrez 1991). It involves bidders adding in their bid package a financial plan for the project. This is a trend that started in the 1970s in countries with limited financial resources or in oil-rich countries short of cash. Because not even the World Bank and its subsidiary development banks had enough money to fully finance all the worthy projects, the export–import banks of various industrialized nations jumped in with additional financing for some jobs on the condition that the contract got to the financing bank's co-nationals. But that, too, fell short, and the call went out to the commercial banks to add their money to the government funds. The ability to secure sizeable low-interest loans from financial institutions to fund large overseas projects has now become an important part of international construction.

Inflation and Currency Fluctuations

This factor was rated third out of seven, with a relative weight of 13.30% computed by Expert Choice and is closely related to the overall state of the economy in the host country. Contracting in international markets involves the frequent transfer of funds across national boundaries. Currency fluctuations are of particular interest for construction companies from industrialized countries operating in developing countries. A possible implication of a declining local currency in a developing country is that costs of imported materials, plant, and equipment will increase, thereby thinning the amount of anticipated profit. It may also increase the costs of loan repayments and interests incurred by local operations for foreign debts (Neo 1976).

The consequences of inflation in the host country also have a serious impact on the cost of a construction project. Some of the recently emerging Eastern European countries and some of the Latin American and African countries have experienced inflation above 100% per year. Forecasting inflation is very difficult. It is in the interest of construction companies to collect and rigorously evaluate detailed financial information. Embassies, banks, economic magazines, financial newspapers, and discussions with individuals with knowledge of the subject are usually the best information sources (McConville 1996). Accounting practices, procurement methods, the timing of purchasing decisions, collective bargaining agreements with local unions, and overall cash flow management have to be adjusted in the light of the anticipated rate of inflation.

Interest Rate Increases

This factor closely follows "inflation and currency fluctuations" with a relative weight of 12.80% computed by Expert Choice. International construction companies looking for financing have to struggle among five major financing sources: National export credit agencies, international financial institutions, commercial banks, investment bankers, and counter trade. Sometimes, as a sixth source, they reach into their own company's treasury for investment. Of these mechanisms of financing, the one that has played the most important role in the success of certain international companies like the Japanese and Italian firms is their respective export–import banks. However, for United States companies, mainly two factors have prevented the efficient functioning of the export–import bank: budget restrictions and

higher interest rates. Interest rates play a crucial role in the success of international construction companies. While Japanese and Italian firms were benefitting from their respective export–import bank interest rates, higher interest rates prevented the efficient functioning of the export–import bank for United States companies. The other factor related to the export–import bank and which affected United States contractors' competitiveness, was the lower interest rates in the early 1980s at which overseas competitors were borrowing money from their respective governmental agencies. Some competitors were offering mixed credits with low interest from their export–import bank. Others were deferring loan payments or granting abnormally long payback periods (Arditi and Gutierrez 1991).

Foreign Competitors in Host Country

Foreign competitors in host countries are potential threats for new entrants into the market. Over the past 10–15 years competition in the international construction industry has increased dramatically as new contractors have entered the industry from less developed countries and as workloads have dropped in the major markets. In the changed environment, international contractors face a complex situation in which success only partially depends on price competition, and other factors which differentiate a contractor's product from that of competitors become more crucial (Seymour 1987). Korean firms chose a cost leadership strategy and made substantial inroads into the Middle East market through aggressive cost cutting on labor-intensive infrastructure projects. Chinese companies with their enormous resources of skilled manpower, provide an example of a strategy based on cost focus (Miles 1995). Participation of new contractors especially from developing nations may affect the international competition. In addition to the new entrants from less developed countries, United States and European construction companies have always been major competitors. For example, while the United States-based companies had 16% of the Middle Eastern, 15% of the Asian, 27% of the African, and 38% of the Latin American markets undertaken by the top 225 international companies listed by ENR, European construction companies had 50, 29, 47, and 48% of these markets respectively in 2001 (The Top 225 International Contractors 2002). This factor was rated fifth out of seven with a relative weight of 11.90% computed by Expert Choice.

Cultural Differences

Doing business across national boundaries requires interaction with people and their institutions and organizations nurtured in different cultural environments. Values that are important to one group of people may mean little to another. In brief, there exists among nations striking and significant differences of attitude, belief, ritual, motivation, perception, morality, truth, superstition, and an almost endless list of other cultural characteristics (Jain 1996). This factor was rated sixth out of seven with a relative weight of 9.10% computed by Expert Choice.

Difficulties encountered in international projects often find their genesis in the differences between the cultures of the foreign contractor and the other parties (owners, subcontractors, material dealers, etc.) in the host country. Kangari and Lucas (1997) recommend that the importance of cross-cultural relations should be well understood before one undertakes a foreign operation. Studies conducted in the United States have suggested that differences in national culture do influence the choice of foreign investment (Fisher and Ranasinghe 2001). However, social and cultural is-

sues manifest themselves in a variety of ways and it is important not to generalize in a manner that can lead to mistakes. Mawhinney (2001) suggests that people are individuals and that the difference between two individuals of the same nation can be bigger than the assumed difference between one national trait and another. Much of the advice on overcoming cultural differences centers on keeping an open mind and not seeing different ways of doing things as being absolutely right or wrong, since cultures and norms vary enormously.

Bribery in Host Country

Even though questionable ethical practices in foreign countries are reported and denounced in many studies, this factor was rated last with a relative weight of only 9% computed by Expert Choice. Ethical considerations with an emphasis on bribery and foreign corruption within the guidelines of the Foreign Corrupt Practices Act are noted by Barco (1994). The Foreign Corrupt Practices Act puts heavy penalties on attempts to bribe foreign officials in order to obtain contracts. The industry does not lobby for permission to bribe, even though bribes may be customary, though perhaps illegal, in many host countries and although they may be viewed as legitimate tax-deductible business expenses in some European countries including Germany (Strassmann and Wells 1988). Corruption and bribery are very emotive words in the developed world markets. While corruption was not tolerated in the developed world (in theory at least) the attitude was different when working outside home markets. For many years the payment of bribes by the international arms of companies to corrupt local officials in pursuit of international projects was condoned by many governments, even though this was banned within their home countries. It was viewed as a cultural difference and therefore unavoidable. Development banks such as the World Bank have a clear anticorruption policy which is applied to their projects although this is a relatively new phenomenon. Corruption and bribery are now more clearly viewed as a criminal activity and construction companies all over the world are forced to avoid such practices as some are caught up in legal investigations (Mawhinney 2001).

Opportunities Associated with International Construction

While the new global economy confronts construction companies with threats to their survival, it also presents unprecedented opportunities for growth and profits. International trade has been growing at twice the rate of gross world product for several decades, and international flows of services have grown more rapidly than flows of tangible products (Root 1994).

Convergence occurred between the two rounds of the Delphi process in 20 pairwise comparisons out of 21. The computed *t*-statistic shows that the difference between the mean standard deviations in the first (μ_{SD1}) and the second (μ_{SD2}) rounds is not significant at $\alpha=0.01$ level. The degree of convergence obtained in the second round appears therefore to be sufficient for consensus.

An overall consistency ratio of 0.03 was obtained with Expert Choice, which indicates that the respondents' judgments are logically consistent. The factors are discussed in the following paragraphs in order of importance.

Increased Long-Term Profitability

The most important opportunity that companies may have in international construction is "increased long-term profitability" with a relative weight of 28.70% computed by Expert Choice. A major reason for diversifying a company's activities is to take advantage of market peaks in an area while fighting slumps in another. Expanding a company's activities to overseas locations presumes that some markets in some overseas locations offer profitable opportunities when domestic markets are not doing particularly well. Whereas it can be argued that in this era of globalization and interdependence, the economic conditions in major industrialized countries often dictate the economic climate in many other nations, it would be realistic to acknowledge the fact that not only the ripple effect takes time to reach all nations, there may also be important local differences that may generate altogether different local conditions. Expanding to the international market appears therefore to be a good way to survive slumps in a country (domestic or overseas) and increase profitability in the long term.

This result is fully in accordance with Crosthwaite's (1988) findings. According to Crosthwaite (1998), the responses of the British construction companies surveyed with respect to their reasons for operating overseas indicated that the top ranked response was to increase "longterm profitability." This is broadly in line with previous research in this area by Seymour (1987) and Abdul Aziz (1994), and their work was not purely restricted to British companies.

Ability to Maintain Shareholders' Return

The second most important opportunity is the "ability to maintain shareholders' return" with a relative weight of 19.10% computed by Expert Choice. This finding supports Seymour's (1987) findings which identifies the maintenance of shareholders' returns as a major reason for operating overseas and the work of Neo (1976) who argues that shareholder opinion is important in the choice of overseas markets. A defensive strategy adopted by major companies is to operate in more than two countries so that recession in one country can be offset by boom periods in others. The line of reasoning is that a contractor's interest in multienvironments is more effective in protecting the shareholders against adverse trading conditions in one geographical area (Neo 1976).

Ability to Take Advantage of Globalization and Openness of Markets

Many economists agree that increasing openness and globalization bring all around benefits (Raftery and Pasadilla 1998). This factor was rated third out of seven with a relative weight of 16.40% computed by Expert Choice. The growing acknowledgment of the advantageous effects of open markets, however, is invariably accompanied by an intensification of global competition as nations better integrate into the world economy (Miller 2000). While globalization increases competition within geographical borders, it also provides increased access outwardly to markets previously inaccessible. It is important for construction companies to recognize this changing environment (Sillars and Kangari 1997).

The growth of multinationals has been an important factor in the internationalization of construction. Multinationals have invested billions of dollars in new foreign operations, much of it

requiring construction input. Multinationals are reported to often use the same construction companies that built their domestic projects (Mawhinney 2001).

Construction has always been an important part of a country's economy as it contributes significantly to the gross domestic product. It is not surprising that it is now considered to be an important part of the global economy particularly since globalization allows multinationals to invest in a large number of countries, encourages the formation of financial institutions that provide favorable loans for construction projects in foreign lands, and allows and sometimes forces contractors to be active in more than only one country.

Availability of New Service Areas

The new economy brings great opportunities for expansion in construction services as a result of increasing demand in manufacturing (textile, electronic, and auto assembling plants), power (hydro-electricity, transmission lines), water supply (dams, reservoirs, desalination and portability treatment plants, industrial waste plants), sewage/solid waste (sanitary treatment plants, industrial waste plants), industrial process (steel mills, refineries, food processing sites), and transportation (airports, bridges, roads, canals, piers). This factor was rated fourth with a relative weight of 10.90% computed by Expert Choice. According to ENR's market analysis, manufacturing, power, water supply, sewage/solid waste, industrial process, and transportation collectively constituted 64% of the total market held by the top 225 international companies in the four years 1998 to 2001 (The Top 225 International Contractors 1999, 2000, 2001, 2002). Investments in infrastructure, power, and manufacturing are considered the prerequisite for economic growth (Ramcharan 1998). The major markets in the transitional economies of Central and Eastern Europe, and the developing countries of Latin America, Asia, and Africa, are characterized by massive investments in infrastructure, power, and manufacturing, thus creating major opportunities for international construction companies.

Availability of Beneficiary International Agreements

Globalization and bilateral and multilateral free trade agreements have resulted in increased business opportunities for construction firms throughout the world. New opportunities are offered by agreements such as the Uruguay Round in the GATT and the North American Free Trade Agreement. Developments in Central and Eastern Europe and former Soviet republics, and emerging markets in Asia and developing countries, as well as changes in the European Union have fundamentally changed the structure of the construction industry (Hastak and Shaked 2000). The development of free trade blocs has increased the construction trade and realigned the construction industry by encouraging acquisitions and joint ventures, or opening new branch offices in foreign countries (Han and Diekmann 2001). This factor was rated fifth out of seven with a relative weight of 9.6% computed by Expert Choice.

Ability to Take Advantage of Privatization Programs in Emerging Economies

Privatization transfers the ownership of state property into the hands of private individuals, frequently by the sale of state assets through an auction. Privatization is seen as a way to unlock gains in economic efficiency by giving new private owners a powerful

incentive—the reward of greater profits—to search for increases in productivity, to enter new markets, and to exit losing ones (Hill 2000). This factor was rated sixth out of seven with a relative weight of 8.9% computed by Expert Choice.

Privatization has grown worldwide since the early 1980s beginning in Great Britain and expanding in the 1990s to developing countries. More than 100 countries have privatized previously government-owned businesses (The Top 225 International Contractors 1999). The foreign investor is an important element in privatization efforts. Especially in developing countries, the level of available capital is usually insufficient to drive the desired rate of market expansion, and these economies are often dependent on foreign investment to support and sustain a privatization program (Miller 2000). It follows that privatization creates opportunities for construction companies to undertake projects in other countries, not only for local owners but also foreign owners or multinationals.

Increased Chances for Technological Advancement

Construction technologies have historically been slow to develop. The acquisition of and ability to apply such new technologies is of particular importance in international construction (Quak 1991). Joint ventures or alliances can be a good solution for construction firms to access specialized technology, enhance their technological know-how, and develop new technical areas. Not surprisingly, this factor was rated last with a relative weight of 6.30% computed by Expert Choice. Indeed, a construction company whose motivation in bidding for international work is to acquire technological expertise will probably not be the winning bidder because international bidders are called because the indigenous construction industry lacks the technology to carry out highly sophisticated projects (CII 1993).

Conclusion

In today's economic system, no market is isolated from the global markets. Globalization brings new opportunities to construction companies. However, for companies that consider international work, these markets also entail many risks. This study sensitizes United States - based construction companies to possibilities in the international markets by highlighting the importance of company strengths associated with international expansion, and the threats and opportunities inherent in international construction. The combined use of AHP and Delphi is an original approach that was successfully explored in this study. The results obtained are limited by the small size of the sample that consisted of 10 out of 54 United States - based companies listed in the top 225 international contractors by ENR. But the data provided by the Delphi study to the AHP process yielded results that are consistent, as measured by the consistency ratios that were always below the threshold of 0.10 specified by Saaty (1999). The results can be summarized as follows:

1. As much as 73% of the company strengths reported by respondents to be of importance in international construction included track record in similar international work in the past, specialist expertise in a particular line of work that requires sophisticated know-how, the capability of delivering project management services, and a network of contacts that can supply critical information about international projects. Expanding business into new countries will help to establish new and more extensive networks and to improve the com-

pany's track record. A company that never had international business experience should consider alliances in order to obtain the necessary track record and establish the necessary networks for future works.

2. Loss of key personnel, shortage of financial resources, inflation and currency fluctuations, and interest rate increases are the most important threats (70%) associated with international construction. The most important threat appears to be the loss of key employees with special talents and skills such as knowledge of foreign language and ability to understand different cultures, in addition to technical and managerial skills. "Financial engineering" has become an important aspect of international projects and the ability to secure adequate financial backing may be one of the most important award criteria for some projects. The inflation and interest rates as well as the monetary policies in effect are governed by local economic conditions. These factors are beyond the control of construction companies but companies' estimating, purchasing, accounting, and personnel policies must be adjusted in anticipation of the future trends in this respect.
3. Increased long term profitability, the ability to maintain shareholders' returns, the openness of the markets, and the availability of new service areas are the most important opportunities (75%) offered by international markets. Profit is the main motivation of business and the prospect of increased profitability and thus improving shareholders' return is the most important driving factor in the decision to expand into other countries. The recent globalization of the world economy creates new fields of work in virgin territories and forces construction companies to undertake projects in other nations if they want to survive and grow while competing with contractors from other countries threatening them in the international as well as their domestic markets.

To survive and prosper in the global economic system, construction companies need to develop special strategies. Operating overseas offers new opportunities but also brings many threats. To conduct business in international markets, construction companies should develop specific strengths. A construction company's decision to expand into international markets must be based on a good understanding of the opportunities and threats associated with international business, as well as the development of company strengths relative to international activities.

Executives of most medium-to-large construction companies have to consider operating overseas some time or another. This study is of relevance to practitioners because these executives need to be cognizant of the factors highlighted in this paper in order to make informed and rational decisions. The study is of relevance to researchers too in that it combines Delphi with AHP in an innovative way. This combination may become the norm in future studies as it has proved to significantly improve the quality of the data plugged into the AHP system, hence achieving consistency ratios below 10%.

References

- Abdul Aziz, A. R. (1994). "Global strategies: Comparisons between Japanese and American firms." *Constr. Manage. Econom.*, 12(6), 473–484.
- Adler, M., and Ziglio, E. (1996). *Gazing into the oracle*, Jessica Kingsley, Bristol, Pa.
- Arditi, D., and Gutierrez, A. E. (1991). "Performance of US contractors in foreign markets." *Constr. Manage. Econom.*, 9(5), 431–449.
- Barco, A. L. (1994). "International expansion, ethics, and prohibited foreign trade practices." *J. Manage. Eng.*, 10(5), 34–40.
- Blalock, H. M. (1972). *Social statistics*, McGraw-Hill, New York.
- Brockhaus, W. L., and Mickelsen, J. F. (1977). "An analysis of prior Delphi applications and some observations on its future applicability." *Technol. Forecast. Soc. Change*, 10, 103–110.
- Brown, B. (1968). *A methodology used for the elicitation of opinions of experts*, The Rand Corporation, Santa Monica, Calif.
- Construction Industry Institute (CII). (1993). "Competing in the global market." *Publication 30-1*, Austin, Tex.
- Cox, V. L. (1982). *International construction: Marketing, planning, and execution*, Construction Press, New York.
- Crosthwaite, D. (1998). "The Internationalization of British Construction Companies 1990–1996: An empirical analysis." *Constr. Manage. Econom.*, 16(4), 389–395.
- Dalkey, N. C., Rourke, D. L., Lewis, R., and Snyder, D. (1972). *Studies in the quality of life.*, Lexington Books, Lexington, Mass.
- Dietz, T. (1987). "Methods for analyzing data from Delphi panels: Some evidence from a forecasting study." *Technol. Forecast. Soc. Change*, 31, 79–85.
- Fisher, T. F., and Ranasinghe, M. (2001). "Culture and foreign companies' choice of entry mode: The case of the Singapore building and construction." *Constr. Manage. Econom.* 19(4), 343–353.
- Friedman, W. (1984). *Construction marketing and strategic planning*, McGraw-Hill, New York.
- Han, S. H., and Diekmann, J. E. (2001). "Approaches for making risk-based go/no-go decision for international projects." *J. Constr. Eng. Manage.*, 127(4), 300–308.
- Hastak, M., and Shaked, A. (2000). "ICRAM-1: Model for international construction risk assessment." *J. Manage. Eng.*, 16(1), 59–69.
- Hill, C. W. L. (2000). *International business: Competing in the global market place*, Int. Ed., McGraw-Hill, New York.
- Hutton, J. (1988). *The world of the international manager*, Phillip Allan, Oxford, U.K.
- Jain, S. C. (1996). *International marketing management*, South Western College Press, Cincinnati.
- Kangari, R., and Lucas, C. L. (1997). *Managing international operations: A guide for engineers, architects, and construction managers*, American Society of Civil Engineers, New York.
- Kennedy, C. R. (1991). *Managing the international business environment*, Prentice-Hall, Englewood Cliffs, N.J.
- Mawhinney, M. (2001). *International construction*, Blackwell Science, Malden, Mass.
- McConville, J. G. (1996). *International construction costs and reference data yearbook*, Wiley, New York.
- Miles, D. (1995). *International project marketing*, International Construction Management Series-6, International Labour Office, Geneva, Switzerland.
- Miller, R. R. (2000). *Doing business in newly privatized markets*, Quorum Books, Westport, Conn.
- Mitchell, V. W. (1991). "The Delphi technique: An exposition and application." *Technol. Anal. Strateg. Manage.*, 3(4), 333–358.
- Neo, R. B. (1976). *International construction contracting*, Bowker Publishing, Essex, U.K.
- Pheng, L. S. (1996). *Theory and practice of construction export marketing*, Ashgate Publishing Company, Burlington, Vt.
- Price, A. D. F. (1995). *Financing international projects*, International Construction Management Series 3, International Labour Office, Geneva, Switzerland.
- Quak, S. K. (1991). *Marketing abroad: Competitive strategies and market niches for the Singapore construction industry*, Pacific Trade Press Pte Ltd., Singapore.
- Raftery, J., and Pasadilla, B. (1998). "Globalization and construction industry development: implications of recent developments in the construction sector in Asia." *Constr. Manage. Econom.*, 16(6), 729–737.
- Ramcharan, H. (1998). "Obstacles and opportunities in international engineering services." *J. Manage. Eng.*, 14(5), 38–47.

- Root, F. R. (1994). *Entry strategies for international markets*, Lexington Books, New York.
- Saaty, T. (1996). *The analytic network process*, RWS Publications, Pittsburgh.
- Saaty, T. (1999). *Decision making for leaders: The analytic hierarchy process for decisions in a complex world*, RWS Publications, Pittsburgh.
- Seymour, H. (1987). *The multinational construction industry*, Croom Helm Ltd., New York.
- Sillars, D. N., and Kangari, R. (1997). "Japanese construction alliances." *J. Constr. Eng. Manage.*, 123(2), 146–152.
- Stallworthy, E. A., and Kharbanda, O. P. (1983). *Total project management*, Gower Publishing Co., Aldershot, Hants, U.K.
- Strassmann, W. P., and Wells, J. (1988). *The global construction industry, strategies for entry, growth and survival*, Unwin Hyman, London.
- The Top 225 International Contractors. (1999). *Engineering News Record*, 243(7), 16 August, 52–56.
- The Top 225 International Contractors. (2000). *Engineering News Record*, 245(7), 14 August, 60–66.
- The Top 225 International Contractors. (2001). *Engineering News Record*, 247(8), 20 August, 72–77.
- The Top 225 International Contractors. (2002). *Engineering News Record*, 249(9), 26 August, 32–36.
- Warszawski, A. (1996). "Strategic planning in construction companies." *J. Constr. Eng. Manage.*, 122(2), 133–140.