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Developing An International Agribusiness Construction Information System

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INTRODUCTION

Construction plays an important role in the development of a strong agricultural economy. This is evidenced by the need to construct efficient farm-to-market roads, irrigation channels, bridges, grain silos, and facilities to produce and store agricultural goods. In Lithuania, for example, 6.1 percent of the agribusiness gross domestic product is construction-related (Kazlauskienė et al., 1991).

Suitable agribusiness construction services are in short supply in many developing countries. Outside expertise is required; however, attracting this outside talent can be challenging. Collecting the information needed to properly evaluate a job outside of the United States can be time consuming and difficult. If this information is available, work abroad for U.S. companies becomes a real possibility. Thus, this study will investigate the value of an international agribusiness construction information system.

Computer information systems have proven their value to the agricultural sector. A 1990 study on the impact of information systems on dairy farm management discovered that the capabilities of the system allowed the test group to improve their farms, while at the same time encouraged long term strategic planning and a shift of time away from labor-oriented tasks towards managerial jobs.

This project, funded by Midwest Agribusiness Trade Research and Information Center (MATRIC), has investigated the needs and design of an international agribusiness construction information system. This system would be a database including pertinent construction industry information about foreign countries, including such information as bidding opportunities, construction risks in a country (such as weather problems or cultural differences), and law and prequalification requirements.

The global construction market is expanding, and there are many opportunities for U.S. contractors, design, and consulting firms, if they have the necessary information available to make informed decisions. Companies who have invested in research abroad are not interested in sharing the information they have discovered with competitors. A database, such as the system proposed here, would answer questions about project risk and financing, and remove obstacles formed by lack of information.

Problem Statement

Reliable information is vital for an informed decision for any business; it is particularly important for a company which desires to work abroad. Presently, there is not a comprehensive construction industry database to aid U.S. construction firms in (1) identifying agribusiness-related construction job opportunities abroad, and (2) providing them with information that can assist in making overall planning and operational decisions concerning international construction work.

A study in 1989 demonstrated the value of such a system (Amador and Starbird 1989). This study investigated and evaluated potential locations for foreign agribusiness investment in twenty Central American, South American, and Caribbean countries. After analysis of the many variables, certain countries proved superior to others, and it was possible to examine each country in light of different criteria. Having a broad base of information available on each country led to the ability to make an informed decision on foreign investment.

However, many firms lack the means to afford such research for themselves. Thus, there is a strong demand for a source of information to aid U.S. firms (those already working abroad and those considering it) in making timely and accurate decisions throughout the various stages of an international agri-construction project.

Research Objectives

In investigating the requirements and feasibility of an international agribusiness construction information system, this project has attempted to answer the needs of industry. To do so, it has been necessary to accomplish the following tasks:

1. Determine what information is pertinent to construction, consulting, and design firms, before considering work in a foreign country.
2. Develop a profile of information needs from firms which are considering working abroad or joint venturing.
3. Gather a list of primary and secondary sources for the countries on which firms were most interested in acquiring information.
4. Construct a conceptual database.
5. Provide recommendations on how to implement such a program.

Methodology

Information pertaining to the possible data needs of industry in its decisions to work abroad and a collection of contact people or organizations in various countries and governments were gathered in the first phase of this project (see Table 1). Throughout the study, extensive use has been made of literature sources, both in gathering contacts and actual information.

From this data a survey was constructed and mailed to several hundred design and construction firms. This survey inquired into what kinds of specific information firms were interested in when deciding whether to work abroad. In addition, other information, such as where the firm would be interested in working and how much it would pay to have access to a database, was gathered.

In the final step in this phase of the study, the data were analyzed and sorted to discover the information needs and preferences of the respondent companies. The results were examined from several different points of view and results tabulated and charted. Finally, recommendations were made on how to implement an appropriate database.

MARKET FOR INTERNATIONAL AGRIBUSINESS CONSTRUCTION

The international construction market consists of projects that are typically undertaken by multinational contractors. This market essentially began at the end of World War II, after the infrastructure of the Far Eastern and European countries was seriously damaged. American construction firms that were situated outside of the United States reacted quickly to the call for reconstruction of those geographical areas.

The international construction industry includes companies that bid both domestically and internationally. Much of the world's construction involves small facilities built by small domestic firms, but there is a significant fraction undertaken by large firms in international competition. These projects are usually large-scale and sophisticated.

A distinction is made between two broad categories of international construction activity, namely conventional and complex construction projects. Conventional construction projects are referred to as traditional construction projects, meaning labor-intensive in nature. Complex construction projects are sophisticated, high-tech, more expensive, and require specialized skills and experience. Table 2 illustrates some of the differences between conventional and complex construction projects.

Agribusiness construction, which is defined in the next section, can have both conventional and complex characteristics. Farm-to-market routes and irrigation systems are examples of conventional

agribusiness construction projects, while a food processing plant would be an example of a complex project.

Definition: Agribusiness Construction

Agricultural construction spans a wide range of projects. These construction projects can be split into primary, secondary, and tertiary groups. Primary projects are those that directly affect farmers and their ability to work. These projects include the building of barns and silos, seed and grain processing, hog production, and dairy production facilities.

Secondary projects include essential infrastructure within a country. These construction projects involve the building of farm-to-market roads, bridges, railroads, and similar projects.

Tertiary projects are the peripherals related to the agricultural community, including, but not limited to, hotels, motels, office buildings, and grocery stores.

A visual representation of the three project groups is shown in Figure 1.

Demand For International Agribusiness Construction Services

International design and construction work involves 80 to 90 percent of developing countries and newly industrialized countries. Most under-developed countries need the skill and ability of foreign companies because of their deficient domestic design and construction capabilities.

New opportunities are emerging in the global market. Major events such as the North American Free Trade Agreement (NAFTA) and the collapse of the Soviet Union are creating new contract opportunities for contractors of all sizes. According to Hannan (1990) Top 400 contractor executives say they are cautiously optimistic about the future as they fine-tune businesses to run on a combination of leaner domestic markets and potentially richer international ones. U.S. companies have a chance to make substantial amounts of money as these changes occur in the international sector. Markets in the former Soviet Union and Mexico are attracting the most international attention. Japan, China, Thailand, Taiwan, and Korea offer promising future markets. The president of Flour Group, Gerald M. Glenn, said they see a continually growing number of new awards coming from international markets (McManamy 1992). The value of the Top 400's domestic contract awards declined to under \$157 billion in 1990, as the international contract awards increased 54 percent to slightly above \$73 billion. Figure 2

contrasts the international contracts in 1990 and 1991. The graph demonstrates that the dollar amount of contracts in 1991 was higher than in 1990.

From 1994 to 1996 there has been more engineering and construction in the world than in the previous 20 years (McManamy and Powers 1993). The great demand for construction is being fueled by such things as NAFTA, the near collapse of communism, the Pacific Rim expansion, and changes in the European Union's economic community, in addition to demand from underdeveloped countries that are moving into the next stage of economic development.

The U.S. Department of Agriculture has recognized the magnitude of the changes taking place in Europe and the former Soviet Union, and is acting as a catalyst in transforming these countries' agricultural market structures into market-friendly organizations, in keeping with the Support for East European Democracies Act of 1989. Through its Eastern Europe and Soviet Secretariat, the USDA is attempting to provide, among other things, credit guarantees for facilities development and to maximize U.S. private industry involvement in all phases of the program.

It is not simply agricultural facilities that need to be designed and built. In Spain, Italy, and Belgium, for instance, supermarkets are of increased importance in consumer behavior. In addition, frozen and preprocessed foods are increasingly being favored in the Netherlands, Spain, and France. There is an increasing market for these tertiary agribusiness construction projects abroad.

Admittedly, the international construction market is forever changing, making it risky for construction, design, and consulting firms to operate successfully within it. "The construction industry is a rapidly changing and highly competitive industry, where the law of the 'survival of the fittest' undoubtedly prevails," according to *International Construction* (1982). This market is very competitive, with both international and domestic firms vying for the same jobs.

Small to medium-sized firms in America can benefit from the growing international market by carefully doing their homework on international markets or by establishing joint ventures with reliable or trusted firms. Joint ventures are a popular option, because they make firms more competitive, help to offset government barriers, reduce risk, and provide companies with some type of payment assurance.

Just as the demand for tertiary projects is growing, so is the demand for secondary projects such as construction of highways, commercial buildings, and industrial plants. This increasing foreign demand is illustrated in Table 3. A sample of 17 of the Top 400 contractors stated that all areas of

construction are expanding, except for residential construction. A wealth of opportunities exists for firms of all sizes if they have access to pertinent information.

International Versus Domestic Construction

Each country presents foreign companies with difficulties from its unique laws, regulations, and culture. Material and equipment availability is a very important factor when considering work abroad, especially when material cost and procurement is 90 times more difficult abroad than in the United States (Grogan and Setzer 1992). These factors may cause an inexperienced firm to bid far too low, possibly resulting in financial disaster.

International projects are generally riskier than local projects because of the many unknown conditions in foreign countries (Arditi and Gutierrez 1991). The contractors who undertake international projects and are familiar with the risks involved are usually large industrial contractors. They encounter risks such as price changing, labor difficulties, and adverse weather conditions. Reliance on the host country's subcontractors, suppliers, personnel, and on payment processing add further uncertainty. These factors make it difficult to estimate project completion time and cost. In addition, the effect of cultural differences on business practices must not be underestimated.

Financing for a project abroad is a major difficulty for some contractors, frequently resulting in a decision to not work in foreign countries. There is a large difference between the financing of international and domestic construction. Multinationals sponsored many of the international projects prior to the 1960s. These companies engaged in resource exploration and development, with financing provided directly by the government through agencies like the U.S. Agency for International Development (AID). Today, the governments of some foreign countries have generally assumed the responsibility and now require financial assistance.

The volume of international work undertaken by U.S. companies has declined considerably in the last few years as has the share of the international market held by them in the same period (Arditi and Gutierrez 1991). The United States, unlike its foreign competitors, has been slow to develop trade and economic policies that support international engineering and construction. Figure 3 shows the share index of the United States, Japan, and Europe from 1980 to 1988.

Figure 3 reveals that the Japanese have almost quadrupled their market share and the Europeans have been steadily increasing theirs, while the U.S. share has been declining. Figure 4 illustrates where the top international contractors acquired new work from 1980 to 1989. The graph also shows

that the number of new projects among the top international contractors has declined considerably, particularly between 1985 and 1988.

Nearly 70 percent of the international volume undertaken by the *Engineering News Record* (ENR) Top 400 contractors between 1980 and 1988 was held by only ten companies: Bechtel (16 percent); Parsons (12 percent); Fluor Daniel (7.2 percent); Lummus Crest (7.2 percent); M.W. Kellogg (6.8 percent); Foster Wheeler (6.7 percent); Brown and Root (4.5 percent); C.F. Braun (4.3 percent); Morrison-Knudson (2.7 percent); and Guy F. Atkinson (2.4 percent) (Arditi and Gutierrez 1991).

Although U.S. firms still dominate the international construction market in contracts, the U.S. competitive position deteriorated in the 1980s (Warf 1991). This decline reflects several factors, including insufficient research and investment in new construction technologies. Research and development expenditures, for example, comprise 3 percent of Japanese construction firm budgets, while their U.S. counterparts only spent 1 percent ("Keeping American Construction Competitive," 1986). U.S. firms were also hampered by high labor cost, due in part to shortages of engineers and architects. Such shortages are critical in a relatively labor-intensive industry such as construction, in which wages generate roughly two-thirds of the total input cost (Warf 1991). The U.S. government's ineffective export financing and promotion policy is a third factor in this decline.

The Need for an Agribusiness Construction Database

If U.S. firms wish to regain a place among the leaders in international construction, then information related to wise bidding practices will be vital to any company considering work abroad. Results from other forms of computer information systems have shown the value of such a system.

The costs are prohibitive for each firm interested in international agribusiness construction to research the various cultural, political, and economic factors that will affect a project abroad. An affordable database, operated by a company whose sole purpose is to make sure that the information within it is useful, accurate, and timely, is nearly a necessity for all but the largest companies.

International projects are available; all that needs to be done is for a company to make a commitment to investigate the possibilities of work abroad.

DEVELOPMENT OF AN INTERNATIONAL AGRIBUSINESS INFORMATION SYSTEM

It would be very easy to overload a system with too much information. If a company is considering working abroad, it will not want to sift through too much information before it finds the few facts that are of interest. Thus, in developing an international agribusiness information system, industry needs and concerns must be investigated.

Research Methodology

The project began with research consisting of an extensive literature review and personal feedback from industry practitioners with international experience detailing industry data needs. The information highlighted several areas that had the potential to be very important in a firm's decision to work abroad. These areas included country information, political and economic information, and construction industry information related to overall industry characteristics, legal, organizational, and construction education, and personnel characteristics.

The next step involved conducting interviews with a variety of firms and experts. The interview questions were developed from the results of the preliminary research. Sixty firms and experts were interviewed. (The list of interviewees is provided as Appendix A.) The interviews were conducted from August 1992 to December 1992. Literature continued to be collected at the same time as the interviews were being conducted.

The next stage involved developing an international construction information survey from the interview results. International and domestic firms, including construction, consulting, and design firms for upper, middle, and lower management, were targeted as candidates for the survey. Seventy-five surveys were mailed to the chosen firms, and 17 firms responded. Due to this low return rate, 100 firms were chosen for a second mailing, with 12 more companies responding. This was still too small a sampling for good results, so an additional 300 firms were surveyed. With an additional 30 responses from this mailing, the survey results included the responses of 59 firms.

It was necessary to analyze the data from this survey and summarize the findings. Primary and secondary sources were collected on several countries that appeared frequently in the surveys and a conceptual information system was developed.

Research Hypotheses

The following hypotheses were developed from the extensive literature review that was undertaken and from the interviews with international and domestic construction, consulting, and design firms.

1. Domestic and international firms differ about what information they feel is pertinent before accepting work overseas.
2. Upper, middle, and lower management differ in what they consider pertinent before accepting work overseas.
3. Construction, consulting, and design firms differ when considering what information is pertinent before accepting work overseas.
4. Most firms will use this information if it is gathered in a structured format, such as that provided by an information systems database.
5. Most firms would like to have pertinent information presented by facsimile.
6. Most firms would pay more for a customized report delivering the most current data on a country of interest.
7. Most firms would like to have pertinent information delivered to them in the form of a hard-copy report.

Interviews

Sixty interviews were conducted in order to discover what information would be of most interest to firms who would like to use an international agribusiness construction database. These interviews were with bankers, lawyers, presidents of construction firms, government officials, and a number of other individuals with ties to international construction and agribusiness. These interviews ranged from acquiring background material and making new contacts to an item-by-item organizing of the survey to be sent to business firms in the next stage of the research project.

One United States AID representative noted that the information demands in the construction sector are not so dissimilar to other sectors interested in venturing into central Eastern Europe: What are the tax laws? What are the labor laws? His comments were typical of the concerns of many businessmen, and he went on to note that agribusiness construction was one area that had been ignored by the Department of Commerce (DOC), and that our Congress is not interested in getting involved in capital investment.

He also pointed out a need for a proactive database. Trends, forecasts, tips, and potential for privatization in foreign countries were mentioned as means of stimulating interest among database users in conducting work abroad. However, American investors are being actively sought, at least in

Europe. This is due to fierce European independence; the developing countries don't wish to be "consumed" by their larger European neighbors.

The interviews did indicate that there are many sources of data available to individuals and firms. In fact, there are a multitude of government agencies that provide information on international markets and investment. "There are so many different government departments involving export promotion... they are all over the place, these sort of trade leads," said Damon Greer of the Department of Commerce. However, he noted that due to a generally defensive attitude about each department's "turf," there is a tendency to dilute efforts to centralize information. In addition to this problem among governmental agencies, there is no database devoted to agribusiness construction. This indicates a need for an easy-access database that could consolidate the pertinent data.

Matins Lacis, from Latvia, said that an agribusiness construction information system would be of great use to his country as well as to foreign firms and investors. "For us, it is very difficult to find resources," he said, in addition to noting that he felt a database set up by Americans would be better received than one set up by a country, due to fear of bias.

"Why is this database necessary? Number one, because if it is ... large scale ... there would be international competitive bidding," Hoonae Kim of the World Bank said. She noted that there is a large amount of information that could be gathered for any foreign country; however, many of these data are irrelevant and it would be costly for any one company to sift through them. It is not just the elimination of irrelevant information that is important; such things as cultural differences—shipping dinnerware to Japan in sets of 5 rather than 4—or changing the name of the Chevy "Nova" when marketing it in Mexico were highlighted by John Steuber of the U.S. Department of Commerce in Des Moines.

Terry Chamberlain from the Association of General Contractors of America feels that an information system such as this is "critical." He says that, "...a company is not going to go overseas unless they know how they are going to get paid. A company is not going to go overseas unless they know what the project is they are going to be working on ... they are not going to go overseas unless they know what kind of taxes they are going to have to pay to the U.S. government and/or to the other government. They are not going to go overseas unless they have the answers to what exactly am I going to get paid, in what currency, and at what rate. All of those things can be answered before they leave. That is not a problem, but that is the key to success."

Survey

The research hypotheses indicated the direction that the survey would take. The hypotheses were based on initial interviews with various firms and experts in international construction and related areas. The interviews were recorded and examined for trends, and these trends were assumed to follow those of the majority of companies. The specific variables in the survey responding to these hypotheses are detailed in Appendix B.

The variables used in this research are treated as measures of information that are difficult to obtain. It is assumed that general information, such as type of government, official religion, geography, and the like is readily available and would require little research.

The survey was broken into nine sections:

1. General information requirements;
2. General construction industry characteristics;
3. Construction legal environment;
4. Construction workforce characteristics;
5. Construction material and equipment characteristics;
6. Construction technology characteristics;
7. Interest in using an information service;
8. Information dissemination; and
9. Payment characteristics.

Data Analysis Techniques

Once the questions were decided upon, a rating system needed to be developed. For sections one through six, the ratings were:

- 1 = not necessary;
- 2 = somewhat helpful;
- 3 = highly recommended but not critical; and
- 4 = critical information.

The ratings for section seven depended upon a yes/no response, while for section eight the following scheme was used:

- 1 = no value (would never use);
- 2 = helpful (a feature desired simply "just in case");
- 3 = valuable (a feature used occasionally); and
- 4 = critically important (a feature used frequently).

Quantitative data were used in the final section of the survey, and several basic statistical techniques were used to analyze the survey data. Means, variances, standard deviations, percentages, histograms, and charts were used in the analysis. Averages greater than or equal to 3 (equivalent to highly recommended but not critical) found in sections one through eight were considered to imply a need to include that kind of information within the MATRIC On-line database.

Histograms were used to report results for all sections except seven, which used a pie chart.

Results

There are many organizations and sources that have access to the kind of information that a U.S. firm needs to be successful in working abroad. As stated, many construction firms are reluctant to participate in the international construction arena because of lack of information. Firms that do participate in the international construction market usually use personal contacts or subsidiaries as a method to gather important information. Embassies, magazines, overseas branch offices, bankers, the U.S. Department of Commerce, and U.S. exporters provide the means to gather pertinent construction information.

Organizations on the international, federal, and state levels are important sources that can be used to collect various types of pertinent construction information for work abroad. A list of sources is presented in Appendix C. Canada, Chile, Kuwait, Lithuania, Mexico, the Philippines, Russia, Saudi Arabia, and Taiwan are represented in this list due to their popularity among construction, consulting, and design firms that returned the International Construction Information Survey.

General Interest

Refer to the figures on pages 19 through 34 for specific results. The more general findings are mentioned here. Companies appear to be most interested in working in Mexico and Russia, while the Middle East and Eastern Europe were regions that held the most interest.

Companies were especially concerned about the construction risk in the specified country and the country's stability. They were also concerned about the types of laws and requirements that would need to be followed, along with import restrictions. Other areas of concern were characteristics of subcontractors in the country of interest, craftworker productivity rates, and availability of construction materials and material facilities.

One important result is that 59 percent of the respondents indicated that they would use this information service, while for 36 percent the decision would be made on how accurate and timely the information would be (see Figure 5). Companies were most interested in acquiring the information in the form of facsimiles, and, discounting those who had no idea how much to pay until they saw the information, the majority were willing to pay between \$400 and \$1,000 a year to subscribe to such a database. In addition, \$500 was the most typical amount a company would pay for a hard copy quarterly report and almost half of the companies were willing to pay between \$500 and \$1,000 for a customized report.

Countries of Interest

When asked which countries they were interested in, several firms responded by listing a number of countries. A few only listed a region; the regional results were not modified to include the numbers generated from specific country responses. This was done due to a desire not to generalize a regional interest from an interest in a specific country.

Mexico was the most popular country of interest to firms, attracting almost 15 percent of all responses (see Figure 6). Russia was of high interest, as were (in descending number of positive responses) Saudi Arabia, Taiwan, Canada, the Philippines, and Kuwait. No individual Central or South American country attracted much interest, except for Mexico. However, collectively they attracted approximately 10 percent of the responses. On a regional basis, the Middle East, Eastern Europe, the Far East, and the Baltic States appeared to be the most interesting to survey respondents (see Figure 7). Combining the individual country and regional responses, the Middle East, Eastern Europe, Central and South America, and the South Pacific appeared to be of most interest to the survey respondents (see Figure 8).

Information of Interest

Of all the possible choices for information of interest, the availability of construction materials was the most important, closely followed by legal requirements, construction risks, stability of the country, and availability of construction material facilities (see Figures 9 through 14).

Respondent firms were not generally interested in the various construction technology characteristics, including computer usage and research and development carried out within the country, or in the overall index gauging the development or sophistication of construction

technology. Firms were not very interested in the total dollar volume of on-going projects in a particular country, nor the percentage of projects by category. Neither were the names of prominent legal firms or availability of construction training programs particularly important.

Method of Information Dissemination

Respondent companies were not overly enthusiastic about any one particular form of information dissemination (see Figures 15 and 16). However, facsimile was the most popular form, followed by registered and nonregistered mail.

Payment Characteristics

Almost one-third gave no response when asked how much they would be willing to pay for a yearly subscription to an international agribusiness construction database (see Figure 17). The most popular price range was between \$400 and \$1,000, with \$500 receiving the most votes (8) within that range, closely followed by \$1,000. Five firms were willing to pay between \$2,000 and \$5,000, with three firms willing to pay \$2,000.

Firms were also asked how much they would pay for a hard copy quarterly report (see Figure 18) and for a customized report delivering customer-specific information (see Figure 19). Trends were similar for both. Just as for a yearly subscription, nearly one-third of the respondents gave no response when asked how much they would pay for a report.

Of those who answered, a significant number said they would pay \$500 for a standardized quarterly report. A payment of \$100 for such a report was the next most popular value. A customized report proved much more valuable; the most popular price range was between \$500 and \$1,000, followed by the range between \$100 and \$250. Four companies were willing to pay between \$2,500 and \$5,000, however.

Difference in Anticipated Information Needs Between Domestic and International Firms

Domestic and international firms had similar views on the importance of most of the variables in the survey. There were a few important differences, however.

International firms rated the entire general information requirements section between 2.5 and 3, implying somewhat helpful information but certainly not critical, while domestic firms felt that this information would be very helpful.

There were a number of variables from different sections that international firms found less important than domestic firms. For example, international firms felt the bidding process and contracting strategies in the foreign country would be helpful, but not as important as domestic firms felt these variables would be.

Another significant point of difference was that 50 percent of the international firms said that they would be interested in using the kind of information that would be found in the proposed database, compared to 74 percent of domestic firms that said yes. However, 47 percent responded that it would depend, with factors such as relevant information likely being the key in their decision-making process.

Difference in Anticipated Information Needs Between Management Levels

There were some significant differences between upper and middle management in the information that individuals at those levels felt would or would not be important when considering work abroad. A number of differences were found among the construction legal environment and the construction work force characteristics sections. There were also some sizable differences in the responses to a small number of miscellaneous variables.

Within the legal environment, upper management felt that the type of bidding process and the prequalification requirements for outside firms were more important than middle management felt them to be. These two variables had the largest differences within this section of the survey; other differences in this section demonstrated that upper management felt that contracting strategies and client information were more important than middle management did.

In the work force characteristics, middle management felt that breakdowns of skilled versus unskilled and union versus nonunion workers were more important considerations than upper management ranked them. A similar difference of opinion was found to be the case for craftworker wage rates and productivity rates.

A few other significant differences included upper management rating the stability of the country and the perceived acceptance of their company within the country as of higher importance than middle management did, whereas middle management felt that contract information and planning matrices were important considerations. In particular, middle management gave much more importance to a construction economic database than upper management did.

Difference in Anticipated Information Needs Among Construction, Consulting, and Design Firms

In general, design firms gave lower importance values to all variables in the survey than either construction or consulting firms. While there was no such pattern between construction firms and consulting firms, there were a number of significant differences in their information needs.

Consulting firms gave higher values throughout the general construction industry characteristics section than either construction or design firms. There were a number of variables that differed by more than .5 point—a substantial difference.

Construction firms, on the other hand, consistently rated the variables in the construction work force characteristics section as more valuable than did either consulting or design firms. At times, the difference was as large as a full point.

Both construction and consulting firms found most of the variables in the construction legal environment to be important, giving similar scores for these characteristics.

Finally, there was a significant difference between construction firms and consulting and design firms in their willingness to use the proposed database. Seventy-five percent of consulting and design firms said that they would use the information, compared to 54 percent of construction firms.

STUDY LIMITATIONS

The project had one major limitation, and that was the relatively small number of firms that responded to the surveys. While 59 respondents is acceptable, a larger selection would have aided in determining information of interest to a larger group of possible consumers. We are not sure if the firms did not respond because they were not interested in such an information service or because they were simply unwilling to spend the time to fill out the survey.

While the data were nearly evenly split between international and domestic firms, the respondents were not evenly split for either upper management/middle management or construction/consulting/design comparisons. The responses were heavily weighted for upper level and construction firms. More data are necessary to make stronger recommendations for differences between upper and middle management. With the current data, some of the conclusions reached by comparisons of these considerations should be viewed as tentative.

RECOMMENDATIONS AND CONCLUSIONS

This study investigated the information needs of the construction industry for accurate bidding in projects abroad. Many different areas were noted to be very important to the firms that responded to the survey, and this information will be vital to the success of an international agribusiness construction information system.

Further work will need to be done if such an information system is to be put into use. A key question will be the cost effectiveness of such a program. Many firms were willing to subscribe to such a service, but would the price that they are willing to pay offset research and data-entry time? In addition, the information must remain timely and up-to-date, necessitating continuing database updating.

To conclude, it is suggested that a pilot program be developed. This program would use construction data from one or two countries and contacts within those countries to keep the information current. The database would be used, and its effectiveness and usefulness would be evaluated after a trial period.

FIGURES

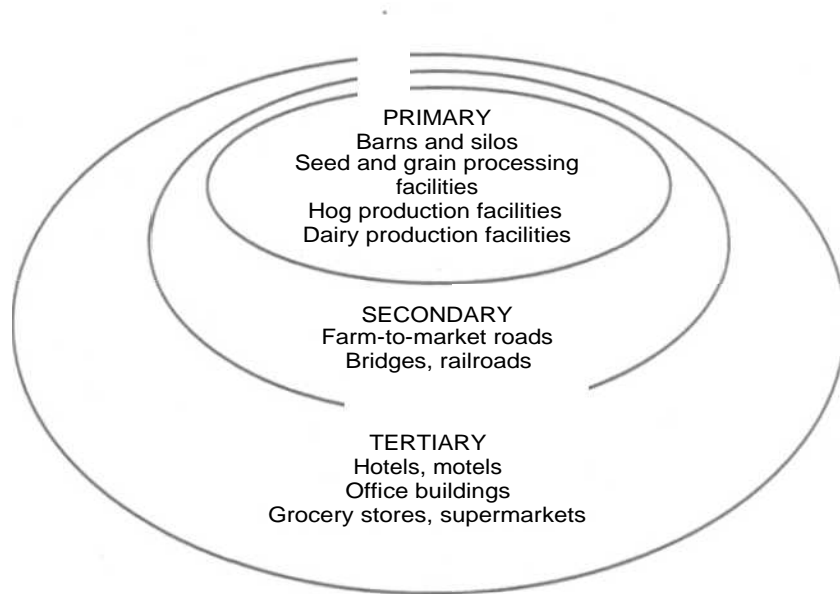


Figure 1. Description of agricultural construction projects

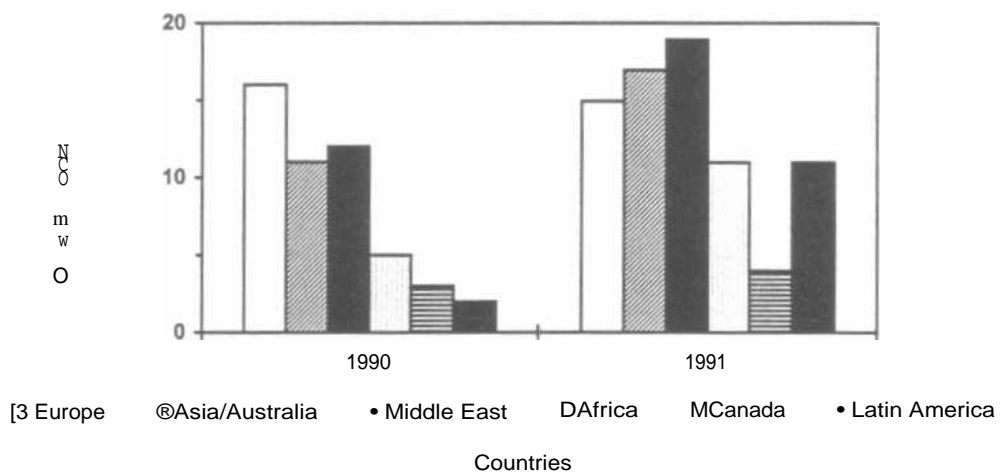


Figure 2. International contracts awarded in 1991 and 1990

Source: Engineering News Record, May 25, 1992

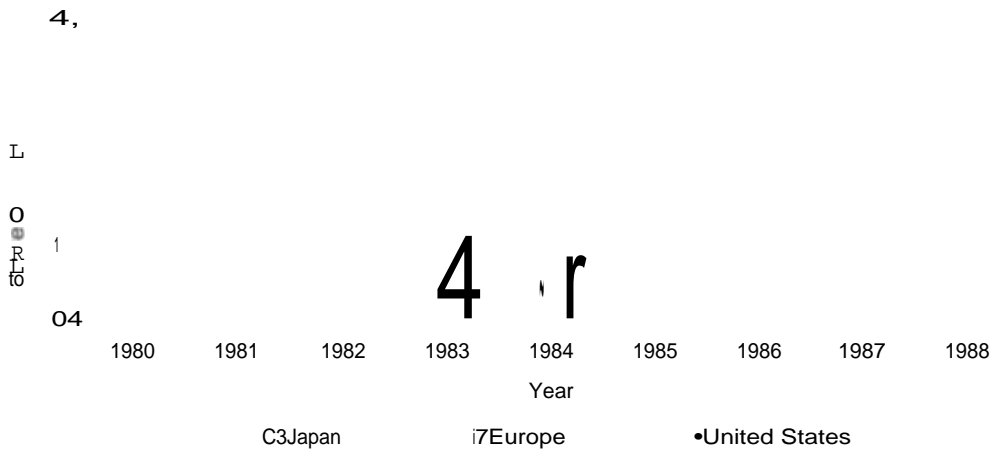


Figure 3. Share growth index for U.S., Japanese, and European (French, West German, Italian, and British) contractors

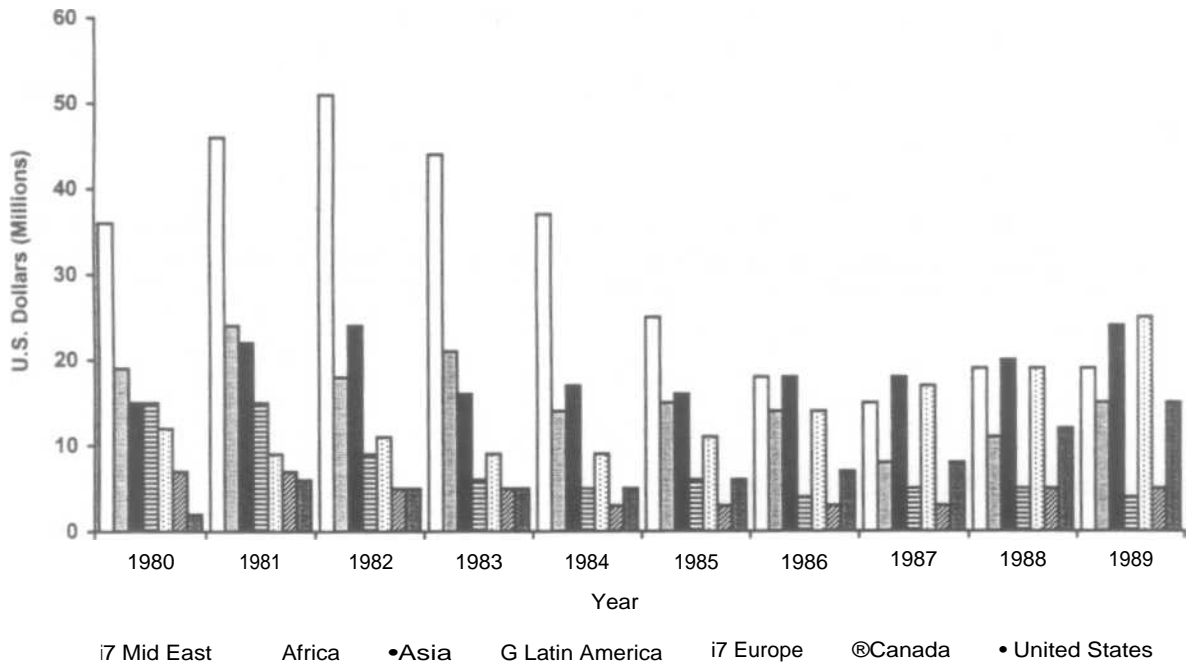


Figure 4. New work among top international contractors

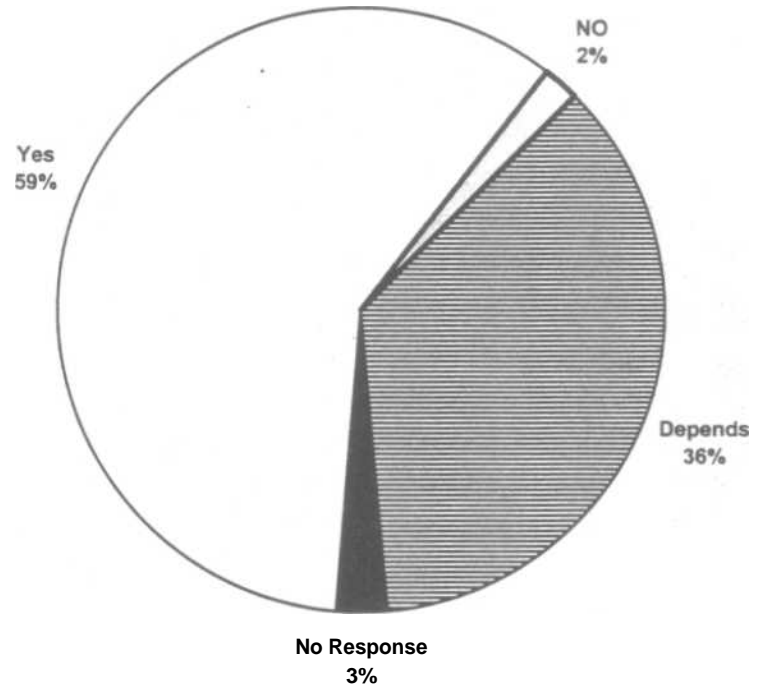


Figure 5. Industry interest in using the information presented in the survey

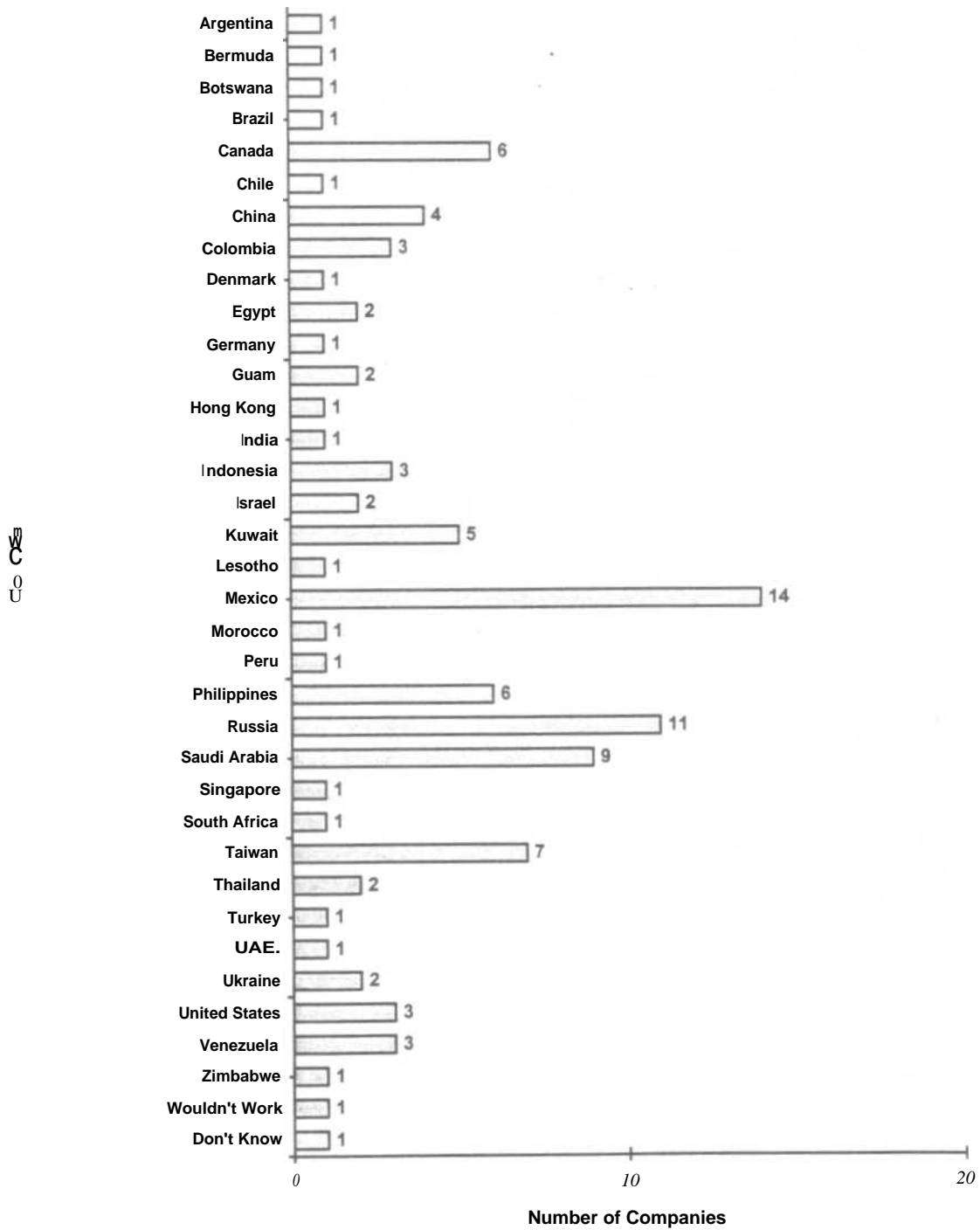


Figure 6. Countries in which companies are interested in doing construction work

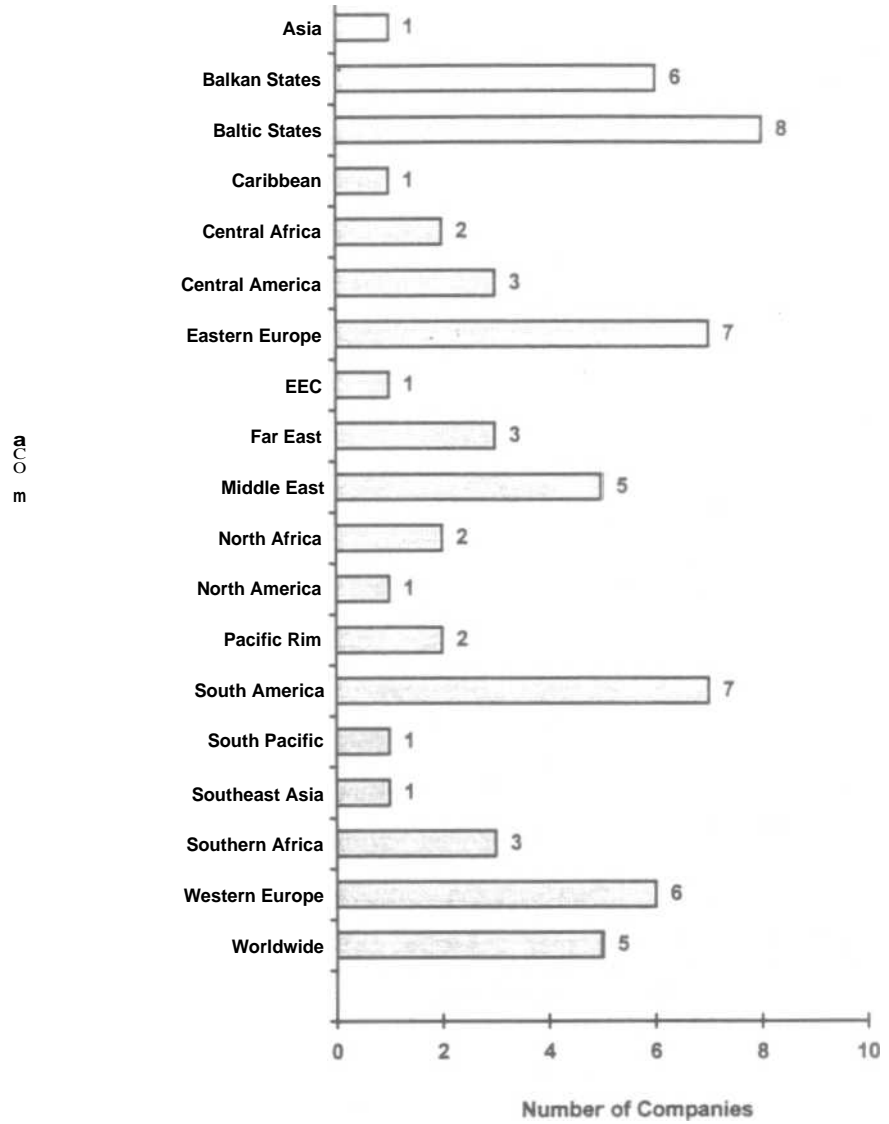


Figure 7. Regions in which companies are interested in doing construction work

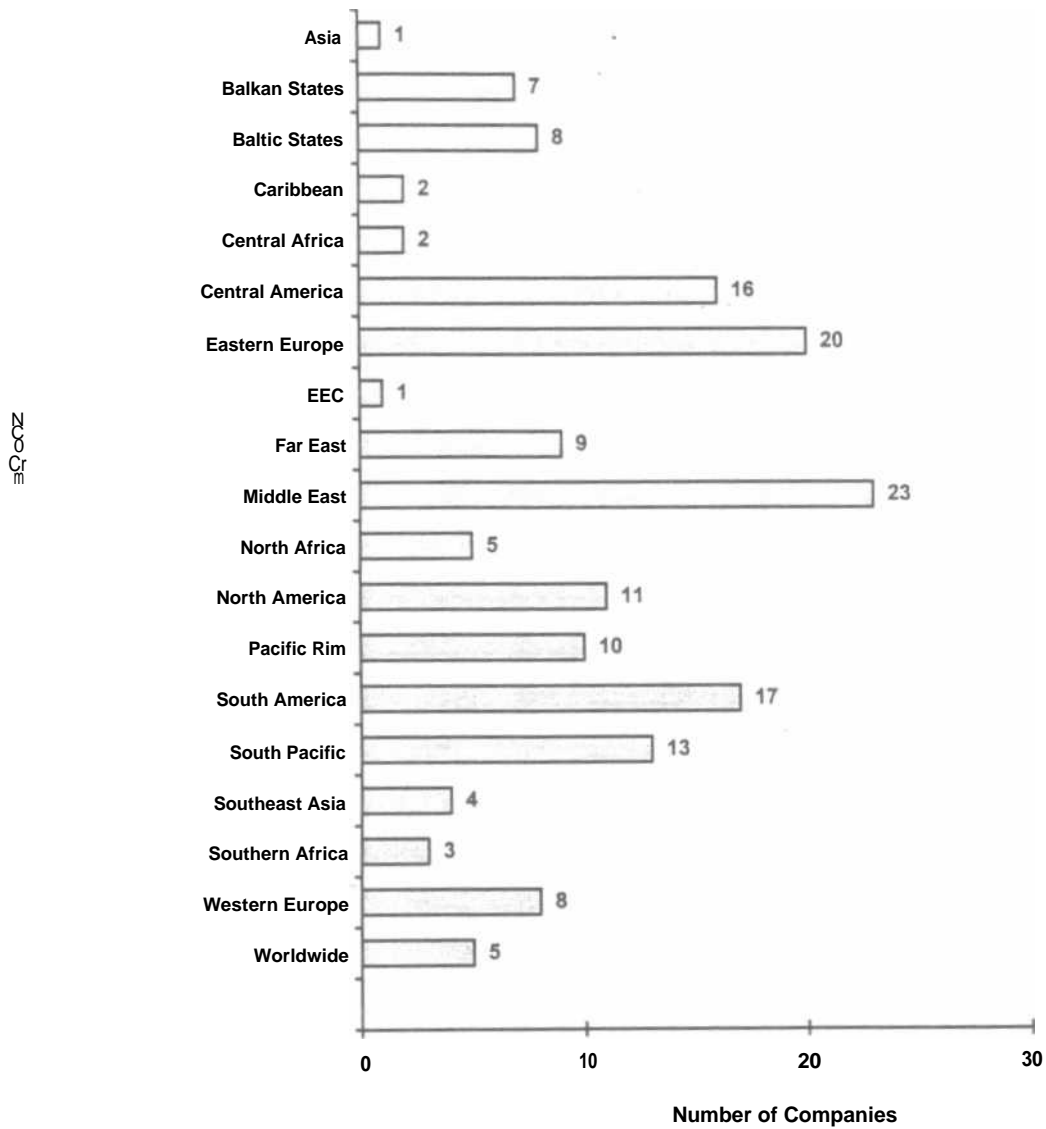
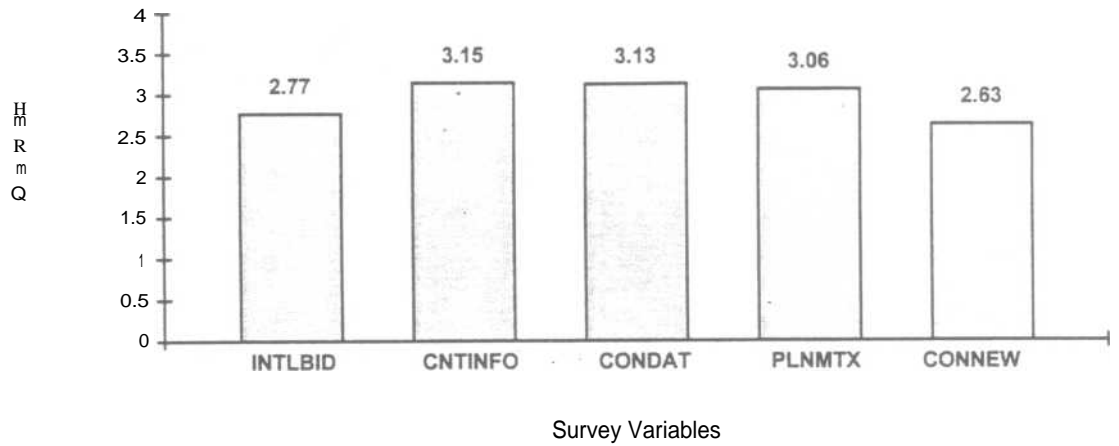


Figure 8. Combined regional interest: individual country and regional responses

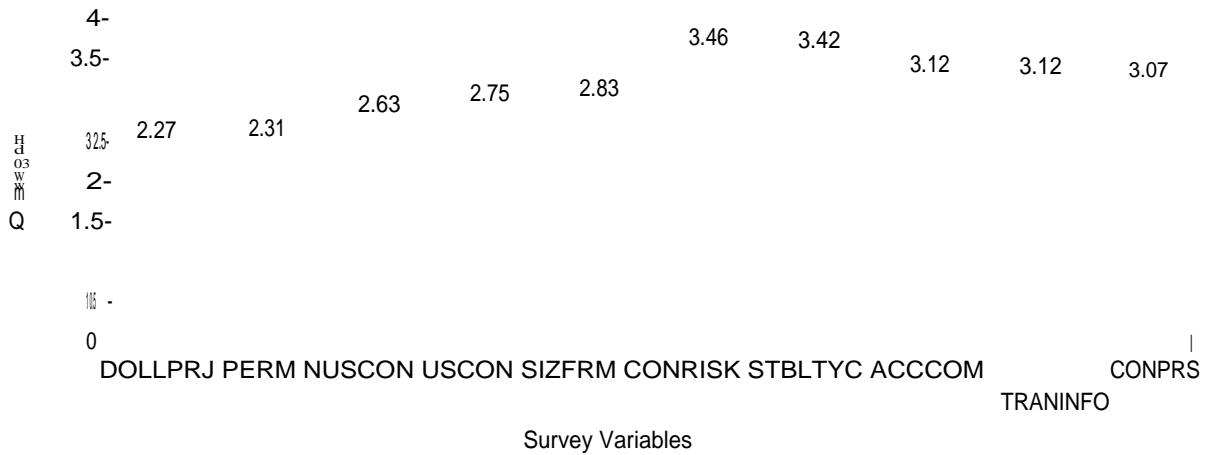


- INTLBID: A listing of international bidding opportunities
- CNTINFO: Contact information (international company contacts and profiles such as material suppliers, design firms, legal and accounting firms)
- CONDAT: Construction economic data base (such as wage rates, productivity rates, number of available construction workers)
- PLNMTX: Planning matrix (a description of how and where to obtain permits, licenses, etc.)
- CONNEW: Construction news briefs regarding country of interest

Ratings

- 1 = Not necessary
- 2 = Somewhat helpful
- 3 = Highly recommended, but not critical
- 4 = Critical information

Figure 9. Results of the "General Information Requirement" section

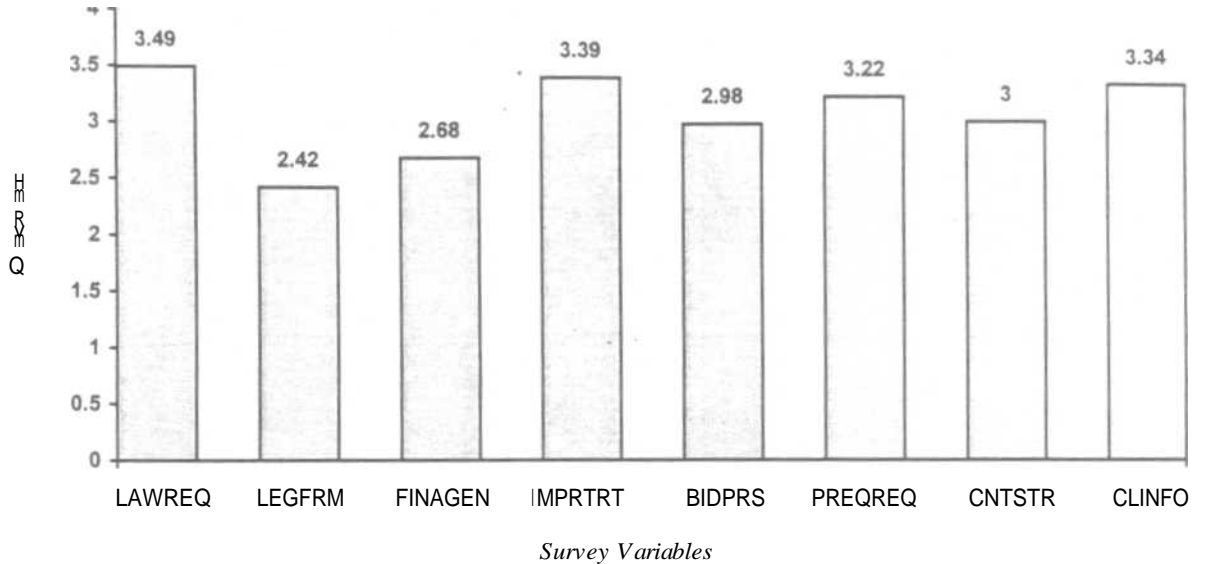


- DOLLPRJ: Total dollar volume of ongoing projects in a particular country
- PERPRJ: Percentage of ongoing projects by category (such as building, heavy, industrial, and residential)
- NUSCON: Names and specialization of non-U.S. construction companies and country represented operating in the country of interest
- USCON: Names and specialization of U.S. construction companies operating in the country of interest
- SIZFRM: Number and size of indigenous engineering and construction industry firms according to company type (architecture, engineering, construction, and consultants)
- CONRISK: Identification of construction risks in country (weather, harsh contract language, facilitating payments, and superstitions)
- STBLTYC: Stability of foreign country
- ACCCOM: Perceived acceptance of your company in host country
- TRANINFO: Transportation logistics information
- CONPRS: Type of construction process procedures and methods used to build projects in foreign country

Ratings

1 = Not necessary	2 = Somewhat helpful
3 = Highly recommended, but not critical	4 = Critical information

Figure 10. Results of the "General Construction Industry Characteristics" section

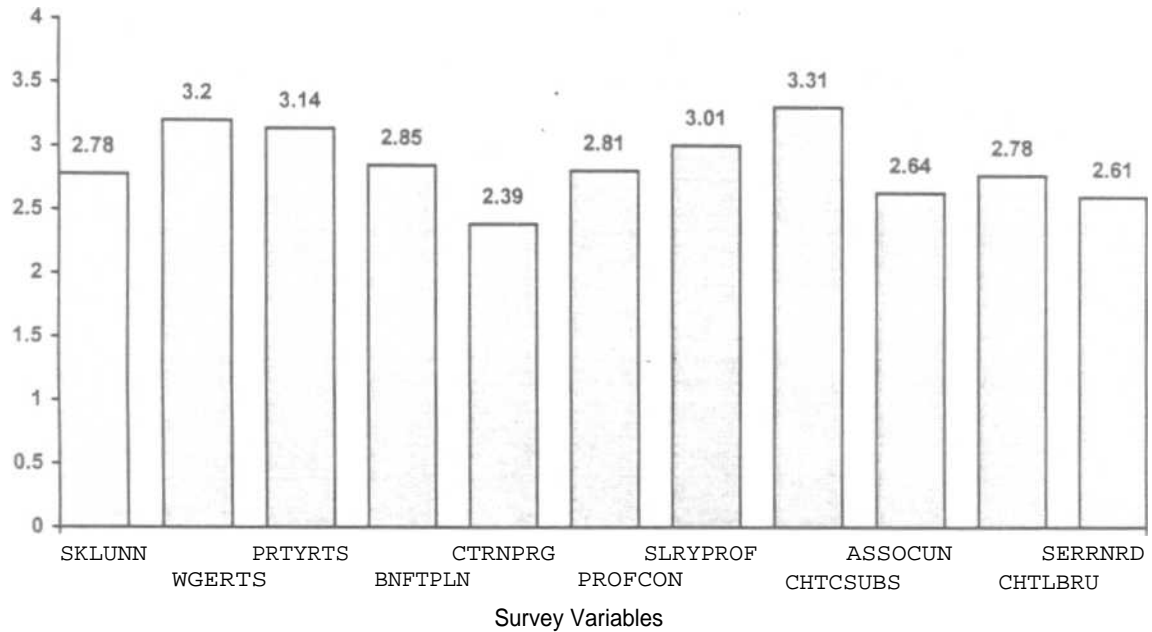


- LAWREQ: Type of laws and requirements (safety, environmental, etc.)
- LEGFRM: Names of prominent legal firms in foreign country
- FINAGEN: Names of agencies that will consider financing construction projects
- IMPRTRT: Types of import restrictions on materials, equipment, and labor
- BIDPRS: Type of bidding process to obtain work
- PREQREQ: Prequalification requirements for outside firms (such as experience, safety records, annual contract volume, and size of company)
- CNTSTR: Type of contracting strategies used in foreign country
- CLINFO: Client information (such as reputation, ability to pay)

Ratings

- 1 = Not necessary
- 2 = Somewhat helpful
- 3 = Highly recommended, but not critical
- 4 = Critical information

Figure 11. Results of the "Construction Legal Environment" section



- SKLUNN: Percentage and number of the total foreign country workforce broken down by skilled versus unskilled and union versus nonunion workers
- WGERSTS: Craft worker wage rates
- PRTYRTS: Craft worker productivity rates
- BNFTPLN: Types of benefit plans for workers
- CTRNPRG: Availability of construction training programs provided for construction workers
- PROFCON: Availability of professionals related to construction in foreign country (such as architects and construction consulting engineers)
- SLRYPROF: Salary of construction professionals in foreign countries
- CHTCSUBS: Characteristics of subcontractors that are in country of interest
- ASSOCUN: Number of associations and unions (such as engineer, designer, contractor associations)
- CHTLBRU: Characteristics of labor unions (such as company-wide basis, craft basis, industry-wide basis)
- SERRNRD: Description of services rendered by associations and unions as well as their relation with their government

Ratings

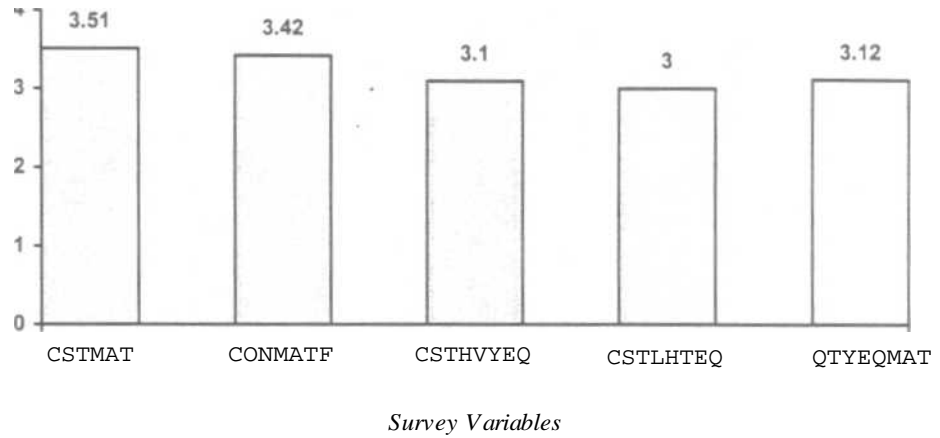
1 = Not necessary

3 = Highly recommended, but not critical

2 = Somewhat helpful

4 = Critical information

Figure 12. Results of the "Construction Workforce Characteristics" section

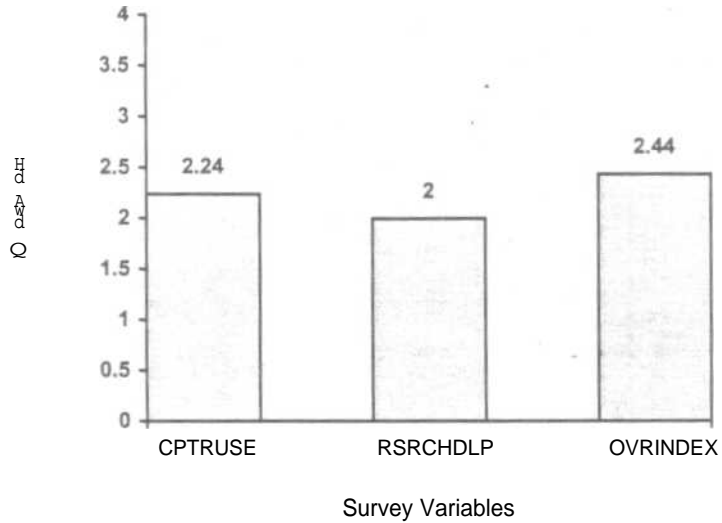


- CSTMAT: Availability and cost of construction materials (such as cement, bricks)
- CONMATF: Availability of construction material facilities (such as ready-mix concrete plants, building supply outlets)
- CSTHVYEQ: Availability and cost of heavy construction equipment (such as bulldozers, end loaders, cranes)
- CSTLHTEQ: Availability and cost of light construction equipment (such as scaffolds, hammers, shovels)
- QTYEQMAT: Quality of equipment and materials used in foreign country

Ratings

- 1 = Not necessary
- 2 = Somewhat helpful
- 3 = Highly recommended, but not critical
- 4 = Critical information

Figure 13. Results of the "Construction Material and Equipment Characteristics" section



CPTRUSE: Characteristics of computer usage in construction industry (such as accounting, design, cost estimating, cost control, planning and scheduling)

RSRCHDLP: Research and development invested in construction carried out by government, private institution, or both

OVRINDEX: Overall index that gauges the level of development or sophistication of construction technology used in a country by local construction companies

Ratings

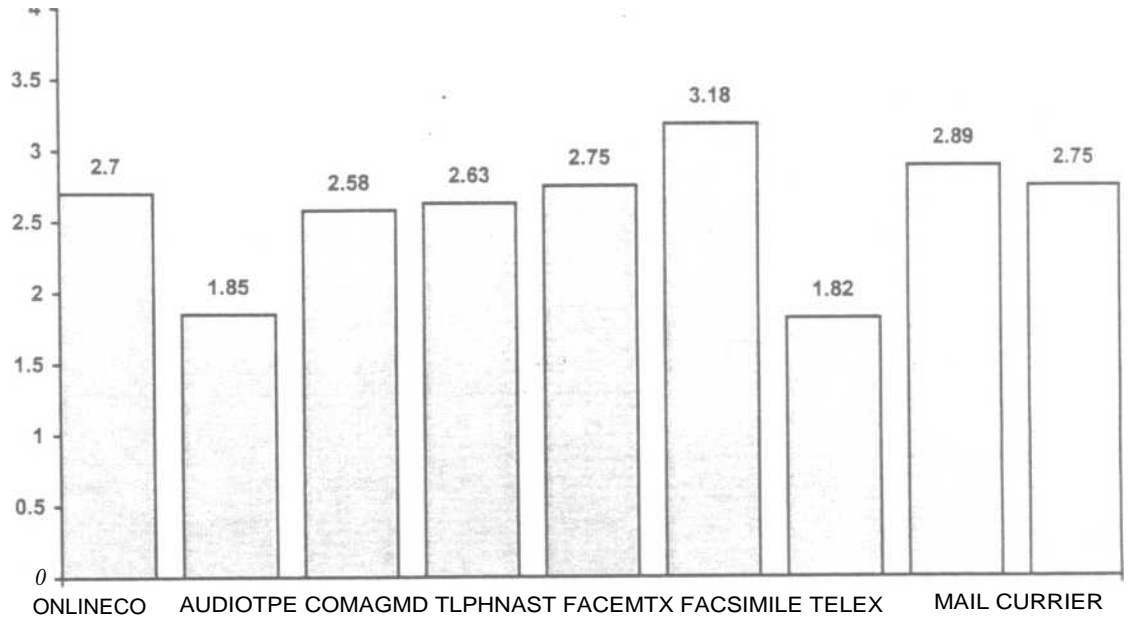
1 = Not necessary

3 = Highly recommended, but not critical

2 = Somewhat helpful

4 = Critical information

Figure 14. Results of the "Construction Technology Characteristics" section



Survey Variables

- ONLINECO: On-line computer access
- AUDIOTPE: Audio tapes with up-to-date reports/briefs
- COMAGMD: Computer magnetic media (diskettes, CD ROM, reels, etc.)
- TLPHNAST: Telephone assistance operators, who will either direct calls or be able to answer questions
- FACEMTX: Face-to-face meetings with experts
- FACSIMILE: Facsimile
- TELEX: Telex
- MAIL: Mail (registered and nonregistered)
- CURRIER: Courier/overnight courier

Ratings

- 1 = No value (would never use)
- 2 = Helpful (a feature that you would simply like to have 'just in case')
- 3 = Valuable (a feature you would use occasionally)
- 4 = Critically important (a feature you would use frequently)

Figure 15. Results of the "Information Dissemination" section

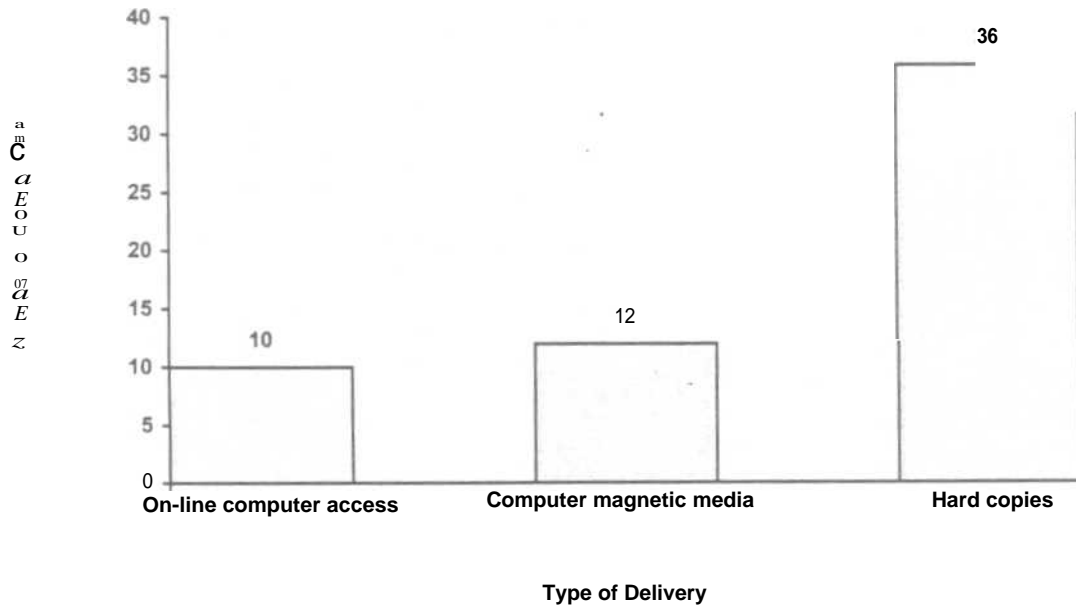


Figure 16. Style of information delivery

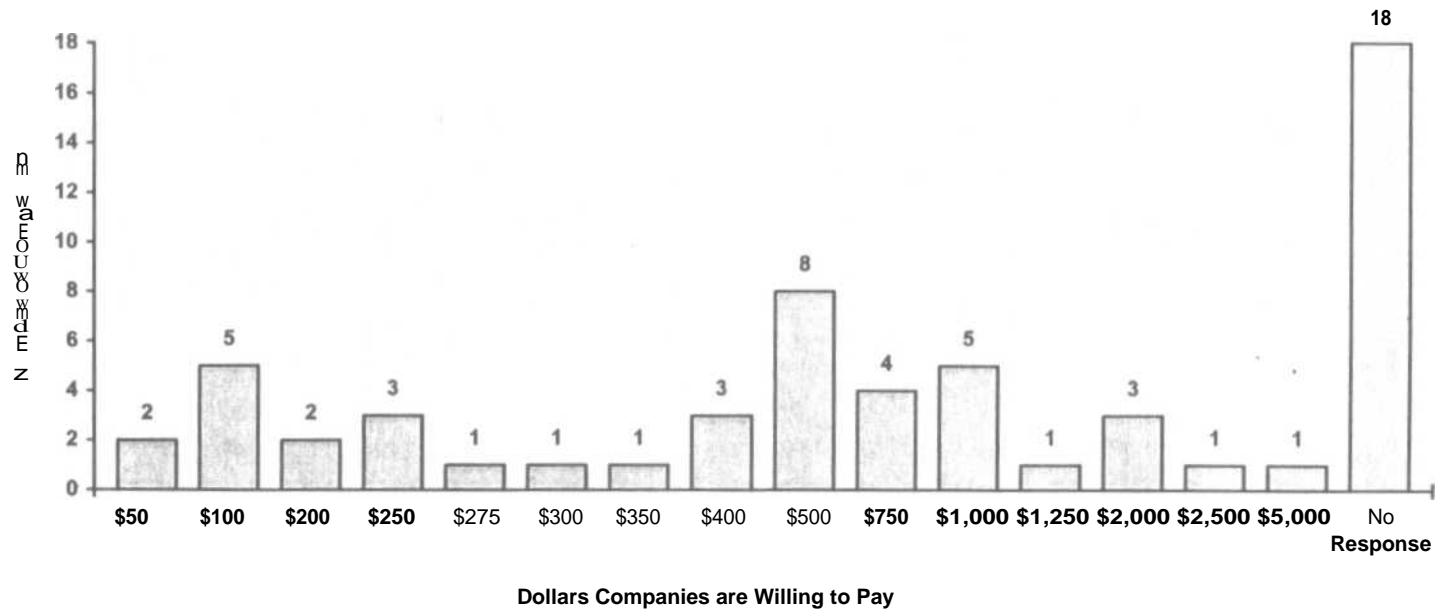


Figure 17. Payment for a yearly subscription

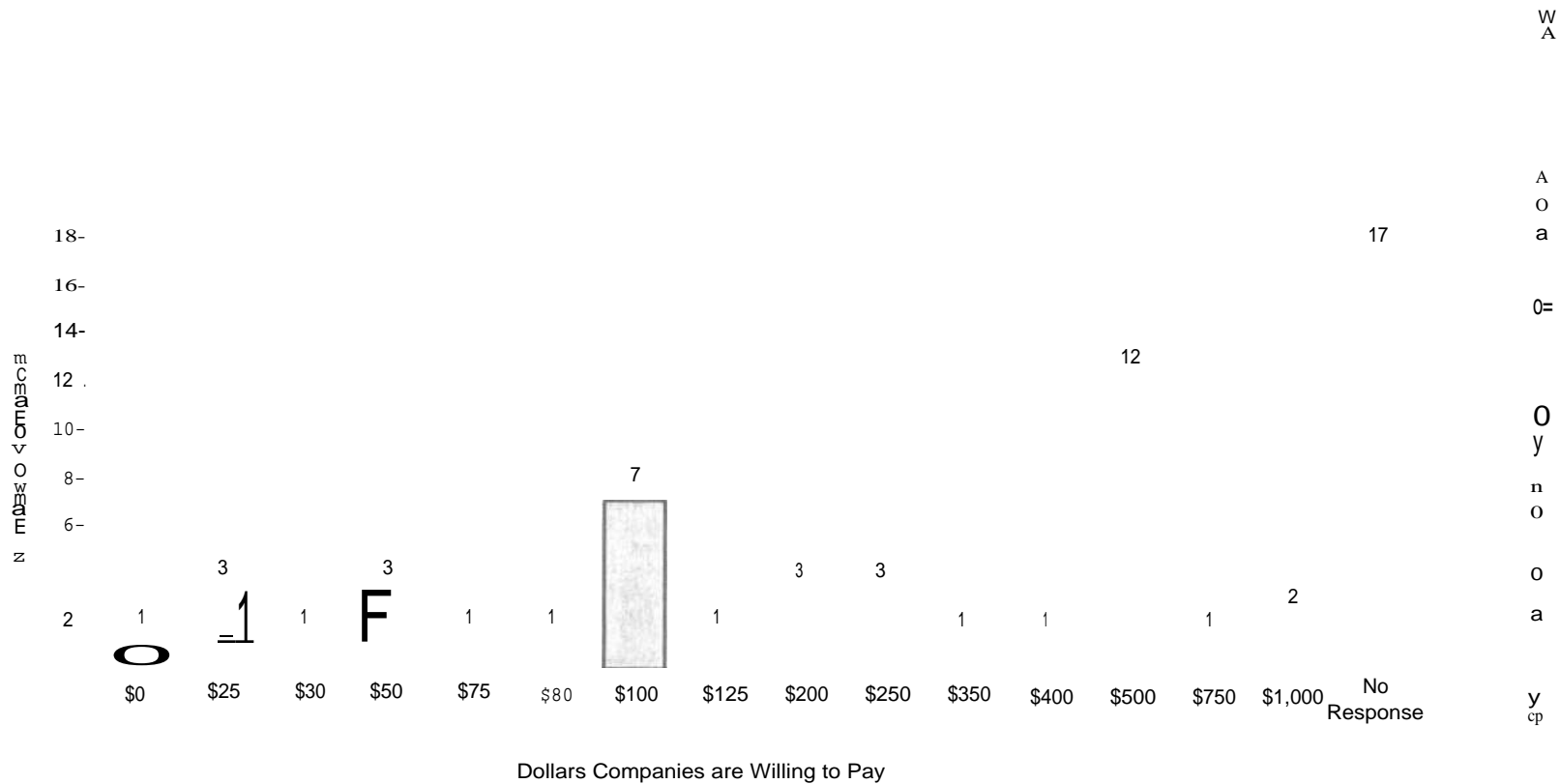


Figure 18. Payment for a standardized hard copy quarterly report

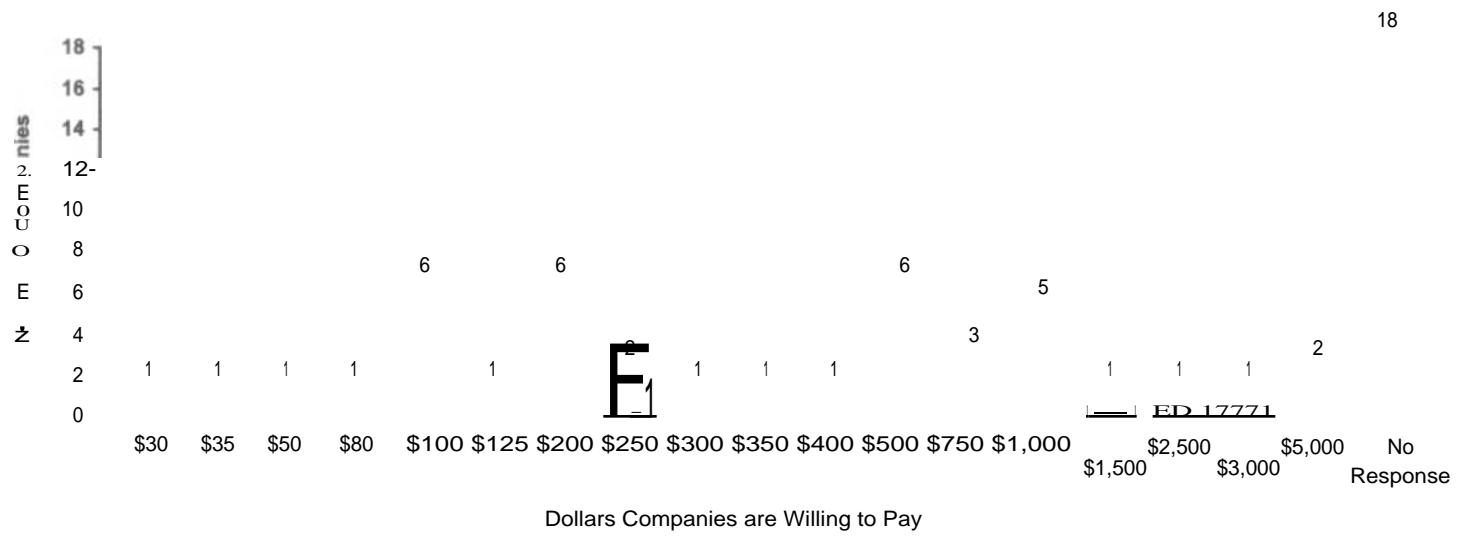


Figure 19. Payment for a customized report

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A.
B
Q

n

TABLES

Table 1. Methodology diagram

Preliminary Stage	Survey Phase	Response Analysis
Literature Review	Literature Review	Gather Survey Results
Preliminary Interviews	Construct Survey to be sent to design and construction firms from preliminary stage results	Analyze Data guild Conclusions and Recommendations

Table 2. International construction projects

Features	Examples
<u>Conventional</u> Labor-intensive Utilize standard equipment and support services	Traditional building and infrastructure projects (e.g., roads, airports, pipelines, irrigation systems, and bridges)
<u>Complex</u> Technology-intensive Require specialized equipment and logistical support systems Require special design construction skills (e.g., for complex processing or automated control systems) Unique (or special) environmental considerations (e.g., underwater/deep sea, Arctic, desert, and/or special geotechnical considerations, such as earthquake protection) Very large-scale or time-limited projects requiring special <u>management skills</u>	LNG or petrochemical processing plants, nuclear power plants, Arctic pipelines, nuclear power or very large-scale infrastructure projects built under severe time constraints

Source: Office of Industry Assessment 1984.

Table 3. Trends of distribution of work by construction type

Type of construction	Maximum value	Minimum value	Mean value	Standard deviation	Sample size
Heavy engineering	2	0	1.12	0.70	17
Building	2	0	1.12	0.49	17
Industrial	2	0	1.12	0.49	17
Residential	1	1	1.00	0.00	17

Note: Trends over 1984-1988: decreasing=0, stable=1, increasing=2.

Source: Arditi and Gutierrez, 1991.

APPENDIX A
INTERVIEWEES

NAME	TITLE	COMPANY/AGENCY
1. Patricia Rourke	Senior Vice President	Banker's Trust
2. Kent Mericle	Vice President/Manager	Norwest Bank
3. Glenn De Stigter	President	Weitz Construction Co.
4. Norm Riis	President	Story Construction Co.
5. John Kursitis	Engineering Consultant	Veenstra & Kim, Inc.
6. Tal Liepa	Engineering Consultant	Veenstra & Kim, Inc.
7. Sharon Middleton	Administrative Asst.	Iowa Dept. of Agriculture & Land Stewardship
8. Kathy Hill-Crees	Marketing Manager	Iowa Dept. of Economic Development
9. John Steuber	Director	U.S. Department of Commerce
10. Keri Storjohann	President	Solutions Corporation
11. Mark Kirby	International Accountant	McGladry & Pullen
12. Dr. John Wong	Professor	Iowa State University
13. Tom Swartz	Director	Internet
14. Don Francois	Project Manager	Pioneer
15. Dave Ralph	Project Manager	Pioneer
16. Neal Meyer	President	Hart/Meyer
17. Jack Taylor	President	Taylor-Ball
18. Dr. Gerald Klonglan	Associate Director	Iowa State University. Ag Experiment Station
19. Mark Maggio	Research Associate	Iowa State University
20. Gregg Narber	Vice-President General Counsel	The Principal Financial Group
21. Jan Graham	Research Associate	Iowa State University
22. Munawar Memon	Graduate Student	Iowa State University
23. Ed Lowe	Consultant	
24. Mark Nordling	Consultant	
25. Tom Person	Vice-President	Stetson Building Products
26. Ed Soenke	Architect	The Design Partnership
27. Jim Chrisinger	Project Manager	Iowa State University Center for Agricultural and Rural Development
28. Alan Gaul	Operations Manager	Seed & Grain Systems
29. Roger Sawheny	Marketing Director	Seed & Grain Systems
30. Al Greffenius	International Lawyer	Davis, et. al
31. Jan Jobe	President, Int'l Div.	The Principal Financial Group
32. Lisa Lyon	Senior International Analyst	The Principal Financial Group
33. Dr. Harold Crawford	Associate Dean	Iowa State University
34. Bill Hawkins	Chief, CCC Operations Div.	U.S. Department of Agriculture
35. Clement Miller	Financial Economist	Ex-Im Bank

36. Mark Rasmussen	Ag. Marketing Specialist	U.S. Department of Agriculture
37. Anthony DiStefano	Marketing Officer	Ex-Im Bank
38. Robert Hughes	VP, Engineering	Ex-Im Bank
39. Monika Goodrich	Int'l Trade Specialist	U.S. Department of Commerce
40. Pamela Green	East European Affairs	U.S. Department of Commerce
41. James Gale	Senior Associate	Overseas Private Investment Corp.
42. Matins Lacis	First Secretary	Embassy of Latvia
43. Linas Orentas	Special Asst. to Ambassador	Lithuanian Embassy
44. Diana Vidutis	Science Tech. Education	Lithuanian Embassy
45. Gene George	Office of Project Development	U.S. Agency for Int'l Development
46. Thomas Foggin	Information Officer	Citizens Democracy Corporation
47. Terry Chamberlain	Director, Int'l Division	AGC of America
48. Hoonae Kim	Agriculture, Industry, & Finance	The World Bank
49. Diane Miller	Contracts Officer	U.S. Agency for Int'l Development
50. <i>Scott</i> Contino	Project Officer	U.S. Trade & Development Center
51. Bruce White	Asst. to Director European Program	VOCA
52. James Snell	Chief, Food Systems	U.S. Agency for Int'l Development
53. Karen Brown	Baltic Desk Officer	U.S. Agency for Int'l Development
54. Mark Abramovitz	Regional Mission for Europe	U.S. Agency for Int'l Development
55. Robert Navin	Chief, Trade and Investment	U.S. Agency for Int'l Development
56. Damon Greer		U.S. Department of Commerce
57. Gene Shaw		U.S. Department of Commerce
58. Patrick MacAuley	Industry Economist	U.S. Department of Commerce
59. Rashmi Nehra	Int'l Trade Specialist	U.S. Department of Commerce (BISNIS)
60. Robert Erwin	Executive Director	American Building Products Export Council

APPENDIX B

FACTOR DESCRIPTIONS

One variable was used to determine the country or region of interest to a firm. The variable is in the form of a question that asks the survey respondent in which foreign country(ies) the company would interested in working.

Forty-two variables were used as measures of pertinent information for international and domestic firms; for construction, consulting, and design firms; and for upper, middle, and lower management. These variables are as follows.

General Information Requirements

1. INTLBID: A listing of international bidding opportunities
2. CNTINFO: Contact information (international company contacts and profiles such as material suppliers, design firms, legal and accounting firms)
3. CONDAT: Construction economic database (such as wage rates, productivity rates, number of available construction workers)
4. PLNMTX: Planning matrix (a description of how and where to obtain permits, licenses, etc.)
5. CONNEW: Construction news briefs regarding country of interest

General Construction Industry Characteristics

6. DOLLPRJ: Total dollar volume of ongoing projects in a particular country
7. PERPRJ: Percentage of ongoing projects by category (such as building, heavy, industrial, and residential)
8. NUSCON: Names and specialization of non-U.S. construction companies and country represented operating in the country of interest
9. USCON: Names and specialization of U.S. construction companies operating in the country of interest
10. SIZFRM: Number and size of indigenous engineering and construction industry firms according to company type (such as architecture, engineering, construction, and consultants)
11. CONRISK: Identification of construction risks in the country (such as weather, harsh contract language, facilitating payments, and superstitions)
12. STBLTYC: Stability of foreign country (e.g., currency, government, and legal system)
13. ACCCOM: Perceived acceptance of your company in host country
14. TRANINFO: Transportation logistics information
15. CONPRS: Type of construction process procedures and methods used to build projects in foreign country

Construction Legal Environment

- 16. LAWREQ: Type of laws and requirements (e.g., safety and environmental)
- 17. LEGFRM: Names of prominent legal firms in foreign country
- 18. FINAGEN: Names of agencies that will consider financing construction projects
- 19. IMPRTRT: Type of import restrictions on materials, equipment, and labor
- 20. BIDPRS: Type of bidding process to obtain work
- 21. PREQREQ: Prequalification requirements for outside firms (e.g., experience, safety records, annual contract volume, and size of company)
- 22. CNTSTR: Type of contracting strategies used in foreign country
- 23. CLTINFO: Client information (e.g., reputation and ability to pay)

Construction Workforce Characteristics

- 24. SKLUNN: Percentage and number of the total foreign country workforce broken down by skilled vs. unskilled and union vs. nonunion workers
- 25. WGERTS: Craft worker wage rates
- 26. PRTYRTS: Craft worker productivity rates
- 27. BNFTPLN: Types of benefit plans for workers
- 28. CTRNPRG: Availability of construction training programs provided for construction workers
- 29. PROFCON: Availability of professionals related to construction in foreign country (e.g., architects and construction consulting engineers)
- 30. SLRYPROF: Salary of construction professionals in a foreign country
- 31. CHTCSUBS: Characteristics of subcontractors in country of interest
- 32. ASSOCUN: Number of associations and unions (e.g., engineer, designer, contractor)
- 33. CHTLBRU: Characteristics of labor unions (e.g., company-wide basis, craft basis, industry-wide basis)
- 34. SERRNRD: Description of services rendered by associations and unions as well their relation with their **government**

Construction Material and Equipment Characteristics

- 35. CSTMAT: Availability and cost of construction materials (e.g., cement, bricks)
- 36. CONMATF: Availability of construction material facilities (e.g., ready-mix concrete plants and building supply outlets)
- 37. CSTHVYEQ: Availability and cost of heavy construction equipment (e.g., bulldozers, end loaders, cranes)
- 38. CSTLHTEQ: Availability and cost of light construction equipment (e.g., scaffolds, hammers, shovels)
- 39. QTYEQMAT: Quality of equipment and materials used in foreign country

Construction Technology Characteristics

- 40. CPTRUSE: Characteristics of computer usage in construction industry (e.g., accounting, design, cost estimating, cost control, planning, and scheduling)
- 41. RSRCHDLP: Research and development invested in construction carried out by government, private institutions, or both
- 42. OVRINDEX: Overall index that gauges the level of development or sophistication of construction technology used in a country by local construction companies

One variable was used to measure the interest in using this information if it were gathered in a structured format on a database.

Nine variables were used to measure the preference of information dissemination:

Electronic Type

- 1. ONLINECO: On-line computer access
- 2. AUDIOTPE: Audio tapes with up-to-date reports/briefs
- 3. COMAGMD: Computer magnetic media (diskettes, CD ROM, reels, etc.)

Technical Support

- 4. TLPHNAST: Telephone assistance operators to direct your call or answer questions
- 5. FACEMTX: Face-to-face meetings with experts

Hard Copies Of Marketing Information/Published Reports

- 6. FACSMLE: Facsimile
- 7. TELEX: Telex
- 8. MAIL: Mail (registered and nonregistered)
- 9. CURRIER: Courier/overnight courier

Three variables were used to measure the cost and format of the information being delivered. These were 1) payment for a yearly subscription (all information available in any desired format at anytime during the membership period), 2) a standardized hard-copy quarterly report, and, 3) a customized report delivering the most current data on a country of interest.

Three variables were used to measure the style of information delivery. These were 1) on-line computer access, 2) computer magnetic media (such as CD ROM and floppy diskettes), and, 3) hard copies.

APPENDIX C
INFORMATION SOURCES

CANADA

1. Federal Business Development Bank
Address: Tour de la Bourse, Place Victoria, CP Montreal, PQ H4Z 1L4
Telephone: (514) 496-7966
Description: Development bank.
2. The Canadian Chamber of Commerce
Address: 55 Metcalfe St., Suite 1160, Ottawa, ON K1P 6N4
Telephone: (613) 238-4000
Telex: 053-3360
Fax: (613) 238-7643
Description: Consists of 500 community chambers of commerce and boards of trade, 80 national trade associations, and 4000 business corporations, affiliated with all provincial chambers of commerce and with International Chamber and other bilateral organizations.
3. The Canadian Manufacturers' Association
Address: One Yonge St., Suite 1400, Toronto, ON M5E 1J9
Telephone: (416) 363-7261
Telex: 065-24693
Fax: (416) 363-3779
4. Canadian Concrete Masonry Producers' Association
Address: 1013 Wilson Ave., Suite 101, Downsview, ON M3K 1G1
Telephone: (416) 635-7179
Fax: (416) 630-1916
5. Canadian Construction Association
Address: 85 Albert St., 10th Floor, Ottawa, ON K1P 6A4
Telephone: (613) 236-9455
Fax: (613) 236-9526
6. Canadian Institute of Steel Construction
Address: 201 Consumers Rd., Suite 300, Willowdale, ON M2J 4G8
Telephone: (416) 491-4552
Telex: 069-86547
7. Canadian Paint and Coatings Association
Address: 9900 Blvd. Cavendish, Bureau 103, St-Laurent, PQ H4M 2V2
Telephone: (514) 745-2611
Fax: (514) 745-2031

8. Canadian Prestressed Concrete Institute
Address: 196 Bronson Ave., Suite 100, Ottawa, ON K1R 6114
Telephone: (613) 232-2619
Fax: (613) 567-3064
9. Ontario Painting Contractors Association
Address: 211 Consumers Rd., Suite 305, Willowdale, ON M2J 4G8
Telephone: (416) 498-1897
Fax: (416) 498-6757

CHILE

1. Banco del Estado de Chile
Address: Avda B. O'Higgins 1111, Casilla 240-V, Correo 21, Santiago
Telephone: 562/ 670-7000
Telex: 340359
Fax: 562/698-3299
Description: State bank.
2. Banco Internacional
Address: Moneda 818, Santiago
Telephone: 562/ 698-1722
Telex: 331066
Fax: 562/33-9134
Description: National bank.
3. Association de Bancos e Instituciones Financieras de Chile AG
Address: Agustinas 1476, 10°, Santiago
Telephone: 562/ 671-7149
Fax: 562/ 698-8945
Description: Banking association.
4. Cia de Seguros de Vida La Construccion, SA
Address: Marchant Pereira 10, 19-20°, Providencia, Santiago
Telephone: 562/ 233-1363
Telex: 725881
Fax: 562/231-0966
Description: Insurance company; principal company.
5. American Reinsurance Company (Chile), SA
Address: Huerfanos 1189 5° Santiago
Telephone: 562/ 695-4484
Telex: 242155
Fax: 562/ 672-3169
Description: Reinsurance company.

6. Asociación de Aseguradores de Chile
Address: Moneda 920, Of. 1002, Casilla 2630, Santiago
Telephone: 562/ 696-7431
Fax: 562/ 698-4820
Description: Insurance association.
7. Camara de Comercio de Santiago de Chile, AG
Address: Santa Lucia 302, 3°, Casilla 1297, Santiago
Telephone: 562/ 632-1232
Telex: 240868
Fax: 562/632-1232
Description: Trade and industry; Chamber of Commerce.
8. PROCHILE (Dirección General de Relaciones Económicas Internacionales)
Address: Avada B. O'Higgins 1315, 2°, Casilla 14087, Coreo 21, Santiago
Telephone: 562/ 696-0043
Telex: 240836
Fax: 562/ 696-0639
Description: Bureau of international economic affairs.
9. Camas Chilena de la Construcción
Address: Marchant Pereira 10, 3°, Providencia, Casilla Clasificador 679, Santiago
Telephone: 562/ 233-1131
Fax: 562/ 232-7600
Description: Employers' organization.

KUWAIT

1. *Arab Business Report*
Address: POB 6000, Safat, Kuwait City
Telex: 3 511
2. *AI-Igtisadi al-Kuwait*
Address: POB 775, 13008 Safat, Kuwait City
Telephone: 965/2433854
Telex: 22198
Fax: 965/2404110
Description: A monthly report on Arabic commerce, trade, and economics published by the Kuwait Chamber of Commerce and Industry.
3. *Kuwait al-Youm*
Address: POB 193, 13002 Safat, Kuwait City
Telephone: 965/2415300
Telex: 46151
Fax: 965/2421926
Description: A weekly report about statistics, Amiri decrees, laws, and government announcements.

4. Central Bank of Kuwait
Address: POB 526, 13006 Safat, Abdullah assalem St., Kuwait City
Telephone: 965/2449200
Telex: 22101
Fax: 965/2464887
Description: Central bank.
5. Kuwait Chamber of Commerce and Industry
Address: POB 775, 13008 Safat, Chamber's Bldg., Ali as-Salem St., Kuwait City
Telephone: 965/2433854
Telex: 22198
Fax: 965/2433858
6. National Industries Co SAK
Address: POB 417, 13005 Safat, Kuwait City
Telephone: 965/4849466
Telex: 22165
Description: A development organization that has controlling interest in various construction enterprises.

LITHUANIA

1. Ministry of the Economy
Address: Gedimino 38/2, Vilnius 2600
Telephone: (3702) 622-416
Fax: (3702) 625-602
2. Ministry of Industry and Trade
Address: Tumo-Vaizganto 8a/2, Vilnius 2739
Telephone: (3702) 628-830
Telex: 261262
Fax: (3702) 227-177
3. United States Embassy in Lithuania
Address: Akmenu 6, Vilnius 2600
Telephone: (3702) 223-031
Fax: (3702) 222-779
Ambassador: Darryl N. Johnson
4. *Lietuvos Komersantas*
Address: Algirdo 9a, Vilnius 2009
Telephone: (3702) 652-387
Fax: (3702) 267-540
Description: A periodical for Lithuanian businessmen.

5. Lithuanian Publishers' Association
Address: K. Sirvydo 6, Vilnius 2600
Telephone: (3702) 628-945
Fax: (3702) 619-696
6. Bank of Lithuania
Address: Totoriu 4, Vilnius 2629
Telephone: (3702) 224-008
Telex: 261090
Fax: (3702) 221-501
Description: State bank.
7. State Commercial Bank of Lithuania
Address: Jogailos 14, Vilnius 2631
Telephone: (3702) 226-333
Fax: (3702) 227-571
Description: State bank.
8. Association of Chambers of Commerce and Industry
Address: Kudirkos 18, Vilnius 2600
Telephone: (3702) 222-630
Telex: 261137
Fax: (3702) 222-621
9. Vilnius Regional Chamber of Commerce and Industry
Address: Algirdo 31, Vilnius 2600
Telephone: (3702) 661-550
Telex: 261114
Fax: (3702) 661-542
10. Association of Lithuanian Businessmen
Address: Jaksto 9, Vilnius 2600
Telephone: (3702) 614-963
Fax: (3702) 624-872
Description: Industrial association.
11. Lithuanian Manufacturers' Association
Address: Saltoniskiu 19, Vilnius 2600
Telephone: (3702) 751-278
Telex: 261257
Fax: (3702) 353-320
Description: Industrial association.
12. Union of Lithuanian Businessmen
Address: Mickeviciaus 18, Kaunas 3000
Telephone: (3702) 202-942
Fax: (3702) 221-413
Description: Industrial association.

13. Lithuanian Confederation of Free Trade Unions

Address: Basanaviciaus 29a, Vilnius 2600
Telephone: (3702) 614-888
Fax: (3702) 226-106
Description: Trade union.

14. Lithuanian Union of Trade Unions

Address: Jaksto 9, Vilnius 2001
Telephone: (3702) 628-857
Fax: (3702) 619-078
Description: Trade union.

15. Lithuanian Workers' Union

Address: Mykolaicio-Putino 5, Vilnius 2009
Telephone: (3702) 621-743
Fax: (3702) 615-253
Description: Trade union.

MEXICO

1. *Manual de costos y precios en la construccion*

Address: Balderas 95, C.P. 06040, Mexico, D.F.
Telephone: 525/521-5098
Fax: 525/512-2903
Description: A construction cost analysis manual.

2. *Comercio*

Address: Rio Tiber 87, 06500 Mexico, D.F.
Telephone: 525/514-0873
Fax: 525/514-1008
Description: A monthly business review.

3. Banco de Mexico (BAN)UCO)

Address: Avda 5 de Mayo 2, Apdo 98 bis 06059 Mexico, D.F.
Telephone: 525/237-2000
Telex: 1773050
Fax: 525/510-9337
Description: Mexico central bank; controls monetary policy, including bank reserve requirements and interest rates. The bank is also responsible for exchange rates.

4. National Financiera, SNC (NAFIN)

Address: Insurgentes Sur 1971, Torre Sur, 10^o, Col. Guadalupe Inn, 01020 Mexico, D.F.
Telephone: 525/548-3306
Telex: 1772659
Fax: 525/664-0742
Description: A government industrial development bank that provides loans, guarantees and investments; contracts and handles development loans from abroad.

5. Asociacion Mexicana de Instituciones de Seguros, AC
Address: Ejercito Nacional 904, 6°, Mexico, D.F.
Description: Insurance association; all insurance companies operating in Mexico are members.
6. Camara Nacional de la Industria y de la Transformacion (CANACINTRA)
Address: Calle Vallarta 21, 3°, Mexico, D.F.
Telephone: 525/566-9333
Description: Branch of Mexico's Chamber of Commerce that represents the majority of smaller manufacturing businesses.
7. Asociacion Nacional de Importadores y Exportadores de la Republica Mexicana(ANIERM)
Address: Monterrey 130, Col. Roma-Cuauhtemoc, 06700 Mexico, D.F.
Telephone: 525/564-8618
Telex: 1772443
Fax: 525/584-5317
Description: The national association of importers and exporters.
8. Commision Coordinadora de la Industria Siderurgica
Address: Mexico, D.F.
Description: Coordinating commission for the development of the iron and steel industry.
9. Fondo de operatinn y Financiamiento Bancario a la Vivienda
Address: Ejercito Nacional 180, 7°, 8° y 11°, Col. Anzures, 11590 Mexico, D.F.
Telephone: 525/255-4199
Fax: 525/203-7304
Description: A development fund that promotes the construction of low-cost housing through savings and credit schemes.
10. Frente Unida Sindical por la Defensa de los Trabajadores y la Constituti6n
Description: United Union Front in Defense of the Workers and the Constitution.

THE PHILIPPINES

1. Ateneo de Manila University Press
Address: P.O. Box 154, 1099 Metro Manila
Telephone: 63/ (02) 9244495
Fax: 63/(02)9244690
Description: Press that publishes literary texts, textbooks, humanities, social sciences, and reference books on the Philippines.
2. The Lawyers' Co-Operative Publishing Co., Inc.
Address: 1071 R. del Pan St., Makati, 1206 Metro Manila
Telephone: 63/ (02) 596463
Fax: 63/ (02) 5220638
Description: Publishes law, medical, and educational texts.

3. Central Bank of the Philippines
 Address: A. Mabini St., cnr Vito Cruz St. 1004 Metro Manila
 Telephone: 63/ (02) 507051
 Telex: 27550
 Fax: 63/(02)5215224
4. Philippine Chamber of Commerce and Industry
 Address: PICC Secretariat Bldg., Ground Floor, CCp Complex, Roxas Blvd., Makati, Metro Manila 2801
 Telephone: 63/ (02) 8320309
 Telex: 62042
5. National Steel Corporation
 Address: 377 Sen. Gil J. Puyat Ave. Ext., Makati, Metro Manila
 Telephone: 63/(02)8162036
 Telex: 22524
 Fax: 63/(02)8152036
 Description: State steel manufacturing trading company.
6. Philippine Cement Corporation (Philcemcor)
 Address: Cocho-Gonzales Bldg., Makati, Metro Manila
 Description: State cement manufacturing trading company.
7. Philippine International Trading Corporation (PITC)
 Address: Philippines Int'l Centre, Tordesillas St., Salcedo Village, Makati, Metro Manila 3116
 Telephone: 63/(02)8189801
 Telex: 63745
 Description: Stock corporation to conduct international marketing of general merchandise, industrial and construction goods, raw materials, semi-finished and finished goods, and bulk trade of agri-based products.
8. Wenagro Industrial Corporation
 Address: 92 Mindanao Ave., Quezon City, Metro Manila
 Description: Producer and exporter of Philippine products.
9. Associated Labor Unions (ALU-TUCP)
 Address: PLEA Compound, Elliptical Rd., Diliman, 1101 Quezon City, Metro Manila
 Telephone: 63/ (02) 9222575
 Telex: 2362
 Fax: 63/(02)9223199
 Description: Trade union federations.

THE RUSSIAN FEDERATION

1. *Ekonomika i Zhizn* (Economics and Life)
 Address: 101462 Moscow, Bumazhny proyezd 14
 Telephone: 7/(095) 250-57-93
 Fax: 7/(095) 212-30-93
 Description: A weekly report on news and information about the Russian economy and business.

2. *Finansy* (Finances)
Address: 103050 Moscow, ul. Tverskaya 22B
Telephone: 7/ (095) 299-43-33
Fax: 7/(095) 299-93-06
Description: A monthly journal that discusses theory and information on finances; compiling and execution of the state budget, insurance, lending, taxation, etc.
3. *Mezhdunarodnye Otnosheniya* (International Relations)
Address: 107078 Moscow, Sadovaya-Spasskaya ul. 20
Telephone: 7/ (095) 207-67-93
Fax: 7/(095) 200-22-04
Description: Organization that publishes reading material on foreign trade, international law, international questions and foreign language textbooks and dictionaries. It also has translations for the U.N. and other international organizations.
4. *Stroyizdat* (Construction Literature)
Address: 101442 Moscow, Kalyayevskaya ul. 23A
Telephone: 7/ (095) 251-69-67
Description: Literature on building, architecture, environmental protection, fire protection, and building materials.
5. *Vneshtorgizdat* (The Foreign Trade Economic Printing and Publishing Association)
Address: 125047 Moscow, ul. Fadeyev 1
Telephone: 7/(095) 250-51-62
Telex: 411238
Fax: 7/(095) 253-97-94
Description: Publishes foreign technical material and information on export goods, import and export firms, joint ventures; available in several foreign languages.
6. *Rosvneshtorgbank* (Bank for Foreign Trade of the Russian Federation)
Address: 103031 Moscow, Kuzaetsky most 16
Telephone: 7/(095) 925-52-31
Telex: 414726
Fax: 7/(095)973-20-96
Description: Banking organization.
7. *Ingosstrakh Insurance Co. Ltd.*
Address: 113 805 Moscow, Pyatnitskaya ul. 12
Telephone: 7/(095) 231-16-77
Telex: 411144
Fax: 7/(095) 230-25-18
Description: An insurance organization that undertakes all kinds of insurance and reinsurance.
8. *Chamber of Commerce and Industry of the Russian Federation*
Address: 103684 Moscow, ul. Ilyinka 6
Telephone: 7/ (095) 923-43-23
Telex: 411126
Fax: 7/ (095) 230-24-55

9. Lenfamtorg

Address: 196084 St. Petersburg, Moskovsky pr. 98
Telephone: 7/ (812) 296-11-65
Telex: 121518
Fax: 7/ (812) 292-56-33
Description: An organization that exports petrochemicals, timber, construction materials, and consumer goods; imports medicine, consumer goods, industrial equipment, etc.

10. Mashinoeksport

Address: 117330 Moscow, ul. Mosfilmovskaya 35
Telephone: 7/ (095) 143-84-68
Telex: 411207
Fax: 7/ (095) 938-21-15
Description: An organization that exports mining and construction equipment, equipment and tools for geological and geophysical prospecting, equipment for the steel industry, the non-ferrous metals industry, and pipeline construction.

11. Stroydormasheksport

Address: 121019 Moscow, Suvorovsky bul. 7
Telephone: 7/ (095) 291-49-31
Telex: 411063
Fax: 7/ (095) 202-90-56
Description: An organization that exports and imports construction and road-building machinery.

12. Tekhnoeksport

Address: 121200 Moscow, Ovchinnikovskaya nab. 18/1
Telephone: 7/ (095) 220-17-82
Telex: 411338
Description: An organization that assists in petroleum production, construction of industrial plants, pharmaceutical plants, hospitals, and schools.

13. Tekhnostroleksport

Address: 113324 Moscow, Ovchinnikovskaya nab. 18/1
Telephone: 7/ (095) 220-14-48
Telex: 411474
Description: An organization that assists the construction of plants producing building materials.

14. Tekhvneshtans

Address: 113324 Moscow, Ovchinnikovskaya nab. 18/1
Telephone: 7/ (095) 220-19-53
Telex: 411110
Description: A company that organizes transportation of foreign trade freight turnover connected with the construction of industrial projects overseas and in Russia.

15. Vneshstroyimport

Address: 103009 Moscow, Tverskoy Bul. 6
Telephone: 7/ (095) 200-32-04
Telex: 411434
Fax: 7/ (095) 973-21-48
Description: An organization that arranges joint construction projects with foreign firms.

16. Construction and Building Materials Industry Workers

Address: 117119 Moscow, Leninsky pr. 42
Telephone: 7/ (095) 938-76-62
Description: Workers' union.

SAUDI ARABIA

1. United States Embassy in Saudi Arabia

Address: P.O. Box 94344, Riyadh 11413
Telephone: 966/ (1) 488-3800
Telex: 406866
Fax: 966/ (1) 488-3278

2. Saudi Arabian Monetary Agency (SAMA)

Address: P.O. Box 2992, Riyadh 11169
Telephone: 966/ (1) 463-3000
Telex: 404400

Description: Stabilization of currency, administration of monetary reserves, regulation of banking, and issuance of notes and coins.

3. Council of Saudi Arabian Chambers of Commerce and Industry

Address: P.O. Box 16683, Riyadh 11474
Telephone: 966/(1) 405-3200
Telex: 405-3200
Fax: 966/(1) **402-4747**

TAIWAN

1. Far East Book Co.

Address: Chungking South Rd., 10th Floor, Sec. 1, Taipei
Telephone: 886/ (02) 3118740
Fax: 886/ (02) 3114184
Description: Publishes literature on law, education, etc.

2. General Chamber of Commerce of the Republic of China

Address: 390 Fu Hsing South Rd., 6th Floor, Sec. 1, Taipei
Telephone: 886/ (02) 7012679
Telex: 11396
Fax: 886/ (02) 7542107

3. Chinese Federation of Labour
Address: 201-18 Tun Hua North Rd., 11th Floor, Taipei
Telephone: 886/ (02) 7135111
Description: Union that represents 2,187,074 workers.

OTHER SOURCES

1. *The World is Your Market (An Export Guide for Small Business)*
Address: Business America, U.S. Dept. of Commerce, 14th and Constitution, NW, Rm. 4805,
Washington, DC 20230
Description: Gives a synopsis of export assistance and resources.
2. *European Construction Costs Handbook*
Address: 100 Construction Plaza, P.O. Box 800, Kingston, MA 02364-0800
Telephone: (617) 585-7880
Description: Provides construction cost data on European countries.
3. Newport International Projects Company, Inc.
Address: 3355 Via Lido, Suite 230, Newport Beach, CA 92663
Telephone: (714) 675-6300
Fax: (714) 675-4865
Description: Assists firms in international business.

APPENDIX D
COVER LETTER AND SURVEY

Cover Letter

<<DATA construction consulting firms>>

August 23, 1993

<<title>> «flrsname>> «lasname>>

«company»

<<address>>

<<city>>, <<state>> <<zip>>

Dear <<title>> «lastname>>:

I am writing to you regarding a project which aims to increase business opportunities for U.S. design, consulting and construction firms in international markets. The Civil and Construction Engineering Department at Iowa State University has been funded by the Midwest Agribusiness Trade Research Information Center (MATRIC) to help assess the viability of an information system that will provide construction industry decision makers with pertinent information about working in a foreign country such as: business opportunities, construction work force characteristics, material and equipment availability, construction worker wage rates, productivity levels, and special laws and other government requirements pertaining to the country of interest. Information will be collected by a contact person residing in the country of interest and will be updated continually.

A survey has been developed to identify your firm's key informational needs prior to and during construction on an international project. The survey will help us identify useful information to be included in this database. The objectives are to 1) provide more work for construction firms abroad, 2) help increase the presence of U.S. firms in international markets, 3) help increase technology transfer to other countries, and 4) encourage involvement of U.S. firms in a variety of construction projects.

Please distribute the survey to three people who represent the following job functions within your organization [or to the most appropriate person(s) in your firm]: 1) the president or vice president of construction, 2) a home office project manager who oversees many construction projects, and 3) an on-site construction manager. This will provide us with the data to determine informational needs from these different perspectives. There are no correct or incorrect answers, only your much needed input.

Your input will be very important to the success of this project, even if your firm has not participated and is not planning on participating in the international construction industry.

Please send us the completed surveys as soon as possible. If requested, we will send you a copy of the results at a later date.

If you have any questions, please contact me at (515) 292-0250. Thank you for your assistance.

Sincerely,
Edward J. Jaselskis
Assistant Professor
Civil and Construction Engineering

International Construction Information Survey

Purpose: The purpose of this survey is to identify informational needs of construction industry companies interested in working abroad. Our research team would like to know what information is important to you as you identify potential international markets, bid on projects, and implement them in the field. There are ten short sections covered in this survey: (1) Respondent Information, (2) General Information Requirements, (3) General Construction Industry Characteristics, (4) Construction Legal Environment, (5) Construction Workforce Characteristics, (6) Construction Material and Equipment Characteristics, (7) Construction Technology Characteristics, (8) Interest in Using Information Service, (9) Information Dissemination, and (10) Payment Characteristics. We assume you already would like to know about general country information related to government, economy, geography, and demographics and are only concentrating on construction-related informational needs. If you have any questions regarding this survey, feel free to contact Dr. Edward J. Jaselskis at (515) 294-0250.

1. RESPONDENT INFORMATION:

- 1.1 Name:
- 1.2 Position:
- 1.3 Which level of management describes your position in your organization? (please check one) President Vice-President of Construction Home Office Project Manager
Overseeing Several Construction Projects On-site Construction Project Manager —
Other . *If you check 'other', please explain:*
- 1.4 Company:
- 1.5 Address:
- 1.6 Phone:
- 1.7 Fax:
- 1.8 Specialization of your construction company:
(e.g., building, heavy-civil, industrial, or residential, or a combination)
- 1.9 Approximate annual company revenues: (\$)
- 1.10 Would you consider your company to be an international construction firm? YES or NO
- 1.11 Have you personally worked on an international construction project? Yes __ NO — If so,
how many years have you worked abroad? List the number of projects:
List the countries:
- 1.12 At present, in which country (ies) are you or your firm interested in doing construction work? Please list:

For sections 2 through 7 please indicate the importance of each of the following informational items related to the country in which you are interested in working, using the following scale: 1=Not Necessary, 2=Somewhat Helpful, 3=Highly Recommended but not Critical, and 4=Critical Information. *Note: Please include items not specifically addressed throughout this survey at the end, in the space provided.*

2. GENERAL INFORMATION REQUIREMENTS:

- 2.1 A listing of international bidding opportunities 1 2 3 4
- 2.2 Contact information (international company contacts and profiles) (e.g. material suppliers, design firms, and legal and accounting firms) 1 2 3 4
- 2.3 Construction economic database (e.g. wage-rates, productivity rates, and number of available construction workers) 1 2 3 4
- 2.4 Planning matrix (a description of how and where to obtain permits, licenses, etc.) 1 2 3 4
- 2.5 Construction news briefs regarding country of interest 1 2 3 4

3. GENERAL CONSTRUCTION INDUSTRY CHARACTERISTICS:

- 3.1 Total dollar volume of ongoing projects in a particular country 1 2 3 4
- 3.2 Percentage of ongoing construction projects by category (e.g., building, heavy, industrial, and residential) 1 2 3 4
- 3.3 Names and specialization of non U.S. construction companies and country represented operating in the country of interest 1 2 3 4
- 3.4 Names and specialization of U.S. construction companies operating in the country of interest 1 2 3 4
- 3.5 Number and size of indigenous engineering and construction industry firms according to company type (e.g., architecture, engineering, construction, and consultants) 1 2 3 4
- 3.6 Identification of construction risks in the country (e.g., weather, harsh contract language, facilitating payments, superstitions, etc.) 1 2 3 4
- 3.7 Stability of foreign country's government 1 2 3 4
- 3.8 Transportation logistics information 1 2 3 4
- 3.9 Type of construction process procedures and methods used to build projects in foreign country 1 2 3 4
- 3.10 Type of construction process procedures and methods used to build projects in foreign country 1 2 3 4

4. CONSTRUCTION LEGAL ENVIRONMENT:

- 4.1 Names of agencies that will consider financing construction projects 1 2 3 4
- 4.2 Names of agencies that will consider financing construction projects 1 2 3 4
- 4.3 Names of agencies that will consider financing construction projects 1 2 3 4

1=Not Necessary, 2=Somewhat Helpful, 3=Highly Recommended but not Critical, and 4=Critical Information.

4.4	Type of import restrictions on materials, equipment, and labor	1	2	3	4
4.5	Type of bidding process to obtain work -	1	2	3	4
4.6	Prequalification requirements for outside firms (e.g., experience, safety records, annual contract volume, and size of company)	1	2	3	4
4.7	Type of contracting strategies used in foreign country	1	2	3	4
4.8	Client information (e.g., reputation and ability to pay)	1	2	3	4
5. CONSTRUCTION WORKFORCE CHARACTERISTICS					
5.1	Percentage and number of the total foreign country work force broken down by skilled vs unskilled and union vs nonunion workers	1	2	3	4
5.2	Craft worker wage rates	1	2	3	4
5.3	Craft worker productivity rates	1	2	3	4
5.4	Types of benefit plans for workers	1	2	3	4
5.5	Availability of construction training programs provided for construction workers	1	2	3	4
5.6	Availability of professionals related to construction in foreign country (e.g., architects and construction consulting engineers)	1	2	3	4
5.7	Salary of construction professionals in foreign country	1	2	3	4
5.8	Characteristics of subcontractors that are in country of interest	1	2	3	4
5.9	Number of associations and unions (e.g., engineer, designer, and contractor associations)	1	2	3	4
5.10	Characteristics of labor unions (e.g., company-wide basis, craft basis, industry-wide basis, etc.)	1	2	3	4
5.11	Description of services rendered by associations and unions as well as their relation with their government	1	2	3	4
6. CONSTRUCTION MATERIAL & EQUIPMENT CHARACTERISTICS					
6.1	Availability and cost of construction materials (e.g., cement, bricks, etc.)	1	2	3	4
6.2	Availability of construction material facilities (e.g., ready mix concrete plants and building supply outlets)	1	2	3	4
6.3	Availability and cost of heavy construction equipment (e.g., bulldozers, end loaders, and cranes)	1	2	3	4
6.4	Availability and cost of light construction equipment (e.g., scaffolds, hammers, and shovels)	1	2	3	4
6.5	Quality of equipment and materials used in foreign country	1	2	3	4

1=No Value (would never use), 2=Helpful (a feature you would simply like to have as an option `just in case'), 3=Valuable (a feature you would use occasionally), and 4=Critically Important (a feature you would use frequently).

9.3 Hard Copies of Marketing Information/Published Reports

9.3.1 Facsimile	1	2	3	4
9.3.2 Telex	1	2	3	4
9.3.3 Mail (registered and nonregistered)	1	2	3	4
9.3.4 Courier/overnight courier	1	2	3	4

10. PAYMENT CHARACTERISTICS:

10.1 How much would this information be worth to you/your firm? Please specify the amount you would be willing to pay for the following services.

10.1.1. For a yearly subscription (all information available in any desired format at any time during the membership period). (\$)

10.1.2. For a standardized hard copy quarterly report, detailing current information important to the construction industry in the country of your choice (\$)

10.1.3. For a customized report delivering the most current data regarding the issues of concern to you in a particular country (\$)

10.2 In general, which medium or style of information delivery do you personally prefer most working with in a professional setting? (Please check one.)

On-line computer access

Computer magnetic media (e.g., CD ROM and floppy diskettes)

Hard copies

Please use the space below and additional paper as necessary to provide your comments, opinions, or ideas for information types of interest that have not been addressed in the survey.

Thank you for your participation. We will send you the results of this survey if you are interested. Please send survey in postage-paid, pre-addressed envelope to the following:

Dr. Edward J. Jaselskis
 450 Town Engineering Building
 Department of Civil and Construction Engineering
 Iowa State University
 Ames, IA 50011
 Fax: (515) 294-8216

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