Project Performance Best Practices - Applicability of U.S. Standards in the Caribbean Basin Countries

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Abstract
This paper examines the applicability of US-based best practices to improve the performance of construction projects in the Caribbean Basin environment. It attempts to identify the obstacles to seamless integration, the primary sources of risk and uncertainty, and points to the primary adjustments that developed countries need to make to adapt to local conditions in developing countries. The study methodology involved a World Wide Web-based survey of the building industry in a number of countries in the Caribbean Basin to ascertain the applicability of US-based best practices. The study recommendations can be used proactively at the inception of each project to improve the level of team integration. This study also demonstrated the feasibility of using a web-based survey instrument. Its continued use will yield more data for future statistical analysis.

Keywords
Globalization, Cultural Factors, Performance Criteria, Project Risk Factors

1. Introduction

Globalization has increasingly brought together construction partners to work on international projects. Whereas many industries have adapted to a changing world, the construction industry continues a tradition of being slow to change, citing factors such as the difficulty in standardizing projects due to the variations in design, complexity, site configurations, project delivery methods, etc., all compounded by the vagaries of weather conditions. Projects that involve a multi-national work force add the dynamic of disparate cultural factors, traditions, and dissimilar business practices, especially in those situations where the leadership of a project directs a work force in a foreign country. Most of the projects won by U.S. companies in foreign countries fall under three headings (Tasar, 2000):

a) International tenders, primarily involving projects with partial or agency funding,
b) Local business development in a host country, for projects that often need foreign expertise
Partnerships with home country clients

Historically, funding organizations such as USAID have tended to expect the host country to approximate the former’s standards of performance. American companies, for example, have a particular work ethic, characterized by a high degree of urgency and a preoccupation with timeliness. In developing countries, while there is a high degree of professionalism, the prevailing standards often do not coincide with American expectations. If overlooked, cultural and situational differences can cause suboptimal project performance.

A pilot study was carried out with construction industry professionals in a number of countries in the Caribbean Basin environment to preliminarily identify the presence and impact of the above mentioned factors. The Caribbean Basin was considered to be appropriate for this study because of its proximity to the United States and the fact that it comprises several developing countries that benefit from international projects that involve U.S. participation.

2. Discussion of Related Factors

In order to design an appropriate survey instrument, several factors were considered in relation to the construction process, including performance criteria and risk factors. These factors are outlined below. Project delivery methods can significantly influence construction project success, depending on the owner’s priorities, such as time frame and cost adherence (Oglesby et al., 1989). Projects are also influenced by the reliability of information, especially in the case of invisible or unknown site conditions.

**Project Delivery Methods:** In addition to determining what type of services are required for a project, it is important to know how these services are being contracted or "delivered" to the owner. Each delivery method uniquely impacts the cost, schedule, risk, and quality of a project.

*Traditional Design-Bid-Build:* This delivery method is still used for most public and private commercial construction where an owner contracts with an architect or engineer for design and bidding assistance and then contracts with the successful bidder to build the project in accordance with the construction documents.

*Design-Build:* The design builder takes responsibility for both the design and construction of a project. The owner benefits by having a single point of responsibility and gains time savings, but lacks a direct advisory relationship with the architect.

*Fast-Track:* Fast tracking is not really a form of project delivery, but rather, a way to reduce the timeline of one of the traditional methods. Work is bid in overlapping phases so that the construction may start prior to having the design completed.

*Construction manager – fee based:* This delivery method adds a fourth team member--the construction manager--as an advisor to the owner. The added cost of a construction manager must be weighed against the benefits this consultant can bring to the project.

*Construction manager – at risk:* By combining the responsibilities of the construction manager and the contractor, the construction manager manages the project and guarantees a specific maximum cost.

**Performance Criteria:** Oglesby et al., (1989), Sanvido et al., (1992), Russell et al., (1996), Ashley, (1997) have all proposed project performance criteria. The most frequently occurring criteria from these sources were proposed for this study. The factors selected were time, budget, variations, quality, meeting specifications, satisfactory relationships between the parties to construction and absence of litigation.
**Timeliness/Dependability:** In construction, time is one of the most important factors required to have a successful process. This section examines the impact that third parties have on projects in the target region.

**Project risk:** The construction industry is one of the riskiest industries; several factors could affect profit margins, and contractors generally absorb most of those risk factors. Most project delivery contracts force contractors to guarantee a fixed price despite the existence of many uncertainties.

**Project cost (inflation factors):** Historically, inflation is driven by wars, poor harvests, political upheavals, or other unique events, but this scenario tends to occur far more frequently in developing countries. The survey requested information about inflation impacts on construction projects.

### 3. Survey Approach

The approach of a web-based questionnaire to solicit construction information from companies located in the countries of interest was selected for several reasons:

a) The Internet is an almost universally used communication and business tool.
b) The response time is reduced to days from weeks typical of postal service surveys.
c) The laborious effort of writing on and mailing surveys often produce few or late responses.
d) The mail system is not as reliable and efficient in developing countries as it is in the USA.
e) Very little funding was available for this project.

The survey instrument elicited responses on the factors of interest, using a seven-point Likert scale. The value one (1) was assigned to the lowest level of importance, and the value seven (7) to the highest. The following steps were taken.

1. The designed survey instrument was posted online at [www.eng.fiu.edu/cm/questionnaire.htm](http://www.eng.fiu.edu/cm/questionnaire.htm)
2. A search was conducted to identify Caribbean Basin companies through their web pages.
3. E-mails were sent to senior officials of the target companies requesting the required information.
4. The information was compiled and analyzed using Microsoft Excel spreadsheets.

#### Table 1: Tabulation of Responses

<table>
<thead>
<tr>
<th>Country</th>
<th>Companies Contacted</th>
<th>Responses Received</th>
<th>Response Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aruba</td>
<td>1</td>
<td></td>
<td>0.00%</td>
</tr>
<tr>
<td>Colombia</td>
<td>15</td>
<td>1</td>
<td>6.67%</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2</td>
<td></td>
<td>0.00%</td>
</tr>
<tr>
<td>Mexico</td>
<td>4</td>
<td>3</td>
<td>75.00%</td>
</tr>
<tr>
<td>Panama</td>
<td>4</td>
<td></td>
<td>0.00%</td>
</tr>
<tr>
<td>Trinidad</td>
<td>34</td>
<td>1</td>
<td>2.94%</td>
</tr>
<tr>
<td>Venezuela</td>
<td>84</td>
<td>8</td>
<td>9.52%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>144</strong></td>
<td><strong>13</strong></td>
<td><strong>9.03%</strong></td>
</tr>
</tbody>
</table>

### 4. Data Analysis and Observations
**Project Delivery Methods:** Most respondents utilize the traditional design-bid-build method (43%), while (27%) are involved in design-build projects, and (22%) in fee-based CM projects. Projects that use the design-bid-build method are subject to longer time frames because of the sequential execution of design and construction activities. Quality is more difficult to obtain if low bid selection is used, because in many cases the lowest bidder is not the most responsible. Also claims and change orders from low bidders often increase the project cost and time.

The survey results indicate that respondents subcontract (50%) of their work. Productivity is usually higher in subcontracted works, because the training curve of the subcontracted employees is at the top. They have been doing the same job for a long period and therefore they are able to reach the standardization of their processes. Also (55%) of these companies said that they participated in projects that involved methods like joint ventures or associations. Projects of that type enhance productivity, therefore government and owners should promote them accordingly.

**Performance Criteria:** As indicated in Figure (1), all of the seven factors used as performance criteria were rated with similar levels of importance. The least important factor is the incidence of change orders; it is probable that they are anticipated as a consequence of using the preferred method of design-bid-build. The absence of litigation is the second lowest factor in the survey. Developing countries have a less litigious environment than does the USA, and disputes tend to be resolved by negotiation processes.

![Figure 1: Performance Criteria](image)

**Timeliness/Dependability:** Timeliness/dependability factors were all rated between (5) and (6) on a scale with (7) being most important. This response may indicate a greater level of tolerance with timeliness issues than would occur in the USA; workers in developing countries, for example, may often experience transportation problems. The respondents indicated relatively high scores for the involved factors; these scores were between (5.4) and (6) out of a possible (7) as the most important. Delays in payments by the owner and responses to requests for time-critical information were rated most critical.

**Risk Factor:** The most two important factors are errors in the design and construction process. This is not surprising because those are the most two common errors in an industry where every project is different and where every design is unique. The third most important factor is the owner’s timeliness in making payments. This contrasts with the developed countries where owners are more responsive, motivated by the contractors’ access to legal remedies. In developing countries the government is often the largest client; contractors may be reluctant to take legal action, and are more exposed to collection risks. Inclement weather is observed to be the lowest risk factor. Those countries have no significant climactic
changes from one season to the next; therefore construction productivity may be the same through the year.

![Risk Factors Chart]

Figure 2: Risk Factors

**Project Cost:** The category of Project Cost yielded significant information that reflected the challenges of the region. Respondents were asked to estimate the average percentage increase costs for several cost categories on a monthly basis. The following results support the fact that inflation is an important risk factor in Caribbean Basin countries; inflation values in those countries are higher than in developed countries; as a consequence credit and cost difficulties affect their construction industry.

*Financial cost:* While (60%) cited between (0) and (0.5%), one in five respondents indicated a monthly inflation of (2%) – (3%), one in ten mentioned (5%) and over. One in ten noted a range of (1%) – (2%).

*Labor and wage rates:* Eighteen percent of respondents indicated monthly inflation of (5%) and over, one in eleven noted (3%) – (5%), and a similar group noted (1%) – (2%).

*Material costs:* Forty six percent of respondents pointed to the relatively low rate of (0.5%) or less. On the other hand, three groups of eighteen percent each cited material cost escalations of (2%) – (3%), (3%) – (5%), and (5%) and over, respectively.

*Insurance costs:* Three groups of nine percent each noted insurance escalations of (1%) – (2%), (2%) – (3%), and (5%) and over, respectively.

**Site Management Responsibility:** Similar values were found for different persons involved in the construction process: Independent Manager – (27%), General Contractor – (33%), Architect or Engineer – (40%). It indicated that roles are not defined in industry, perhaps because of the lack of fixed construction methodologies.
International Involvement: A number of questions addressed the level of international involvement in construction projects in the Caribbean basin. None of the companies contacted said that their projects were US funded. Even when external governments or organizations invest in the Caribbean countries, in most cases local governments manage the resources. Some projects are US funded in those countries, for example the International Development Bank funds social programs in order to improve local conditions, but local governments manage disbursements.

Codes: Most of the companies contacted used US codes in the metric system for either internally or externally funded projects. Many of the local regulations were reportedly adapted from US codes; therefore, this factor was not a problem.

5. Conclusion

This project identified some of the problems encountered in some Caribbean Basin construction projects. In many cases industry behaviors were an adaptation to the external factors, which are more unstable than in developed countries, for example political, inflation and social threats continually affect the performance of the industry. In those countries planning is based on short periods of time, because of the rapid rate of change in external factors, which may have negative consequences.

The extent of these challenges was evidenced by the rates of inflation that were reported for financial costs, labor and wage rates, material costs, and insurance costs. This state of affairs may militate against the transfer of certain best practices from U.S. construction companies. For example, good supply chain management involves the avoidance of storing excessive amounts of inventory, i.e. construction materials and equipment. This practice works well when suppliers’ prices are relatively stable. However, the experience in many of the target countries is that the cost of holding excessive inventory is offset by the avoidance of price escalation due to currency fluctuations.

The study also pointed to a preference for negotiation, as opposed to litigation. Overall, valuable lessons were learned that will help company representatives from the U.S. or other developed countries to better understand the Caribbean Basin environment from a business point of view.

The web-based pilot survey approach used in this project was successful in obtaining responses across transnational boundaries in a short period of time at minimal cost, although the sample size did not lend itself to statistical analysis. A continuation of this study can be expected to yield more detailed information.

References


