Impact of Resources and Strategies on Construction Company Performance

Zeynep Isik1; David Arditi2; Irem Dikmen3; and M. Talat Birgonul4

Abstract: Globalized competition and customer needs forced construction companies to measure their performance beyond the financial measures such as profitability, turnover, etc. As qualitative determinants were added to measurement systems, their investigation and evaluation became a major area of research. In this study, the impact of “resources and capabilities,” “strategic decisions,” “project management competencies,” and “strength of relationships with other parties” on “company performance” was investigated. A questionnaire survey was administered to 73 Turkish contractors and the results of the survey were analyzed using structural equation modeling. The findings indicate that, as expected, resources and capabilities and strategic decisions have an important and direct impact on company performance, whereas project management competencies and strength of relationships with other parties impact company performance only indirectly, through their impact on companies’ resources and capabilities and strategic decisions.

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Introduction

A performance measurement system is used as an information system to deploy policy and strategy and to obtain feedback (Bititci et al. 1997). This is an important process that quantifies the efficiency and effectiveness of all actions in every business (Amaratunga et al. 2000). Therefore, performance measurement is an essential ingredient in achieving objectives (Evangelidis 1983).

Companies, primarily in manufacturing industries, started measuring their performance in order to predict the conditions in the business environment in which they compete and to set their future strategies (Neely 1999). The driving force for performance measurement gained momentum owing to the requirements of clients, investors, and other stakeholders (Robinson et al. 2005). The increased popularity of performance measurement pioneered also the investigation of qualitative measures in contrast to the traditional measures which were expressed in financial terms (Kaplan and Norton 1992). As a result, a new field of study emerged in which researchers started to search for different measurement parameters and assess their impact on performance. As the performance concept gained importance in manufacturing industries, companies in the construction industry were also forced to consider measuring its performance. Measuring the performance of construction companies became a fertile research area over the past few decades as the level of competition between companies increased (Kagioglou 2001; Bassionii et al. 2004).

The current construction management literature indicates that several models were developed to measure performance by using critical success factors, performance measures, and indicators. However, it also indicates that these studies are centered mostly in the manufacturing industries rather than construction and that the few studies conducted in the construction industry focus on the measurement of project performance rather than company performance.

The objective of this study was to investigate the impact of company resources and capabilities and of strategic decisions on construction company performance. It was proposed to measure these dimensions qualitatively, i.e., by seeking participants’ subjective opinions on a number of variables rather than by simply comparing financial indexes. It was hypothesized that a company’s resources and capabilities, strategic decisions, project management competencies, and the strength of the company’s relationships with other parties impact company performance. Whether these characteristics impact company performance directly or indirectly is to be assessed by structural equation modeling (SEM), a multivariate analysis technique that was used to explore the interdependencies between the parameters and the impact of these parameters on construction company performance. A questionnaire survey that measures the variables in question was administered to construction companies in Turkey. The study described in the following sections makes it a point to use subjective/qualitative data to assess the performance of a construction company.
Definition, Classification, and Interaction of the Variables

A company is a complex structure, consisting of different interrelated components that influence its performance (Tang and Ogunlana 2003). These components include the resources and the capabilities of the construction company, its project management competencies, the strength of its relationships with other parties, and the long-term and short-term strategies of the company.

Resources and Capabilities

A company’s resources and capabilities may be defined as its tangible and intangible assets. They include the company’s financial resources, technical competencies, leadership characteristics, experience and image in the industry, research and development capabilities, and innovation tendencies.

- **Financial resources** indicate a company’s strength in the market in terms of its capacity to carry out projects. Adequate financial resources ensure the company can get into risky situations that have a prospect of high returns. As a company’s financial strength increases, its credibility and reputation also increases among clients and suppliers (Warszawski 1996). Profitability and turnover can be used as indicators of financial strength but, generally, the financial strength of a company is measured by examining the ratio of its liabilities to equities. The majority of construction projects are funded by the owner who pays the contractor periodically, who in turn pays the subcontractors, the suppliers, and other parties of the project for services rendered. A portion of the periodic payments is normally held by the owner as retainage. The success of this routine depends on the financial strength of the owner as well as of the contractor (Gunhan and Ardit 2005).

- **Technical competency** concerns the extent of technical know-how available in the company that is necessary to undertake specific projects and the number and type of machinery and equipment owned by the company that are necessary for the physical realization of construction projects. According to Warszawski (1996), a company’s technical competency can be assessed by analyzing the company’s preferred construction methods, the experience of its technical staff, the productivity and speed of its construction activities, and the quality of the company’s output.

- **Leadership** involves developing and communicating mission, vision, and values to the members of an organization. A successful leadership is expected to create an environment for empowerment, innovation, learning, and support (Shirazi et al. 1996).

- **Experience** is highly related to a company’s knowledge management competency. Organizational learning can be effective only if the lessons learned from completed projects are kept in the organizational memory and used in future projects (Kululanga and McCaffer 2001).

- **The image of the company** compared with its competitors is important. As in all market-oriented industries, contractors also need to portray an image that fits the needs of the market and the clients targeted.

- **Research and development capability** is a response to increased industry requirements that occurred as a result of globalization and competition between the companies. Developments occur in all phases of the construction process and technologies emerge which are deemed to have a positive impact on competitive advantage. In contrast to the traditional conservative stance of the industry, construction companies are forced to develop and adopt new technologies in order to survive.

- **Innovation capability** indicates a company’s external orientation to the increasingly dynamic environment of the industry (Pries and Janssen 1995). The construction industry is traditionally defined as static andintroverted, as an environment where processes hardly change. But globalization and higher rates of competition between companies have forced construction companies to change. According to Porter (1980), competitive advantage can be achieved by cost leadership, differentiation, and focus. The traditional characteristics of the construction favor cost leadership obtained through lowest bids and focus obtained through specialization (e.g., tall buildings, sewage systems, etc.) deemed as the predominant competitive advantages. However, the dynamic changing nature of construction has thrust forward differentiation strategies, too. Innovation capability is an important factor in achieving cost leadership, focus, and differentiation, hence enhancing competitiveness.

Resources and capabilities are inevitably influenced by project management competencies as construction companies are characterized by a project-based structure and by the strength of the company’s relationships with third parties as construction companies operate in a multiparty environment that includes owners, subcontractors, financial institutions, surety companies, material dealers, equipment manufacturers, etc.

Project Management Competencies

The construction industry is a project-based industry since contractors survive and grow based on the success they achieve in their projects. Each construction project is unique but the managerial process is normally uniform across projects in a company. As the project is at the core of the construction business, project management competencies cannot be dissociated from overall company performance. Project management knowledge areas and skills have been investigated by many researchers (Project Management Institute 2000; Hendrickson and Au 1989; etc.). The most common of these factors adopted for this research are presented below.

- **Schedule management** is the competency of reasoning backward since, in the execution of all projects, there is a target date to finish and deliver the job (Hendrickson and Au 1989). The success of a project is dependent on project planners that are experienced enough to make estimates of several parameters that may be the cause of a potential delay and to complete the project on or ahead of schedule.

- **Cost management** refers to activities that ensure that the lowest possible overall project cost is achieved, consistent with the owner’s investment objectives.

- **Quality management** represents solutions in response to the complex and nonstandardizable nature of construction projects that makes it difficult to manage the quality. Even minor defects may require reconstruction and may impair the facility’s operations. Poor quality in constructed facilities can be corrected only at a cost and may cause delays (Davis et al. 1989; Kanji and Wong 1998).

- **Human resources management** is an inevitable dimension of project management since it is people who deliver projects. According to Delaney and Huselid (1996), there is a positive association between human resources management practices and company performance.
• **Risk management** is a prominent component of project management in view of the complex, dynamic, and challenging nature of construction projects. Risk in a construction project is unavoidable and affects productivity, performance, quality, and budget significantly. However, risk can be transferred, accepted, minimized, or shared (Latham 1994). Risk should be managed properly to decrease or eliminate its unwanted affects (Kangari 1995).

• **Supply chain management** has a strong correlation with project performance. A number of public sector construction initiatives in the United Kingdom, including the Latham report (1994) and the Egan report (1998) identified areas of underperformance among suppliers and government clients. These initiatives have emphasized the benefits of improving supply chain management.

• **Claims management** is of particular importance because the construction activity involves a large number of parties, an environment conducive to conflicts. Claims and disputes between construction owners, contractors, and other participants can be avoided by clearly stated contractual terms, early non-adversarial communication, and a good understanding of the causes of claims (Semple et al. 1994).

• **Knowledge management** is essential in accessing information relevant to best practices, lessons learned, historical and schedule data, and any other information necessary to run an efficient project. The need for innovation and improved business performance also requires the effective deployment and utilization of project knowledge (Kamara et al. 2002). The capability of a company to cope with sophisticated projects is the result of a successful knowledge management (Warszawski 1996).

• **Health and safety management** has a human dimension as accidents during the construction process can result in personal injuries and/or fatalities. Accidents also cause an increase in indirect costs such as the cost of insurance, inspection, and conformance to regulations (Ringen et al. 1995). Strict health and safety management regulations can reduce the number of accidents and accidents’ effects on project costs.

### Strength of the Relationships with Other Parties

The performance of construction companies is influenced by the strength of their relationships with the parties involved in typical construction projects such as public or private clients, regulatory agencies, subcontractors, labor unions, material dealers, surety companies, and financial institutions. The strength of these relationships is related to the mutual satisfaction of the parties, i.e., the realization of the expectations of the parties. The primary relationships that are of more importance than others include relationships with construction owners (both public and private), labor unions, and regulatory agencies because of the reasons discussed in the following sections.

• **Relationships with clients** concern the traditional rivalry between clients and contractors. Even though the importance of cooperation and trust between clients and contractors has been understood somewhat better (Bresnen and Marshall 2000), a strong relationship between clients and contractors is still difficult to achieve. In this sense, client satisfaction comes into question. In order to have good relations with clients, contractors should recognize the clients’ basic expectations relative to cost, time, and quality (Ahmed and Kangari 1995). On the other hand, good relationships are characterized by timely payments on the part of the owner, fewer claims on the part of the contractor, and the absence of legal disputes.

• **Relationships with labor unions** concern employment policies and practices and relates to the management of the human resources of the company. For example, if a company decides to cut cost and, along the way, reduces its labor force, labor unions may show their dissatisfaction by threatening to strike (Arthur 1992). Smooth labor relations pave the way to a dispute-free environment where the likelihood of strikes, slowdowns, and jurisdictional disputes is minimized.

• **Relationships with the government** are governed by the effects of government policies and the implementations of regulatory agencies on the construction industry. The construction industry constitutes a large portion of the economy of a country, forcing governments to accommodate construction companies accordingly. In general terms, bureaucratic obstacles set by regulatory agencies to maintain standards in companies’ day-to-day operations (e.g., codes, inspections, approvals, etc.) and companies’ difficulties in obtaining preferential financial support are some of the government-induced problems. On the other hand, tax incentives and relaxation of customs duties to allow the import of some materials and to prevent shortages are encouraging government actions (Öz 2001).

### Strategic Decisions

The literature on strategic decision making is spread over a wide range from an individual strategist’s perspective to strategic management techniques to the implementation of these techniques in real situations (Globerson 1985; Letza 1996; Warszawski 1996; Neely et al. 1997). The strategies selected for this study (see below) represent the characteristics of the construction industry as a project-based organization.

• **Differentiation strategies** refer to the differentiation of products or services that provides competitive advantage and allows a company to deal effectively with the threat of new entrants to the market (Porter 1979). Many new construction companies enter the industry every year because starting a new company does not require a large investment; consequently the construction industry becomes more competitive and forces existing companies to seek advantages over competitors by means of differentiation strategies.

• **Market, project, client, and partner selection strategies** are related to the characteristics of construction projects such as the location and complexity of the project, environmental conditions, availability of competent subcontractors, availability of materials, equipment and know-how locally, financial stability of the client, and potential partners that have capabilities that the company does not possess.

• **Project management strategies** can be developed by referring to the mission of the company and the company’s business environment. The managerial functions of a project include activities such as planning, cost control, quality control, risk management, and safety management, to name but a few. In order to achieve project goals, adequate strategies have to be set up relative to these functions.

• **Investment strategies** occur along several dimensions such as capabilities of the company (resources), pricing (financial decisions), product (construction project related factors), and finally research and development (Spence 1979).

• **Organizational management strategies** involve decisions pertaining to the company’s reporting structure, planning, controlling, and coordinating systems, as well as the management of
the informal relations among the different parties within the company (Barney 1991).

**Company Performance Indicators**

Performance indicators are used to track company performance by means of measurable characteristics (Bititci et al. 1997). The literature indicates that many researchers have commented on performance measurement from different perspectives. For example, Cross and Lynch (1988) developed SMART, a strategic analysis and reporting technique as part of a measurement process. The European Foundation for Quality Management excellence model in Europe, the Malcolm Baldrige National Quality Award in the United States, and the Deming Prize in Japan were adopted to promote quality as the fundamental process for improving performance within a business (Watson and Seng 2001; Bassion et al. 2004). Key performance indicators (KPIs) were designed by a U.K. construction best practice program for benchmarking purposes. Cox et al. (2003) analyzed the use of KPIs and was able to expose the difference between the perceptions of management and construction executives. The balanced scorecard (BSC) model of Kaplan and Norton (1996) was promoted as a strategic performance management system. Kagioglou et al. (2001) adopted the BSC for their performance measurement process framework with an additional number of elements and perspectives. Bassion et al. (2005) built a conceptual framework for measuring business performance in construction by merging the principles of the BSC and business excellence models. Yu et al. (2007) also developed a performance measurement system for construction companies by using the BSC perspective. El-Mashaleh et al. (2006) examined the effect of information technology on company performance and found a positive association between them. Elyamany et al. (2007) developed a performance evaluation model using the financial, economic, and industrial characteristics of companies. The majority of the literature about performance measurement relies on models developed for manufacturing industries (Kagioglou et al. 2001). The applicability of these systems to construction was confirmed by Nudurupati et al. (2007) by using empirical data.

The BSC perspective was adopted in this study because of its established status and its common use in the industry. It is a framework for measuring the strategic, operational, and financial characteristics of a company. It combines four perspectives to assess the performance of a business.

- **The financial perspective** indicates the success of the company measured in terms of indicators such as profitability, turnover, etc.
- **The learning and growth perspective** refer to the progress achieved by a company and its growth potential. Organizational learning capacity and the achievements of the organization in such areas as company image or various competencies are also taken into account in this perspective.
- **The internal business perspective** is an indicator of the success and efficiency of the operational and managerial activities in the company.
- **The customer perspective** considers the satisfaction of the different participants in the project such as the client and ultimate users.

In this study, it was hypothesized that company performance is influenced by the resources and capabilities, the strategic decisions, the project management competencies, and the strength of the company’s relationships with other parties. The reasoning in the model and the causality of the interrelationships are investigated and verified by means of data collected from 73 Turkish construction companies.

**Methodology**

Given the model described in the preceding section, five constructs were developed to measure the latent variables “project management competencies,” “strength of relationships,” “resources and capabilities,” “strategic decisions,” and “company performance.” A questionnaire was then developed consisting of questions that inquire about the variables that measure the latent variables. Each question was associated with variables described in the preceding sections. The questionnaire was administered via e-mail and face-to-face interviews to 185 construction companies established in Turkey. The target construction companies were all members of the Turkish Contractors Association (TCA) and the Turkish Construction Employers Association (TCEA). The 185 companies received an e-mail describing the objective of the study, inquiring about their willingness to participate in the study and requesting a face-to-face interview with an executive of the company. Forty seven questionnaires were completed, the majority of which were administered by face-to-face interviews. The rate of response was 25%. However, considering the fact that there were other construction companies in the industry which were not members of TCA or TCEA but showing similar characteristics with the member companies of these two associations in terms of size and type of work undertaken, a decision was made to expand the survey by including 26 additional similar companies selected individually through personal contacts. At the end of the extended survey, there were 26 more completed questionnaires, bringing the total number of respondents to 73. The variables that respondents have rated are listed in Table 1.

**Data Analysis**

The SEM is a statistical technique that combines a measurement model (confirmatory factor analysis or CFA) and a structural model (regression or path analysis) in a single statistical test (Kline 1998; Mueller 1996; Garver and Mentzer 1999). Data obtained from the 73 completed questionnaires were analyzed by using an SEM software package called Eqs. 6.1. The selection of SEM for use in this research was based on the structure of the proposed model that is composed of a number of direct and indirect interdependencies between the independent and dependent variables.

In the SEM process, the measurement model must be validated through CFA. While conducting CFA, construct validity should be satisfied by using content validity and empirical validity tests. Once the measurement model is validated, the structural relationships between latent variables are estimated (Anderson and Gerbing 1988; Garver and Mentzer 1999).

Content validity tests rate the extent to which a constituent variable belongs to its corresponding construct. Since content validity cannot be tested by using statistical tools, an in-depth literature survey is necessary to keep the researcher’s judgment on the right track (Dunn et al. 1994). An extensive literature survey was conducted to specify the variables that define latent variables. The model was tested in a pilot study administered to industry professionals and academicians. Based on the input of these subjects, the model was restructured, eliminating some of the vari-
where \( N \) is the number of items and \( p \) is the mean inter-item correlation. It can be interpreted from the equation that a higher inter-item correlation indicates statistical agreement among the items; as \( N \) increases, the probability of correlation decreases (Cronbach and Meehl 1955). A higher Cronbach’s \( \alpha \) coefficient indicates higher reliability of the scale used to measure the latent variable. According to the EQS analysis results, Cronbach’s \( \alpha \) values were 0.926 for project management competencies, 0.833 for resources and capabilities, 0.775 for strength of relationships, 0.870 for “decisions and strategies,” and 0.723 for company performance, all well beyond the threshold of 0.70 recommended by Nunally (1978).

Unidimensionality refers to the degree to which constituent variables represent one underlying latent variable. The CFA was used to test for unidimensionality. Initially, CFA was conducted independently for each construct. Once each construct in the model was deemed unidimensional by itself, then unidimensionality was tested for all possible pairs (Garver and Mentzer 1999; Dunn et al. 1994).

Convergent validity is the extent to which the latent variable correlates to corresponding items designed to measure the same latent variable. If the factor loadings are statistically significant then convergent validity exists.

In the SEM process, a theoretical model has to be specified initially that incorporates the latent variables represented by their constituent variables and their interrelationships. The initial model prepared for this purpose assumed that company performance is influenced not only by resources and capabilities and strategic decisions but also by project management competencies, as suggested by most researchers (e.g., Jaselskis and Ashley 1991; Chua et al. 1999; Brown and Adams 2000; Cooke-Davies 2002; Chan et al. 2004). Moreover, it was hypothesized that “strength of relationships with other parties” impacts resources and capabilities while project management competencies affect resources and capabilities and strategic decisions. The model was assessed and all factor loadings (Table 1) were found to be significant at \( \alpha = 0.05 \); the Cronbach’s \( \alpha \) of the overall model was found to be greater than 0.7. However, some of the path coefficients were not found to be significant at \( \alpha = 0.05 \). The path coefficients marked on these heavy arrows can be interpreted similar to regression coefficients that describe the linear relationship between two latent variables (Matt and Dean 1993). This finding required the investigation of different relationships between the constructs of the model. Hence, the model was respecified.

The revised relationships between the latent variables were hypothesized in the final model as marked by the heavy arrows in Fig. 1. All path coefficients in Fig. 1 are statistically significant at \( \alpha = 0.05 \). The final factor loadings of the respecified model are presented in Fig. 1, marked next to the light arrows. All factor loadings marked on the heavy arrows in Fig. 1 are statistically significant at \( \alpha = 0.05 \) and display rather uniformly high values indicating that the latent variables are represented quite well by their constituent variables.

According to the path coefficients generated by the respecified model, project management competencies have a significant impact on resources and capabilities and strategic decisions of the company with path coefficients of 0.809 and 0.871, respectively. Contrary to the general wisdom perpetrated by most researchers (e.g., Jaselskis and Ashley 1991; Chua et al. 1999; Brown and Adams 2000; Cooke-Davies 2002; Chan et al. 2004) that project management competencies have a direct impact on company performance, this construct appears to have an indirect influence on company performance through resources and capabilities and strategic decisions that have direct influences on company performance with path coefficients of 0.481 and 0.441, respectively. On the other hand, strength of relationship with other par-

### Table 1. Latent and Constituent Variables with Factor Loadings in Initial Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management competencies</td>
<td></td>
</tr>
<tr>
<td>Schedule management</td>
<td>0.762</td>
</tr>
<tr>
<td>Cost management</td>
<td>0.771</td>
</tr>
<tr>
<td>Quality management</td>
<td>0.760</td>
</tr>
<tr>
<td>Human resources management</td>
<td>0.831</td>
</tr>
<tr>
<td>Risk management</td>
<td>0.714</td>
</tr>
<tr>
<td>Supply chain management</td>
<td>0.716</td>
</tr>
<tr>
<td>Claims management</td>
<td>0.737</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>0.826</td>
</tr>
<tr>
<td>Health and safety management</td>
<td>0.758</td>
</tr>
<tr>
<td>Resources and capabilities</td>
<td></td>
</tr>
<tr>
<td>Financial resources</td>
<td>0.523</td>
</tr>
<tr>
<td>Technical competency</td>
<td>0.588</td>
</tr>
<tr>
<td>Leadership</td>
<td>0.652</td>
</tr>
<tr>
<td>Experience</td>
<td>0.514</td>
</tr>
<tr>
<td>Company image</td>
<td>0.627</td>
</tr>
<tr>
<td>R and D capability</td>
<td>0.773</td>
</tr>
<tr>
<td>Innovation capability</td>
<td>0.791</td>
</tr>
<tr>
<td>Strength of relationships</td>
<td></td>
</tr>
<tr>
<td>Relations with client</td>
<td>0.737</td>
</tr>
<tr>
<td>Relations with government</td>
<td>0.731</td>
</tr>
<tr>
<td>Industrial relations</td>
<td>0.763</td>
</tr>
<tr>
<td>Strategic decisions</td>
<td></td>
</tr>
<tr>
<td>Differentiation strategies</td>
<td>0.678</td>
</tr>
<tr>
<td>Market selection strategies</td>
<td>0.678</td>
</tr>
<tr>
<td>Project selection strategies</td>
<td>0.787</td>
</tr>
<tr>
<td>Client selection strategies</td>
<td>0.662</td>
</tr>
<tr>
<td>Partner selection strategies</td>
<td>0.766</td>
</tr>
<tr>
<td>Project management strategies</td>
<td>0.613</td>
</tr>
<tr>
<td>Investment strategies</td>
<td>0.655</td>
</tr>
<tr>
<td>Organizational management strategies</td>
<td>0.581</td>
</tr>
<tr>
<td>Company performance indicators</td>
<td></td>
</tr>
<tr>
<td>Financial perspective</td>
<td>0.496</td>
</tr>
<tr>
<td>Learning and growth perspective</td>
<td>0.839</td>
</tr>
<tr>
<td>Internal business perspective</td>
<td>0.547</td>
</tr>
<tr>
<td>Customer perspective</td>
<td>0.640</td>
</tr>
<tr>
<td>Learning and growth perspective</td>
<td></td>
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<tr>
<td>Internal business perspective</td>
<td></td>
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<tr>
<td>Customer perspective</td>
<td></td>
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</tbody>
</table>

Scale reliability is the internal consistency of a latent variable and is measured most commonly with a coefficient called Cronbach’s \( \alpha \). The purpose of testing the reliability of a construct is to understand how each observed indicator represents its corresponding latent variable. The Cronbach’s \( \alpha \) coefficient is calculated using Eq. (1)

$$\alpha = \frac{Np}{1 + p(N-1)}$$  \hspace{1cm} (1)
ties appears to impact resources and capabilities with a path coefficient of 0.322.

Another way of assessing construct unidimensionality is the goodness of fit of the model. A number of fit indexes are available but Marsh et al. (1988) proposed that the ideal fit indexes should have: (1) relative independence of sample size; (2) accuracy and consistency to assess different models; and (3) ease of interpretation aided by a well-defined continuum or preset range. Many fit indexes do not meet these criteria because they are adversely affected by sample size (Bentler and Yuan 1999). The nonnormed fit index (NNFI) considers a correlation for model complexity (Kline 1998). The comparative fit index (CFI) is interpreted in the

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**Fig. 1.** Respecified structural equation model
same way as the NNFI and represents the relative improvement in fit of the hypothesized model over the null model. The root-mean-square error of approximation (RMSEA) is an estimate of the discrepancy between the observed and estimated covariance matrices in the population (Hair et al. 1998). The $\chi^2$ compares the observed covariance matrix to the one estimated on the assumption that the model being tested is true. However, when the sample size is small, it is difficult to obtain a $\chi^2$ that is not statistically significant; in such situations, the ratio of $\chi^2$ to degree-of-freedom (df) is to be examined. Based on the stated criteria and the suggestions made by Garver and Mentzer (1999), Jackson (2003), and Bentler and Yuan (1999): (1) the NNFI; (2) the CFI; (3) the RMSEA; and (4) the ratio of $\chi^2$ to df were selected in this study since they are less affected by sample size compared to other goodness-of-fit indexes (Jackson 2003).

The comparison of the fit indexes of the initial model with the final model presented in Table 2 indicates that the fit of the final model was enhanced after respecification. The final model is quite satisfactory since all indexes are close enough to the recommended perfect values. Indeed, Table 2 indicates that the $\chi^2$ to df ratio was satisfactory as it was smaller than 3 and RMSEA implied a good fit with a value smaller than 0.1, the thresholds suggested by Kline (1998). One reason why the goodness-of-fit indexes NNFI and CFI are not closer to 1 (perfect fit) is because only a portion of the company performance may be explained by resources and strategies. There are indeed other parameters that influence the performance of a construction company directly and indirectly such as project performance and external factors that were beyond the scope of this study. In addition, since goodness-of-fit indexes are affected by sample size (Jackson 2003), a larger sample than the 73 cases used in the study could yield higher fit indexes.

### Discussion of Findings

A few of the previous studies in the construction management literature adopted the BSC perspective (Kagioglou et al. 2001; Bassioni et al. 2004; Yu et al. 2007) for investigating the relationship between the drivers, measures, and indicators of performance. In these studies, reasonable results were obtained which encouraged the adaptation of the BSC perspective in this study. In this study, “financial performance,” “learning and growth,” “efficiency in internal business,” and “customer satisfaction” were used as the general indicators of company performance in place of “cost, time, and quality,” i.e., the “iron triangle,” as called by Atkinson (1999). The reason for selecting BSC was its established status in the literature.

### Table 2. Goodness-of-Fit Indexes

<table>
<thead>
<tr>
<th>Fit indexes</th>
<th>Allowable range</th>
<th>Initial model</th>
<th>Final model</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNFI</td>
<td>0 (no fit)—1 (perfect fit)</td>
<td>0.748</td>
<td>0.819</td>
</tr>
<tr>
<td>CFI</td>
<td>0 (no fit)—1 (perfect fit)</td>
<td>0.770</td>
<td>0.835</td>
</tr>
<tr>
<td>RMSEA</td>
<td>&lt;0.1</td>
<td>0.097</td>
<td>0.082</td>
</tr>
<tr>
<td>$\chi^2$/degree of freedom</td>
<td>&lt;3</td>
<td>$711/424=1.68$</td>
<td>$627/424=1.48$</td>
</tr>
</tbody>
</table>

### Effect of Resources and Capabilities

Resources and capabilities was found to be most influential on company performance. The critical importance of the resources and capabilities of a company was also emphasized in the literature. The strategic management literature defines resources and capabilities as the strengths of a company. Given the competitive environment among the rivals, resources and capabilities cannot be assumed to be identical in every company (Porter 1980; Barney 1991). According to the resource-based perspective mentioned by King and Zeithaml (2001) and Barney (1991), a company’s resources and capabilities have to be valuable, rare, inimitable, and should lack substitutes to have a positive effect on performance. Only if these conditions are met can resources and capabilities be transformed into a source of competitive advantage (Barney 1991). It follows that a construction company’s equipment, manpower, technical, and managerial know-how should be efficient, cost-effective, rare, and sophisticated enough to prevent imitation by competitors.

### Effect of Strategic Decisions

Strategic decisions was found to have a direct and almost similar influence on company performance with resources and capabilities. Strategy is defined as a plan, pattern, position, perspective, and ploy (Mintzberg et al. 1998). Its significant effect on performance is demonstrated empirically in the literature (Porter 1980). Sun Tzu, in his famous “Art of War” which was written in the fourth century B.C. emphasizes the importance of strategy for success by stating: “All men can see the tactics whereby I conquer, but what none can see is the strategy out of which victory is evolved” (Sun Tzu 2003). Emphasizing the importance of strategic decision, Child (1972) also stated that companies can achieve higher organizational performance by adopting different competitive positioning alternatives based on strategic decisions. The strategic decision construct in the study was represented by eight constituent variables, all closely related to competition. What makes this latent variable in the model more prominent than the others is the increasingly competitive environment in the construction business.

### Effect of Project Management Competencies

The influence of determinants that take a project to success or failure have been investigated by several researchers (e.g., Larson and Gobeli 1989; Chua et al. 1999; Brown and Adams 2000; Cooke-Davies 2002; Chan et al. 2004), the majority of whom pointed out the importance of project management competencies among other criteria. Pinto and Mantel (1990) have also identified managerially controllable factors as the causes of project failure. Jaselskis and Ashley (1991) have associated project management with the competencies of a project manager and suggested that the probability of success may depend on the optimal allocation of project management resources. Research on the linkage between project performance and company performance is limited but it can be assumed that in a project-based industry like construction there’s a direct link between project and company performance (Cooke-Davies 2002). Contrary to previous studies, the results of the current study revealed an indirect influence of project management competencies on company performance. It appears that project management competencies have a strong and direct effect on company resources and capabilities and strategic decisions, which in turn affect positively company performance.
Even though most researchers associate project management competencies directly with company performance, it is not far fetched to argue that project management competencies enhance company capabilities such as finances through profitable projects, leadership, and company image through successful project performance and technical competency and corporate experience through the exercise of project management expertise. Similarly, project management competencies enhance strategic decisions such as differentiation and market/project selection strategies through appropriate knowledge management obtained from a variety of projects and organizational management strategies through unified claims management and supply chain management across projects.

Effect of Strength of Relationships with Other Parties

Even though the effects of project management competencies on company success have always been considered to be inevitable (e.g., Jaselskis and Ashley 1991; Chua et al. 1999; Brown and Adams 2000; Cooke-Davies 2002; Chan et al. 2004), the strength of relationships with other parties has rarely been discussed in the construction management literature. In one of the few examples, variations of relationships were discussed in the study by Hausman (2001) where a strong relationship’s positive effect was confirmed. According to Pinto and Mantel (1990) and Dissanayaka and Kumaraswamy (1999), good relationships between a construction management firm and the client’s representatives expedite the operations and help to achieve better performance. Dainty et al. (2003) pointed out the importance of managing client relationships in a positive way that encourages long-term successful relationships.

The strength of a company’s relationship with other organizations constitutes a social dimension of performance measurement, a dimension associated with the people in the construction environment (Kendra and Taplin 2004). Considering the sophisticated nature of the industry and the cultural values of the society, it made sense to assess companies’ relationships not only with the client but also with government agencies and labor unions. On this account, the communication and negotiating skills of company executives have to be stressed. However, the subtle difference between favoritism and the strength of relations has to be distinguished. Relationship strength in business is an important phenomenon in Confucian societies like China, Hong Kong, Taiwan, Japan, and Korea. It is generally called “guanxi” which means “connection” in Chinese. While western societies regard guanxi as favoritism or nepotism, Confucian societies regard it as an inevitable asset while doing business (Yeung and Tung 1996). Turkey as a connection point between the west and the east carries both sides’ characteristics. The findings certainly indicate that contractors’ performance is enhanced by strong relationships in the Turkish setting.

Conclusions

It was hypothesized in this study that construction company performance is influenced by the resources and capabilities within the company, the long-term and short-term strategies adopted by the company, the strength of the relationships of the company with other parties involved in construction projects, and project management competencies. An SEM model was set up to measure the five latent variables (resources and capabilities, project management competencies, strength of relationships with other parties, strategic decisions, and company performance) through their constituent variables and to see if the hypothesized relationships exist. According to the findings of the SEM analysis (Fig. 1), Cronbach’s α coefficients of all the latent variables were well over the 0.70 minimum set by Nunally (1978) and indicated that the internal reliability of the constructs was quite high. The internal reliability of the overall model was also found to be 0.953 which is an excellent result. The CFA showed that all factor loadings presented in Fig. 1 were significant at α=0.05. The goodness-of-fit indexes presented in Table 2 consistently indicated a good fit. The reason why the fit indexes are not closer to perfect fit (i.e., are not higher than 0.9 for NNFI and CFI) can be explained by the smaller sample size of 73 respondents used in this study and by the fact that there may be more than the four latent variables that impacts company performance such as project performance and external factors. The impact of the other variables is investigated separately.

Given the very strong path coefficients, the hypothesis set forward in this study appears to have held. Not only do resources and capabilities and strategic decisions have a direct impact on company performance but project management competencies and the strength of the relationship with other parties also appear to have an indirect impact on company performance.

Based on the findings of this study, it can be concluded that this research has resolved the dilemma between the subjective (qualitative) and the objective (quantitative) measures of performance. The strong path coefficients between the constructs of the model are an indication that, after decades in pursuit of finding ways to improve the performance of construction companies, subjective dimensions of performance have proven to be as effective as the traditional objective dimensions.

References


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