

Performance of MBE/DBE/WBE Construction Firms in Transportation Projects

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Abstract: The goal of this research is to conduct a comparative investigation of the performance of minority/disadvantaged/women business enterprise (MBE/DBE/WBE) versus non-MBE/DBE/WBE companies in transportation projects. A performance assessment model was developed in a survey format following review of contemporary performance measurement tools. The survey was administered to prequalified MBE/DBE/WBE and non-MBE/DBE/WBE companies in transportation projects nationwide. The names and addresses of these companies were obtained from U.S. DOT websites. Comparisons between the two groups were made using the Mann-Whitney test. When the test was administered to the entire group regardless of firm size and age, non-MBE/DBE/WBE companies outperformed MBE/DBE/WBE companies. However, MBE/DBE/WBE companies were smaller and had been in business for fewer years than non-MBE/DBE/WBE companies. When MBE/DBE/WBE and non-MBE/DBE/WBE companies of similar size and age were compared, the study revealed that there are no significant differences in performance.

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Introduction

The construction industry is a significant contributor to the overall U.S. economy. According to the U.S. Census Bureau's economic census, there were over 700,000 construction establishments with payroll that were in business in 2002 (U.S. Department of Commerce, Economic and Statistics Administration, U.S. Census Bureau 2005a). Construction is the third largest sector after the retail trade sector and the professional, scientific, and technical service sectors. The construction industry spent close to \$1.2 trillion in 2002, which included the value of construction work performed by general and specialty contractors and included new construction, additions and alterations or reconstruction, and maintenance and repair. Overall, the construction industry employed over 7 million people in 2002 or about 6% of the nation's nonfarm, private sector employment, with an annual payroll of \$250 billion.

The *Current Population Survey* from the Bureau of Labor Statistics show that the construction industry's workforce differs from the overall labor force (U.S. Department of Labor, Bureau of Labor Statistics 2008). In 2007, the industry employed disproportionately more Hispanic or Latino workers (30% of total con-

struction employees versus 14% average for all industries) and fewer women (3% versus 46% overall), African-Americans (7% versus 11% overall), and Asians (1% versus 5% overall).

Policy makers have already recognized the importance of minority businesses to strengthen and to diversify the economy. The U.S. DOT works to ensure minority businesses the opportunity to compete for and obtain a fair share of DOT contracts by providing financial assistance such as short-term loans at competitive interest rates and procurement assistance through education and providing resources.

The goal of this research is to assess the performance of minority/disadvantaged/women business enterprise (MBE/DBE/WBE) versus non-MBE/DBE/WBE companies in transportation projects throughout the United States. The performance of these companies was measured by a model developed by synthesizing the various performance measures discussed in the literature.

The study was motivated by two reasons. First was realizing that the construction industry is a significant contributor to the overall U.S. economy and that there will be substantial demographic changes in the U.S. population in the future toward a larger number of minority owned businesses. According to the U.S. Census Bureau, by 2050, minorities are expected to represent nearly half of the U.S. population compared to nearly 30% in 2000 (U.S. Census Bureau 2005a; U.S. Department of Commerce, Economic, and Statistics Administration, U.S. Census Bureau 2005b). If minority businesses grow in a rapidly changing economy, they can become major players in the U.S. economy. The second motivation of the study was to address the belief about preferential selection procedures that favor unqualified candidates over qualified candidates in federal assisted contracts or state and large metropolitan contracts to meet MBE/DBE/WBE goals.

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MBE/DBE/WBE Programs

Executive Order 10925 (The White House 1961) issued by President Kennedy created an equal opportunity committee and mandated that projects financed with federal funds “take affirmative action” to ensure that hiring and employment practices are free of racial bias. The Civil Rights Act of 1964 prohibited discrimination of all kinds based on race, color, religion, or national origin. Issued by President Johnson, Executive Order 11246 (The White House 1965) required government contractors to take specific measures to ensure equality in hiring. The affirmative action program encouraged the employment of underrepresented groups.

An MBE is a business that is at least 51% owned and controlled by one or more minority persons. A minority is defined as an individual who is African American, Hispanic American, Asian American, or Native American. To become certified as an MBE, a company must be approved by a regional or local affiliate of the National Minority Supplier Development Council (NMSDC), which is the pre-eminent certifying body in both the public and private sectors. Application materials are reviewed by field investigators, who also conduct site visits and personal interviews with key minority group members. The standards for approval are uniform nationwide by all NMSDC affiliate offices (Jenkins 2007).

The Federal Government’s DBE Program includes African Americans, Hispanic Americans, Asian-Pacific and Subcontinent Asian Americans, American Indian/Native Americans and women. Other individuals can also qualify as socially and economically disadvantaged on a case-by-case basis. A DBE must be 51% owned and controlled by these individuals. To participate in the DBE program, a small business owned and controlled by these individuals must receive DBE certification from the relevant state—generally through the state’s Uniform Certification Program. To be regarded as economically disadvantaged, an individual must have a personal net worth that does not exceed \$750,000. A DBE firm must meet the size criteria of the Small Business Administration’s and have average annual gross receipts not to exceed \$20.41 million over a three year period (U.S. DOT 2008).

WBE is an independent business that is at least 51% owned and controlled by one or more women who are U.S. citizens or legal resident aliens; whose business formation and principal place of business are in the United States or its territories; and whose management and daily operation is controlled by one or more of the women owners (www.wbenc.org). To become certified as a WBE, a company can be approved by a regional or local affiliate of the Women’s Business Enterprise National Council or National Women Business Owners Corporation.

A company can be certified as a DBE, MBE, WBE, or any combination. A company may apply for DBE to participate in U.S. DOT assisted contracts and apply for MBE to participate in state funded contracts. However, most state and large metropolitan contracts will also encourage DBE and WBE participations.

Minority contractors face major obstacles compared to nonminority contractors. In 1977, Glover conducted the first comprehensive survey of minority contractors in four U.S. cities. In this survey, minority contractors identified limited access to capital, lack of management skills, and difficulties in recruiting and retaining skilled craftspeople and supervisory personnel as limiting their growth and preventing them from fully participating in the construction industry. Chang’s (1986) study confirmed Glover’s findings. El-Itr and Kangari (1994a) found that minority contractors cannot obtain competitive material quotes that large firms with strong purchasing power can. Although minority-

participation programs have been in existence for over 20 years to mitigate these problems, there has been a long debate of whether these programs have succeeded in bringing minority participation into the mainstream of the construction industry. It should be understood that every state DOT has a comprehensive MBE/DBE certification process as well as rules to determine eligibility for certification. Certification does not guarantee automatic work and all firms are expected to meet performance standards and contract specifications. Each state DOT establishes realistic and achievable MBE/DBE goals. Individual contract goals are set based upon the dollar value of the project, the availability of MBE/DBEs to perform the work which is to be subcontracted, and the availability of certified MBE/DBEs in the location where the work is to be done.

Some scholars argue that these programs have created many operational problems in the construction industry. As a result, these programs are considered unacceptable by some major interest groups including nonminority contractors, and the bonding and financing industry (Beliveau et al. 1991). The study of Beliveau et al. (1991) found that the federally mandated DBE program increased the number of minority contractors participating, but not the number of qualified contractors who could perform mainstream highway work. Also misuse of this program has caused researchers and industry leaders to continually question this plan. Some argue that the program should be eliminated and some claim that the program should be reorganized to benefit the construction industry as a whole (Beliveau et al. 1991; Koehn and Espallat 1984; Koehn and Chyan 1989; El-Itr and Kangari 1994b).

Minority populations are on the rise. In about 40 years, the minority population will make up half the U.S. population (U.S. Department of Commerce, Minority Business Development Agency 2006). Policy makers have recognized the importance of minority businesses to strengthen and to diversify the economy. The underlying principles of the MBE/DBE/WBE programs may be sound, but policies to retain and expand qualified minority contractors should be periodically observed and revised as necessary to avoid nonqualified minority contractors taking advantage of the government mandated programs.

Measuring the Performance of Construction Companies

After relying heavily on financial measures for over half a century, contemporary performance measurement frameworks started to develop in full force by the late 1980s and into the early 1990s (Cross and Lynch 1988; Keegan et al. 1989; Maskell 1989; Brignall et al. 1991; Azzone et al. 1991). By 1992, Kaplan and Norton (1992) revolutionized the conventional concept of performance measurement by introducing the balanced scorecard (BSC), which declared that financial measures are and always will be important but they must be supplemented with other indicators that predict future financial success. In addition to financial measures, BSC includes three nonfinancial concepts namely, customer satisfaction, internal business processes, and learning and growth which are intangible assets that govern the future long-term success of a company. Although Bassioni et al. (2004) noted some of its shortcomings, BSC still prevails as an influential and widely accepted framework for performance measurement (Paranjape et al. 2006). It is the least criticized and most widely accepted performance measurement framework (Paranjape et al. 2006). Many researchers have since developed advanced performance mea-

Table 1. Summary of Contemporary Performance Measurement Frameworks in the Construction Industry

Sources	Framework	Performance criteria
Fischer et al. (1995)	Nontraditional framework KPI and EFQM criteria	Cost, schedule, construction labor, change order data
Robertson (1997)		Quality, time, communication, employee satisfaction, training and development, safety, environmental practices, work won on value criteria, internal business, financial
Arditi et al. (2000)	Nontraditional framework	Competition based on innovation, organizational strategy, manager's qualifications
Construction Best Practice Program (CBPP) (2002)	KPI for the construction industry	Cost, time, defects, client satisfaction, safety, financial, productivity
Kagioglou et al. (2001)	Modified BSC	Financial, customer, internal business, project, supplier
Beatham et al. (2002)	Modified EFQM	Leadership, policy and strategy, partnership and resource, people, processes
Bassioni et al. (2004)	BSC and EFQM and Baldrige criteria	Leadership, customer, strategic management, information analysis, people/supplier management, resource/intellectual capital management, risk management, work culture, process management
Phua (2006)	Nontraditional framework	People management, resource management, regulations/codes, financial
Yu et al. (2007)	BSC and KPI	Profitability, financial growth, financial stability, external/internal customer satisfaction, market share, R/D, technological capabilities, business efficiency, HR, organization competency, access to information

surement models that contained additional features to the BSC (e.g., Sinclair and Zairi 1995; Flapper et al. 1996; Bititci et al. 1997; Ghalayini et al. 1997; Medori 1998; Oliver and Palmer 1998).

Another development in the late 1990s involved ten high-level key performance indicators (KPIs) for industry comparison and demonstration of performance improvement on completed projects [Department of the Environment, Transport, and the Regions (DETR) 2000] of Egan (1998). The indicators are composed of construction time and cost, the predictability of time and cost, the number of defects, the satisfaction of the client relative to the product and service provided, safety issues, productivity, and profitability (Cox et al. 2003).

Other significant developments came from the introduction of different quality management models. Although these were introduced as quality management tools, they were adapted to develop performance measurement frameworks. According to Tan (2002), the most used models are the excellence model developed by the European Foundation for Quality Management (EFQM) (1999), the Baldrige model initiated by the NIST (NIST 2002) in the United States, and the Deming Prize model used by the Union of Japanese Scientists and Engineers (JUSE) (2009). Like the BSC, these models are also based on the assumption that learning improves enablers, which in turn leads to positive impacts on the results. A company can self-assess and evaluate its organization by using these models. A company's strategic objectives are measured by their impact on people, customers, and society (Robinson et al. 2004).

According to Bassioni et al. (2004), BSC, the EFQM excellence model, and the KPI developed by Egan (1998) were the top three performance measurement frameworks that are used. These models address the serious deficiencies in traditional performance management built around financial measures. They provide a structured approach for identifying improvement opportunities, and translating an organization's vision to achievable goals, targets, and specific tasks (Robinson et al. 2004).

Proposed Performance Measurement Model

Each framework focuses on different facets of performance and it is only logical to build upon the principles of the existing frameworks to develop a comprehensive framework (Bassioni et al. 2004). Recent research of performance measurement models in the construction industry generated models composed of combined frameworks. For example, Robertson (1997) and Beatham et al. (2002) proposed a framework that combined KPI and the EFQM model. Samson and Lema (2002) and Bassioni et al. (2004) proposed a framework that combined BSC and the EFQM model. Yu et al. (2007) proposed a framework that combined KPI and BSC.

Within the last decade many researchers have explored different ways to measure the performance of a construction company. How does one choose a model? As Bassioni et al. (2005) suggested, there exists a gap in knowledge and practice and each model takes on a different approach to measuring the performance of a company. However, models either complement one another, or overlap to some extent. Bassioni et al. (2005) called for a comprehensive model that incorporates all ideas that have been proved to be successful. As such, an enhanced performance measurement model can be developed.

The model presented in this study does not represent a completely new framework, but utilizes the basic principles of BSC, KPI, and the EFQM excellence model in order to cover a broad spectrum of factors associated with the performance of companies in the construction industry. To accomplish the objective of this study, i.e., a thorough comparison of the performance of MBE/DBE/WBE versus non-MBE/DBE/WBE companies, the criteria used by the above literature were identified (see Table 1), critically reviewed in a pilot study by a senior member of an MBE company, and combined into the proposed performance measurement model presented in Table 2. It is clear that most of the researchers cited in Table 1 proposed performance measurement models that often overlap with each other either implicitly (simi-

Table 2. Proposed Company Performance Measurement Model

Performance issues	Performance factors	Questions	Scales
Financial	Profit	Profits compared to competitors' profits in past three years	Not profitable, below average, average (industry standard), above average, extremely profitable
	Growth in revenue	Growth in terms of revenue in past three years	Significant decline, decline, stable, growth, significant growth
	Cash flow stability	Financial stability in terms of cash flow in past three years	Extremely weak, weak, average, strong, extremely strong
		Financial stability in terms of credit line in past three years	Extremely weak, weak, average, strong, extremely strong
Customer satisfaction	External customer satisfaction	Percentage of repeat customers	None, less than 25%, between 25 and 50%, between 50 and 75%, over 75%
		Degree of customer satisfaction	Very dissatisfied, somewhat dissatisfied, neither, somewhat satisfied, very satisfied
	Internal customer satisfaction	Frequency of employee recognition	Never, as necessary, once a year, quarterly, once a month
		Degree of employee satisfaction	Very dissatisfied, somewhat dissatisfied, neither, somewhat satisfied, very satisfied
Internal business	Market share	Growth in terms of market share in past three years	Significant decline, decline, stable, growth, significant growth
	Technological capability	Technological capability compared to competitors	Very weak, somewhat weak, same as competitors, somewhat strong, very strong
		Business efficiency	Extremely low, below normal, normal for business, above normal, extremely high
		Ability to meet project deadlines	Never meet deadline, meet 0–25% of deadlines, meet 25–50% of deadlines, meet 50–75% of deadlines, meet over 75% of deadlines
Learning and growth	HR development	Efficiency of internal communications	Poor, fair, average, good, excellent
		Educational background of technical staff	Number with no degree, associate's degree, bachelor's degree, master's degree, doctoral degree
		Percentage of employees with professional licenses/certifications	None, less than 25%, between 25 and 50%, between 50 and 75%, over 75%
		Extent of training	Never, not unless required, encourage employees to participate, pay for professional training
Safety	Organizational competency	Process to manage organizational learning	None, internal training, formal lessons-learned system, external training
			None, encourage employers to provide safe work environment, direct action to create safe work environment
Technological innovativeness	IT implementation	Computer applications used in business operations	Microsoft Office, project management software, ERP and higher
Quality management	Quality management	Type of quality management system in place	None, informal system, formal system as necessary, formal system regularly

lar concepts but different terminology and emphasis), or blatantly (borrowing principles and modifying them). Even the so called “nontraditional” measurement frameworks are not exempt from this phenomenon. A thorough synthesis of all concepts that went into these models resulted in the seven performance issues presented in Table 2. These seven performance-related issues were formulated into performance factors, which in turn were measured by a series of questions. In order to secure the highest rate of response, the questions always sought the opinions of respon-

dents rather than hard numbers (see last column in Table 2). Also, the measurement of the performance factors was simplified and the number of questions kept to a minimum. For example, whereas technological innovation may include novel methods of construction, new methods of management, latest model equipment, etc., it was measured simply by the number of IT applications in place in the company. Such compromise may constitute a limitation of the study but was inevitable for achieving a decent response rate.

Survey—Data Collection

The information for potential respondent firms was gathered from the websites of fifty state DOTs. The websites of 47 of the 50 state DOTs had a list of MBE/DBE/WBE consultants available. Twenty two of the state departments of transportation had a list of prequalified consultants available. Lists were provided as PDF files, Excel files, or as online database search forms. Many firms were certified in multiple states and most did not have a contact person or an e-mail address available. An extensive search was conducted by visiting companies' websites for the appropriate contact information. This study was intended for senior and top-level executives of these companies. It was expected that senior executives could answer the questions based on their detailed knowledge of the activities of their respective organizations.

A questionnaire survey was designed and responses were collected through www.SurveyMonkey.com. SurveyMonkey has an intuitive survey editor that allows creating user friendly surveys using a web browser. Responses were sought by sending e-mails to potential respondents. The e-mail briefly described the study and provided a link to the survey site. The request for participation in the questionnaire survey was e-mailed on March 17, 2008 to 1,442 senior executives in as many firms identified earlier. At the time of the e-mailing, it was not known how many of these firms were MBE/DBE/WBE firms and how many were not. Respondents were assured of the confidentiality of both respondent and firm identities. One hundred ninety five of those e-mails did not reach the intended recipient. The second and third reminder e-mails were sent one week and two weeks, respectively, after the first one.

The seven issues identified in this research (Table 2, first column) are based on the concepts of BCS, KPI, and the EFQM excellence model. The *financial*, *customer satisfaction*, *internal business*, and *learning and growth* issues were borrowed from the BCS model, which is an underlying concept that is repeatedly used in many performance measurement models. The *job safety* issue is unique to the construction industry and was therefore picked as a performance measure. Many firms are also trying to stay on the cutting edge by investing in IT. The use of IT has proven to play a crucial role in improving the performance of a company and was therefore used in this study as a measure of *technological innovativeness*. Many construction companies are also pursuing certification in *quality management* systems such as ISO 9000 to achieve higher quality in the company's internal procedures but also to satisfy requirements of the customers or government requirements worldwide (Chini and Valdez 2003).

The first five questions inquired about the respondent's position with the company and the company profile such as the type of work the organization performs, MBE/DBE/WBE status, age, and size of the company. The parameters of the model presented in Table 2 were measured by pertinent questions (Table 2, last column).

The last question in the survey asked the respondents to rate the importance of the 13 factors that are used to measure the performance of a company.

Results and Discussion

The survey was sent to two groups of respondents, namely, senior executives employed by MBE/DBE/WBE and non-MBE/DBE/WBE construction companies. The two groups were indepen-

Table 3. Characteristics of Responding Firms

Characteristics	Percentage (%)	Attributes
Respondent title	82	Senior executives/principals
	8	Project managers
	11	Others
Business certification status	62	MBE/DBE/WBE companies
	38	Non-MBE/DBE/WBE companies
Business practice	69	Construction management
	64	Design
	14	Construction
Business experience	31	Less than 10 years
	69	Over 10 years
Business size	58	Less than 50 employees
	42	Over 50 employees

dently drawn and randomly picked from lists provided by state DOTs.

Responses were returned by a total of 135 firms. This represents a response rate of 11%. One hundred thirty two of the completed responses were used in the analysis excluding three of the firms from the analysis because the survey was not answered by the intended respondent. As seen in Table 3, a total of 82 firms (62%) were MBE/DBE/WBE firms and 50 (38%) were non-MBE/DBE/WBE firms. More MBE/DBE/WBE firms responded to the survey perhaps because this was more applicable to them. The most common titles of the respondents were senior executive/principal. Most of the companies did design work and/or construction management and project management. None of the companies had been operational for less than one year. Over half of the responding companies (69%) had been operational for over ten years. Respondent companies included both small and large companies.

At the end of the survey, respondents were also asked to rate on a 1–5 point scale the relative importance of thirteen performance factors (profit, growth in revenue, cash flow stability, external customer satisfaction, internal customer satisfaction, market share, technological capability, business efficiency, human resource development, organization competency, job safety, IT implementation, and quality management) in assessing the performance of a company. Table 4 shows the results.

For example, for the financial issue, each of the three financial performance factors (i.e., profit, growth in revenue, and cash flow stability) received an average importance weight from the respondents. The average of these three weights established a single importance weight for the financial issue. Likewise, importance weights were calculated for all the seven issues. Table 4 shows the results of the average importance weights and the normalized importance weights of all seven issues.

Judging from the average importance weights in Table 4, respondents recognized external customer satisfaction as their top priority. This finding aligns with the worldwide survey of 681 senior executives conducted by *The Economist* in 2002, where 65% of the respondents reported customers as their main focus ("Running the show. Surveys: A corporate leadership," 2003). Next in importance were cash flow stability, profitability, and internal customer satisfaction.

A nonparametric test, the Mann-Whitney test was performed to compare the central tendencies of these two independent samples (MBE/DBE/WBE versus non-MBE/DBE/WBE) by test-

Table 4. Average Importance Weights of Performance Factors and Issues

Performance issues	Performance factors	Average importance weights of performance factors ^a	Normalized importance weights of performance factors	Average importance weights of issues ^a	Normalized importance weights of issues
Financial	Profit	4.34	0.343		
	Growth in revenue	3.95	0.312	4.22	0.153
	Cash flow stability	4.37	0.345		
Customer satisfaction	External customer satisfaction	4.79	0.392		
	Internal customer satisfaction	4.28	0.35	4.077	0.148
	Market share	3.16	0.258		
Internal business	Technological capability	3.73	0.485	3.845	0.139
	Business efficiency	3.96	0.515		
Learning and growth	Human resource development	3.50	0.468	3.75	0.136
	Organizational competency	4.00	0.533		
Job safety	Job safety	3.92	1	3.92	0.142
Technological innovativeness	IT implementation	3.50	1	3.5	0.127
Quality management	Quality management	4.27	1	4.27	0.155

^aOn a scale of 1 to 5, where 1=least important and 5=most important.

ing a set of hypotheses at a significance level of $\alpha=0.05$. The following hypotheses were tested:

1. H_1 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of financial performance;
2. H_2 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of customer satisfaction;
3. H_3 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of internal business performance;
4. H_4 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of learning and growth performance;
5. H_5 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of safety performance;
6. H_6 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of technological innovativeness;
7. H_7 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of quality management performance; and
8. H_8 : MBE/DBE/WBE firms and non-MBE/DBE/WBE firms are identical in terms of overall performance.

According to the findings presented in Table 5, non-MBE/DBE/WBE companies outperformed MBE/DBE/WBE companies in four issues. While the differences between the two populations were not statistically significant in terms of internal business, job safety, and quality management, non-MBE/DBE/WBE companies were stronger financially, had better customer relationships, hired and retained more qualified human resources, and were equipped with superior IT capabilities than MBE/DBE/WBE companies. These findings are similar to the findings of the studies Chang (1987) and Glover (1977) conducted almost 20 and 30 years ago, respectively. Glover (1977) and Chang (1987) also conclude that MBE/DBE/WBE companies face difficulties in financing, and lack management skills because they have difficulty recruiting and retaining good workers, which in turn hinder the growth of the company. Blanchflower et al. (2003) studied whether minority owned small businesses face disadvantages in the credit market. The study found that African American-owned firms are substantially more likely to be denied credit than other groups and are charged higher interest rates than comparable white-owned firms. The study of Bates (2006) on a preferential procurement program in Chicago also sheds light into the difficulties minority contractors face in the construction industry. When the preferential pro-

curement program was challenged as reverse discrimination in the federal court, the study of Bates (2006) revealed that minorities worked fewer hours and earned less per hour than their white counterparts. Consequently, according to Bates (2006), MBE/DBE/WBE companies cannot participate in the construction industry with equal status as non-MBE/DBE/WBE companies.

Non-MBE/DBE/WBE firms outperformed MBE/DBE/WBE firms in terms of IT capabilities, too. IT capabilities and financial performance are closely related. According to Huang et al. (2006), firms with high IT capability tend to perform well on a variety of profit and cost-based performance measures. IT increases opportunities and improves financial profitability (Huang et al. 2006; Dardan et al. 2006; Thouin et al. 2008). Also, it is

Table 5. Comparison between MBE/DBE/WBE versus Non-MBE/DBE/WBE Companies

Performance issues	Weighted average score for MBE/DBE/WBE	Weighted average score for non-MBE/DBE/WBE	Two-tailed p values	Statistical significance
Financial	3.138	3.564	$P(1)=0.000$ $P(2)=0.000$	Yes
Customer satisfaction	3.668	3.890	$P(1)=0.006$ $P(2)=0.011$	Yes
Internal business	3.764	3.910	$P(1)=0.136$ $P(2)=0.271$	No
Learning and growth	3.122	3.546	$P(1)=0.003$ $P(2)=0.007$	Yes
Job safety	3.312	3.056	$P(1)=0.142$ $P(2)=0.285$	No
Technological innovativeness	2.785	3.231	$P(1)=0.023$ $P(2)=0.047$	Yes
Quality management	3.272	3.425	$P(1)=0.192$ $P(2)=0.384$	No
Overall	3.302	3.522	$P(1)=0.003$ $P(2)=0.005$	Yes

Table 6. Number of Companies in Each Category (132 Companies Total)

Size and age of company	Non-MBE/DBE/WBE (total 50) (%)	MBE/DBE/WBE (total 82) (%)
Percentage of old companies— Over 10 years in business	82	61
Percentage of large companies— Over 50 employees	68	26
Percentage of large and old companies	68	24

critical to have the technological skills of IT personnel, a sophisticated IT infrastructure and platform, and highly effective IT end users (Huang et al. 2006). In essence, a large amount of investment is required to increase the IT capability of a company in order to realize the benefits once it is implemented. MBE/DBE/WBE construction firms find it difficult to invest in IT since they are faced with difficulties in financing and discrimination in the credit market.

It can be inferred from this study that both MBE/DBE/WBE and non-MBE/DBE/WBE companies performed equally well in terms of implementing a quality management system and understood the importance of quality management for effective management and the competitive survival of their organizations. A part of quality management was probably having the technical capability to do the work, meet and exceed client expectations by completing the work on time and having a good flow of communications, which are all part of internal business. According to Dean and Bowen (1994), there has been an increased level of interest in quality management in many sectors of the industry. Today quality management is essential and fundamental to excel in the industry (Nair 2005). Both MBE/DBE/WBE and non-MBE/DBE/WBE companies also performed equally well in terms of monitoring and protecting the health, safety, and welfare of the workers and employees. According to Jaselskis et al. (1996) companies with low recordable incidence rate provided a more detailed written safety program, spent greater monetary resources, provided additional safety training, and conducted more informal inspections.

The differences between the overall performance scores of MBE/DBE/WBE and non-MBE/DBE/WBE companies were statistically significant at $\alpha=0.05$. An overall weighted score was calculated by treating the individual scores in the seven issues by their respective importance weights presented in Table 4. Again, the Mann-Whitney test was performed to compare the central tendencies of these two independent samples. Overall, non-MBE/DBE/WBE companies outperformed MBE/DBE/WBE companies.

The analysis also showed that MBE/DBE/WBE companies are in general younger and smaller than non-MBE/DBE/WBE companies. According to Table 6, non-MBE/DBE/WBE companies had been in business longer and employed a larger workforce than MBE/DBE/WBE companies. The overall averages are presented at the bottom of Table 6 and may indicate that one of the reasons why MBE/DBE/WBE companies were outperformed by non-MBE/DBE/WBE companies is because of their smaller size and limited experience.

It was only reasonable to compare the performance of MBE/DBE/WBE and non-MBE/DBE/WBE companies of comparable size and equivalent business experience. Hence, the Mann-Whitney tests were repeated for “large and old” MBE/DBE/WBE

Table 7. Comparison between Large and Old MBE/DBE/WBE versus Large and Old Non-MBE/DBE/WBE Companies

Performance issues	Weighted average score for MBE/DBE/WBE	Weighted average score for non-MBE/DBE/WBE	Two-tailed <i>p</i> values	Statistical significance
Financial	3.596	3.643	$P(1)=0.305$ $P(2)=0.610$	No
Customer satisfaction	3.730	3.858	$P(1)=0.236$ $P(2)=0.472$	No
Internal business	3.880	3.927	$P(1)=0.500$ $P(2)=1.000$	No
Learning and growth	3.222	3.655	$P(1)=0.052$ $P(2)=0.103$	No
Job safety	3.499	3.268	$P(1)=0.281$ $P(2)=0.562$	No
Technological innovativeness	3.333	3.477	$P(1)=0.371$ $P(2)=0.741$	No
Quality management	3.375	3.640	$P(1)=0.201$ $P(2)=0.401$	No
Overall	3.523	3.641	$P(1)=0.097$ $P(2)=0.194$	No

versus “large and old” non-MBE/DBE/WBE companies, where “large” is defined by a minimum of 50 employees and “old” means being in business at least 10 years. Table 7 presents the findings of the comparison between large and old non-MBE/DBE/WBE and large and old MBE/DBE/WBE companies. There were no statistically significant differences between large and old MBE/DBE/WBE companies and large and old non-MBE/DBE/WBE companies in any of the seven issues.

This finding is consistent with the view that larger companies have an advantage when it comes to performance, in that larger company size allows strategic diversification, greater advantage in negotiating with clients, and ability to face competition by keeping prices below the competitive level (Fiegenbaum and Karnani 1991). Larger size means the possibility of more diversification allowing companies to successfully cope with possible market changes, as well as dealing with high-risk situations (Serrasqueiro and Nunes 2008). Small companies lack financial resources, lack strong managerial skills, and experience difficulty in attracting qualified personnel compared to larger organizations (Kale and Ardit 1998). The study of Kale and Ardit (1998) found that the smallness of a construction company was one of the main factors contributing to the failure of a company.

In addition to the effect of company size, the findings of this research also show that the age of a company has an effect on performance too. Younger companies have greater risk of failure than older companies because they depend on the cooperation of strangers, may not be as reputable as older companies, and are unable to compete effectively against well-established companies (Stinchcombe 1965). In addition, the study of Freeman et al. (1983) revealed that organizational death rates at early ages are much higher than those at later years. There is greater potential for survival as time passes as the structure of an organization stabilizes and effectively copes with the environment. Kale and Ardit (1998) studied construction companies over a 10 year period and found that the percentage of failure increases over the first few years after their establishment, reaches a peak, and decreases afterwards.

Conclusion

A company performance management model was developed in this study to investigate the performance of MBE/DBE/WBE versus non-MBE/DBE/WBE companies in the construction industry. To promote equality in the construction industry, the U.S. government sets aside a certain percentage of federally funded projects to be awarded to MBE/DBE/WBE companies. This policy raises concerns among policy makers, practitioners and academics and the legitimacy of the program is continuously challenged and revisited for improvements (Beliveau et al. 1991; El-Itr and Kangari 1994b). Hence, this research was conducted to compare the performance of MBE/DBE/WBE versus non-MBE/DBE/WBE companies in the construction industry and to test if there are any statistically significant differences in the performance of these two groups.

Although there are many company performance measurement tools cited in the literature, the construction industry was slow to develop a comprehensive performance measurement tool at the organizational level. In this study, a measurement model was developed by identifying recurring performance criteria in the literature and by combining them into a single measurement model (Table 2). Information was collected by administering questionnaire surveys to executives of companies in the construction industry including designers, contractors, and construction managers.

The study revealed that there is a statistically significant difference in the performance of MBE/DBE/WBE and non-MBE/DBE/WBE companies. According to the findings, non-MBE/DBE/WBE companies outperformed MBE/DBE/WBE companies in four issues. They were stronger financially, had better customer relationships, hired and retained more qualified personnel, and were equipped with superior IT capabilities than MBE/DBE/WBE companies. These findings are similar to findings in previous studies conducted by Bates (2006), Blanchflower et al. (2003), Chang (1986), and Glover (1977).

The study also showed that MBE/DBE/WBE companies are in general smaller and younger than non-MBE/DBE/WBE companies. When the same tests were administered to large and old MBE/DBE/WBE and large and old non-MBE/DBE/WBE companies (large and old companies employ less than 50 people and have been in business for more than 10 years), no significant differences were found in the performance of the seven issues and in the overall performance of these companies.

The findings of this research indicate that the performance of large and old MBE/DBE/WBE and non-MBE/DBE/WBE companies is quite similar. However, MBE/DBE/WBE companies that are smaller and younger suffer from the handicaps of small size and youth (i.e., difficulty in obtaining financing, difficulty to penetrate already established networks, difficulty in attracting and retaining competent staff, lack of credibility in the eyes of clients, etc.). Consequently, they are outperformed by the generally larger and older non-MBE/DBE/WBE companies, reinforcing the perception in the industry that MBE/DBE/WBE companies are inferior when compared to non-MBE/DBE/WBE companies. This research study suggests however that when MBE/DBE/WBE companies are outperformed by non-MBE/DBE/WBE companies, it is not because they are MBE/DBE/WBE companies, but because they are smaller and younger than non-MBE/DBE/WBE companies.

There are two limitations to this research. First, this study was conducted by using the subjective opinions of senior management because it was impractical to ask the respondents to provide data

on past financial performance. It was expected that senior executives could answer the questions based on their knowledge of the activities of their respective organizations. The possibility of extracting objective data from company records can be explored in future research. The approach developed in this study could be a good starting point.

Second, the performance measurement tool devised for this research was a synthesis of previous models proposed by different researchers. According to Bassioni et al. (2005), there is still room for improvement in this field. The variables considered in the model could be augmented by other interesting performance criteria such as supplier information and R&D. Further research could improve the model by expanding its coverage.

Despite these limitations, this study makes several contributions. This study suggests that both researchers and practitioners should acknowledge that MBE/DBE/WBE companies are equally capable of performing well in transportation projects compared to their non-MBE/DBE/WBE counterparts. It also concurs with previous research that smallness and newness have an important effect on the performance of a company.

As the demographic landscape continues to change in the United States, the construction industry should encourage diversity and find ways to nurture MBE/DBE/WBE companies to strengthen the economy.

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