

## **Managerial Competencies of Construction Managers**

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### **Abstract**

The construction industry differs from other industries due to its ingrained culture, unique nature, working conditions, and project-based setup. Besides technical issues, professionals in the construction industry also need to handle managerial issues. Therefore, professionals in charge of construction projects need to be in possession of management skills. Do the construction managers currently involved in construction projects exhibit the characteristics to be expected of a professional manager in this field? This study aimed to evaluate the managerial behaviors of active construction managers by administering a competency assessment test to a sample of construction managers and comparing the results with managers employed in industries other than construction. The Management Development Questionnaire (MDQ), a well-established and popular tool was used for this purpose. A total of 63 responses were received. The respondents were assessed in 20 different competencies. The results indicated that the responding construction managers scored slightly below average. This may be an indication that a more rigorous training of construction managers could benefit the industry.

### **Keywords**

Construction management, Competency, Comparison, Construction industry, Project managers

### **1. Introduction**

Managers in the construction industry are responsible for getting a project completed on schedule by working with the architect's plans, making sure materials are delivered on time, assigning work, overseeing craft supervisors, and ensuring that every phase of the project is completed properly and expeditiously. They also resolve problems and see to it that work proceeds without interruptions.

They may gain experience as masons, plumbers, carpenters or electricians and then move up through promotions and by increasing their skill set to management. Most construction management education is the experience garnered from working in real world situations. Not many managers are the product of a formal education program in construction even though this kind of work requires special planning, safety, cost control, and risk management skills.

Specialized construction management education is a recent field in colleges and universities. But still, not many universities offer construction management education (Arditi, 2006). In contrast, when other industries are considered (finance, IT, manufacturing, etc.), it appears that most managers have gone through extensive managerial programs and often have baccalaureate or advanced degrees specifically in management studies (business administration, finance, marketing, management science, etc.). This study is an attempt to explore the differences in managerial competencies encountered in construction vs. other industries.

## 2. Methodology of the Study

According to many dictionaries (e.g., The American Heritage Dictionary of the English Language, Chambers 20<sup>th</sup> Century Dictionary, Merriam-Webster's Collegiate Dictionary, WordNet 2.0), the definitions of competence and competency are basically the same; the quality of being adequately or well qualified physically and intellectually. But Rowe (1995) distinguishes between competence and competency. According to Rowe (1995), competence refers to the range of skills that are satisfactorily performed (what people can do), and competency to the behavior adopted in competent performance (how people do it). Rowe (1995) also mentions that competence is an objective measurement whereas competency is subjective. For instance, a skiing competition is measured by time and the competitor can know his/her performance. On the other hand, an ice skater's performance is measured by jury which is subjective. Competence is defined by numbers, whereas competency is determined by comparison. It can be said that competence is more functional and competency is more behavioral. The MCI Personal Competence Model (*Middle Management Standards* 1992) is a good example of a model that measures competence (Iversen, 2000), whereas Boyatzis's (1982) and Schroder's models (1989) are the two best known models that measure competency. McClelland's (1973) contribution to these models was to suggest that competencies should be assessed on the basis of not only occupational outcomes but social ones as well.

Because competence models require objective data such as number of employees over a period of time or the dollar value of work, they have practical limitations because not too many construction companies keep this sort of record or would be willing to disclose such information. Competency models, on the other hand, require subjective data that are relatively easier to extract from qualified respondents, and are therefore more suited for the sort of study that is presented in this paper.

The Management Development Questionnaire (MDQ) is a personal assessment instrument that is used to identify the strengths of CEOs, owners, presidents, executives, and managers of construction firms. It makes use of the concepts developed by Boyatzis (1982) and Schroder (1989). It was designed to measure a person's managerial behaviors with 20 different competencies across five broad domains; namely managing change, planning and organizing, interpersonal skills, result orientation, leadership. MDQ is composed of 160 statements that are used to evaluate 20 competencies. Every competency is assessed by 8 questions.

MDQ is generally used to assess the managerial behavior of an individual. The end result is a report issued to a supervisor who wants to assess the performance of an individual working for them. In this study, MDQ is used for the first time as a tool to collect information about the managerial behaviors of a group of people as opposed to a single individual. MDQ is administered to a number of people employed in the same discipline. The end result in this case, is a collection of assessments, the average of which represents the managerial behavior of the group considered in the study.

The five global competencies covered by MDQ are described briefly in the following paragraphs.

Managing Change. This competency describes a positive and innovative attitude, acceptance of new ideas, attitude to take risks, and willingness to challenge regular practices. It has four competencies including initiative, risk taking, innovation, and flexibility and adaptability.

Planning and Organization. This global competency is a disciplined and considered approach to the details of the work involved. It requires a developed sense of prioritizing tasks and projects with analytical thinking, decision making, planning, and quality focus.

Interpersonal Skills. This global competency measures how a person handles and understands people and his/her approach to communicating with them. It involves oral communication, teamwork, relationships, and sensitivity.

Result Orientation. This competency is one of the key areas of management. It is about setting and achieving business goals. This global competency encompasses a commitment to the job, and a strong focus to meet customer needs. Four competencies, namely achievement, customer focus, business awareness, and learning belong to this global competency.

Leadership. Leadership is the global competency that is about balancing the needs of a person's goal with the ability to motivate, influence and empower his/her team to assist in achieving the ensuing tasks. This global competency is composed of four competencies, namely authority and presence, motivating others, developing people, and resilience.

## **2.1 Reliability and Validity of the Questionnaire**

Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials. Validity refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure. A result can be valid but not reliable, or vice versa. The method of internal consistency was conducted by the developers of MDQ to measure reliability and exploratory factor analysis to measure validity by making use of data collected from various industries (Cameron and the Test Agency, 1997). It should be noted that psychological tests are never completely reliable or valid, because the human psyche is too complicated to know anything about it with full confidence.

Internal consistency is a measure of reliability which measures whether different survey items measure the same thing. Concisely, it is a check if the questionnaire is internally consistent with the answers. It is usually measured by Cronbach's alpha coefficient. Table 1 shows the Cronbach's alpha coefficients for each competency (Cameron and the Test Agency, 1997). According to Hair (1998), the cut-off point for Cronbach's alpha in exploratory research is accepted as 0.60. The mean of the Cronbach's alpha coefficients for the 20 competencies is 0.69. It can be said that, the questionnaire is internally consistent, or reliable.

Validity is the extent to which a test measures what is desired to be measured. In other words, validity is achieving the desired results by hitting the target. For a psychological assessment, the fundamental concern is its validity. In fact, "validity is not a property of an assessment, but rather of the meaning of the test scores" (Messick, 1995; Cronbach, 1971).

Exploratory factor analysis (EFA) was used by the developers of MDQ to provide some evidence for the validity of the questionnaire (Cameron and the Test Agency, 1997). Exploratory factor analysis is a variable reduction technique that combines numerous variables into a much smaller set of "factors" (Rennie, 1997). EFA seeks to uncover the underlying structure of a large number of variables. Since MDQ has 20 variables, EFA tries to find out whether those 20 variables really measure what is intended to be measured. According to Leong (2006), "if the structure (number of factors, pattern of loadings) is consistent with what could be expected based on theory or design of the measurement device, there is some evidence for validity".

**Table 1: Internal Consistency of MDQ**

Competency	Cronbach's alpha
Initiative	0.74
Risk taking	0.73
Innovation	0.80
Flexibility and Adaptability	0.35
Analytical thinking	0.74
Decision making	0.74
Planning	0.77
Quality focus	0.67
Oral communication	0.88
Sensitivity	0.79
Relationships	0.70
Teamwork	0.70
Achievement	0.71
Customer focus	0.53
Business awareness	0.67
Learning	0.71
Authority and presence	0.83
Motivating others	0.23
Developing people	0.79
Resilience	0.74

- The extracting method Principal Component Analysis was used to determine the number of factors. In this method, correlations between variables are defined to determine if they can be grouped under smaller sets (factors). The extraction of factors in Principal Component Analysis is achieved by calculating the eigenvalues of the matrix for each item. The eigenvalues represent the percent of explained variance that is due to each factor.
- The second step is the determination of the factors to be retained. The Guttman-Kaiser rule that retains only factors with an eigenvalue larger than 1 was used. Three factors were found with eigenvalues greater than one. In Principal Component Analysis, correlation coefficients between the variables and the factors are also calculated and called loadings. High factor loadings are sought.
- The third step involves the rotation method. Rotation serves to make the output more understandable and is usually necessary to facilitate the interpretation of factors. The sum of eigenvalues is not affected by rotation, but rotation will alter the eigenvalues of particular factors and will change the factor loadings. The rotation method increases the strength of the relationship between many of the variables and the factors. Table 2 presents the loadings on each factor with the cut-off set at 0.40 as recommended by Cronbach (1955). This indicates that 18 of out of 20 competencies are related or associated with the three factors identified in the analysis (Cameron and The Test Agency, 1997).

It is also important to check the communalities after factor extraction. Communality is the proportion of a variable's variance explained by the factor structure. Low communalities across the set of variables indicate the variables are little related to each other. They also mean uniqueness of the items. On the other hand, high communalities mean that the items contribute significantly to the factor structure. In can be observed in Table 2 that there is only one low communality value (0.23) out of the communality values calculated for all 18 management competencies (Cameron and the Test Agency, 1997). This does not mean that this competency (motivating others) should be removed from the list. Rather it means that it is unique or outside the factor structure. The remaining 17 competencies have good communalities indicating that these competencies do add to the factor structure identified in the analysis. Given the

analysis described above, there seems to be enough evidence to state that MDQ's validity is not in question.

**Table 2: Factor Structure of MDQ**

Scale	Factor			Communality
	1	2	3	
Risk taking	0.99			0.63
Innovation	0.94			0.72
Authority & presence	0.85			0.75
Oral communication	0.82			0.68
Initiative	0.78			0.78
Decision making	0.72			0.64
Relationships	0.59			0.48
Achievement	0.58			0.67
Learning orientation	0.53			0.66
Quality focus		0.95		0.66
Planning		0.85		0.65
Analytical thinking		0.82		0.61
Business awareness		0.61		0.61
Flexibility & adaptability			0.83	0.57
Teamwork			0.76	0.64
Sensitivity			0.62	0.7
Motivating others			0.49	0.23
Developing people			0.47	0.7
<b>PERCENT OF VARIANCE</b>	<b>44</b>	<b>10</b>	<b>8</b>	

### 3. Survey – Data Collection

The managerial competencies of construction managers were assessed by administering the MDQ to them. MDQ is an assessment tool composed of 160 questions that evaluate five global competencies along with their four components (a total of 20 competencies).

The contact information of the potential participants was collected from the Internet at random. The potential participants were either owners, CEOs, executives, or managers of private construction companies in the U.S. These companies were randomly selected with no regard to their annual income or the number of their employees ([www.salesgenie.com](http://www.salesgenie.com)). The survey was emailed to approximately 1400 potential participants three times. As expected, the response rate was quite low. A total of 63 questionnaires were returned and used in the analysis.

Every competency is measured by eight questions. There are five possible answers to a question: strongly agree, agree, neutral, disagree, and strongly disagree. Respondents' answers were converted to a five-point rating scale. The total score for a competency is the sum of the scores of eight questions. So, the score of a competency varies between 8-40. These scores are then converted into a Standard Ten (STEN) Scale, rating participants' responses on a 1-10 range, based on a proprietary scale developed by HRD Press, Inc.. The STEN scores were calibrated by HRD Press Inc. for each and every competency separately by considering all respondents in all industries. According to this calibration, STEN Scores of 1-3 represent lower than average, 4-7 average, and 8-10 higher than average performance (Cameron and The Test Agency, 1997).

For all 63 participants and for all 20 competencies, STEN scores were calculated separately, i.e., a total of 1260 STEN scores were found. Then their mean values were used for analysis.

#### **4. Results and Discussion**

Managing Change: Managing change is acceptance of new ideas. Table 3 indicates that the average score of this global competency is “4.815” which is considered to be average. Construction managers scored above 5.00 in “initiative” and “innovation”. “Initiative” measures the capability of originating an activity, task, or managerial action. People with a high score in the “initiative” competency act independently, are brave, take the first step, and consider the opportunities. “Innovation” is about generating new ideas and putting them into practice. Being creative, trying new ideas, originating changes, thinking laterally might be the attributes of a high scoring individual in this competency. On the other hand, the lowest score was received by construction managers’ competency in “flexibility and adaptability” (3.767). This scale measures the ability to respond flexibly to different situations and people. If a person does not handle change with an open mind, does not compromise to get agreement, or does not adapt quickly, this person is likely to receive a low score in this competency. The score construction managers received corresponds to “low” managerial ability in this competency and represents a weakness that managers need to improve. The reason for the poor performance in “flexibility and adaptability” can be explained by the unusually high expectations caused by the dynamic and unpredictable nature of the construction business which forces construction managers to often deal with unexpected conditions.

Planning and organization: Planning and organization focuses on discipline, prioritizing the tasks, and attention to details. According to Table 3, construction managers’ score in this global competency (4.994) falls within the average range defined by HDR Press, but this global competency is the highest ranked competency among the five global competencies. The four constituent competencies, namely “analytical thinking”, “decision making”, “planning”, and “quality focus” also received relatively higher scores, probably because time is of the essence of the typical construction contract. In other words, a delayed completion can cost severe penalties and is to be avoided. “Analytical thinking” is the ability to think systematically, logically, rationally and scientifically. An individual scoring high in this competency analyzes things before acting, makes logical and rational decisions, and evaluates carefully. A high score in “decision making” indicates that a person takes responsibility, displays confidence, acts quickly, and does not hesitate while making decisions even when under pressure. “Planning” involves working in a systematic and organized manner. People with high scores organize themselves effectively, are always prepared for any situation, and handle tasks systematically. High scorers in “quality focus” have high standards relative to finishing jobs, delivering on time and within budget, and getting the detail right.

Interpersonal skills: Interpersonal skills include the ability to communicate, understand others, and get along with people. The construction project is a workplace for different parties, trades, and people. Therefore, managers have to deal with all kinds of people and organizations, and need to work with them. Table 3 indicates that the respondent construction managers’ scores in competencies associated with “oral communication” and “relationships” are relatively high. “Oral communication” measures how clearly a person’s views are expressed, how much impact these views have on others, and how influential this person’s verbal presentation skills are. People with high scores are excellent communicators and good at selling ideas. The “relationships” scale measures whether a person gets along well with other people. High scorers in “relationships” have a wide network, relate to people well, are surrounded by others, and are lively. On the other hand, the scores of the remaining two competencies, namely those associated with “sensitivity” and “teamwork” are lower. “Sensitivity” measures the level of regard for others. Low scorers tend not to listen much to people, consider other peoples’ opinions, and involve others in decisions. “Teamwork” is about understanding the dynamics of how a team operates and managing the different personalities within a team. High scores in “sensitivity” and “teamwork” imply a democratic

style of management. The results in Table 3 show however that construction managers have a tendency to be more autocratic than democratic.

**Table 3: STEN Scores of Each Competency**

Global competencies	STEN Scores	Competencies	STEN Scores
Managing change	4.815	Initiative	5.431
		Risk Taking	4.678
		Innovation	5.383
		Flexibility & adaptability	3.767
Planning & organizing	4.994	Analytical thinking	5.126
		Decision making	4.772
		Planning	4.870
		Quality focus	5.207
Interpersonal skills	4.693	Oral communication	5.451
		Sensitivity	4.183
		Relationships	5.048
		Teamwork	4.089
Result orientation	4.849	Achievement	4.908
		Costumer focus	3.718
		Business awareness	5.500
		Learning orientation	5.269
Leadership	4.585	Authority & presence	5.588
		Motivating others	4.805
		Developing people	4.141
		Resilience	3.807

Result orientation: Competency in “result orientation” is important because it is about defining the goals and achieving them. According to the findings presented in Table 3, competency in “costumer focus” received the lowest score among all scores (3.718). “Costumer focus” involves paying attention to customer service concepts and a desire to provide high standards. A high score means being committed to quality, and focusing on customer needs. The fact that construction managers scored low in this competency is a weakness that can be improved. On the other hand, competency in “business awareness” received the second highest score (5.500) of all scores (see Table 3). This competency measures the understanding of how to manage the business by maximizing opportunities, being aware of competitors and setting challenging targets. High scorers follow the business news, and set tough business targets.

Leadership: Leadership is the ability to motivate, influence, and empower others. According to Table 3, “authority and presence” was found to be the competency that received the highest score from construction managers (5.588). “Authority and presence” measures a person’s self confidence and how a person presents himself/herself. The high score indicates that an autocratic style of management that requires natural leadership, self-confidence, and a dynamic and charismatic personality is rather appropriate in the construction industry, considering the difficult conditions of construction work in general. Indeed, construction managers have to be autocratic in order to be accepted by all trades and

construction workers who typically come from different life styles and cultures. The construction industry has one of the highest cultural disparities among the parties involved in a project. The finding is consistent the finding relative to the competency in “planning and organization”. On the other hand, Table 3 also shows that construction managers scores quite low in “resilience” (3.807). “Resilience” involves being able to deal with difficult situations calmly and coping with stress effectively. Low scorers are not relaxed, and easily lose self-control when under pressure, something that happens quite often on a construction site.

According to Table 3, performance scores vary from 3.718 for “costumer focus”, a major weakness of construction managers, to 5.588 for “authority and presence”, a competency where construction managers scored on the higher side. Nine of the competencies received scores above 5, eight of them between 4-5, and three below 4, but all except three, were well within the average range of 4-7 defined by HRD, Inc. The overall average of the scores in the 20 competencies is “4.787”. Construction managers scored lowest in “flexibility and adaptability”, “costumer focus”, and “resilience”, all of them quite understandable in the difficult conditions of the construction process, including the frequent occurrence of highly unpredictable events. Their scores are lower than 4 and they constitute the relatively weaker competencies of construction managers.

These scores have potential implications for people holding project management positions in the construction industry. The reason why project managers in the construction industry scored in the average range in as many as 17 of the 20 managerial competencies investigated in this study possibly lies in the fact that they generally have a technical background and lack a formal management education/training.

## **5. Conclusion**

This research intended to assess the managerial competencies of project managers in the construction industry relative to managers in other industries.

The global competency levels of construction managers fall within the average range (4-7) relative to competency levels in other industries. The major reason for this finding is likely to be that most construction managers have a technical rather than a managerial background. Most do not particularly study construction management or project management in their formal education.

While construction professionals need to regularly address technical issues, they inevitably have to handle managerial issues too. Actually, managing construction projects requires specialized management knowledge and skills, because construction projects are conducted under time and resource constraints, are unique, depend on outsourced services, and are high-priced projects. On the other hand, construction management courses are not part of most civil engineering or architecture curricula (Arditi, 2006). In order to overcome this problem and improve the managerial skills of professionals in charge of construction projects, individuals identified for managerial positions should be encouraged to acquire formal degrees in this field, and all civil engineering and architecture curricula should be expanded to cover the basic construction management practices.

The results of this research are limited to the population surveyed. The study conducted encompasses a relatively small portion of the U.S. construction industry (63 participants). Further comprehensive research is required to take this study one step further. Future studies should reach more participants. Some control factors may be needed such as type and size of company, type and size of job, geographical location, and level of managerial position.

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