

## **Profiling the Modern Project Manager**

Georgios N. Aretoulis

*Department of Civil Engineering, AUTH, Thessaloniki, Greece  
garet@civil.auth.gr*

Eleni N. Aretouli

*The Johns Hopkins University School of Medicine, Baltimore, USA  
earetou1@jhmi.edu*

Demos C. Angelides

*Department of Civil Engineering, AUTH, Thessaloniki, Greece  
dangelid@civil.auth.gr*

Glykeria P. Kalfakakou

*Department of Civil Engineering, AUTH, Thessaloniki, Greece  
riak@civil.auth.gr*

### **Abstract**

Civil engineering projects include several uncertainties and risks, due to the special characteristics of construction industry. Time and cost are two crucial parameters that could potentially lead to successful and conforming to regulations production of projects. In this highly competitive environment, the tasks performed by a project manager are of special importance to the well being and economic prosperity of construction companies. This paper is trying to examine and create a desired profile of the person, who is responsible for managing a construction project. Firstly, there is an effort to review all the tasks that a manager is involved in. Performance and efficiency of each task is related to a number of characteristics attributed to the personality and cognitive skills of the manager. This study investigates the implementation of selected psychological instruments and inventories to a number of professional project managers. Furthermore, this study highlights the importance of psychological assessments in facilitating the procedure of selecting the appropriate person for a highly demanding managing position in a construction company and delineates many of the required characteristics that constitute the profile of the successful project manager.

### **Keywords**

Construction industry, Project manager, Project management, Project control, Psychology, Profiling

### **1. Introduction**

The effectiveness and productivity of organisations have been always depended heavily on the quality of their workforce, or their human capital, and there is general agreement that its importance relative to financial capital is steadily increasing. The recruitment and selection of an effective workforce consequently can be viewed as central to the success of an enterprise and a key function of Human Resource Management (HRM) (Wolf and Jenkins, 2006).

In projects, crisis, uncertainty and suspense are continually recurring to test the quality of project managers. The term project manager (PM) is used in the general sense of applying to the person, who has responsibility for managing the whole or some major part of a total project (Pilcher, 1994). Typical responsibilities of a project manager are coordinating and integrating of subsystem tasks, assisting in determining technical and manpower requirements, schedules and budgets, and measuring and analyzing project performance regarding technical progress, schedules and budgets. However, a project manager is supposed to play a stronger role in project planning and controlling, and is also responsible for negotiating, developing bid proposals, establishing project organization and staffing, and providing overall leadership to the project team in addition to profit generation and new business development (Jha and Iyer, 2006).

Project managers always face the challenges of figuring out how to proceed with the implementation of their projects, despite uncertainty, great diversity and an enormous amount of potentially relevant information. They try to get things done through a large and diverse set of people despite having little direct control over most of them. Knowing what project managers do, what kind of skills they demonstrate and what is their career path would seem to constitute a very important step for the selection and development of an effective manager, who is equipped to cope with any problem and accomplish unique outcomes with limited resources within critical time constraints (El-Sabaa, 2001).

The importance of the project manager in the delivery of successful projects has generated a considerable amount of rhetoric and a smaller body of research based literature dealing with the knowledge, skills and personal attributes required of an effective project manager. With a few notable exceptions, findings have been based on opinions, primarily of project managers (Crawford, 2000). Moreover, modern construction projects are no longer confined to a single discipline and are generally multidisciplinary. Typically a large multidisciplinary project needs coordination among the personnel of different departments (Jha and Iyer, 2006). The purpose of this study is to identify and analyze dominant skills and traits that a project manager should have for the success of a project.

The paper is organized in two parts:

- Part one provides an introduction and background to the topic, highlights the available literature relevant to this study, the roles undertaken by a project manager in a construction project, the tasks that a manager is involved in, and the characteristics attributed to the personality and cognitive skills of the manager.
- The second part proposes the development of a series of tests in order to evaluate all these traits in each individual and the implementation of selected psychological instruments and inventories to a number of professional project managers.

## **2. Analysis of Project Manager Skills**

In El-Sabaa (El-Sabaa, 2001) it is suggested that effective administration rests on three basic developable skills. These are human skills, conceptual skills and technical skills. Although these skills are interrelated, they can be developed independently.

In Fraser (Fraser, 2000) the PM is studied as an individual. The PMs are studied on what actually do, as opposed to their personal characteristics. PMs spent a considerable amount of their time outdoors talking to people, mainly supervisors, about technical matters. Thus, they were mainly concerned with coordinating the people involved in performing the technical tasks and, therefore, welding together effective teams. They attached rather less importance to planning and programming their projects and to their dealings with the design team and client. The PMs were asked to rank the managerial skills, that they thought they personally possessed, in order of importance for effective management. The combined order, from the most to the least important was (Fraser, 2000):

- social skills
- decision making
- handling problems
- recognizing opportunities
- managing change.

Furthermore the raw scores obtained from 126 respondents of a questionnaire survey were summarized into three skill areas. Each area contained several critical factors. As it is cited in El-Sabaa (El-Sabaa, 2001), the percentile scores of the three main skills of all sectors are: Human skills with a percentile score of 85.3% represented the most essential project manager skills. Conceptual and organizational skills with a percentile score of 79.6% represented the second category of essential project manager skills. Technical skills with a percentile score of 50.46% represented, relatively, the least essential project manager skills (El-Sabaa, 2001).

Personality research has shown that there are five major aspects of personality. Everyone's personality can be measured according to the degree to which they express, or do not express, these traits:

- **Extraversion**  
Extraverted personalities tend to be characterized by sociability, assertiveness, talkativeness, and activity. Extraverted people tend to prefer large groups to small gatherings.
- **Openness**  
Open personalities tend to have an active imagination, aesthetic sensitivity, attentiveness to inner feelings, intellectual curiosity, preference for variety and independent judgment. They are willing to entertain novel ideas and unconventional values.
- **Agreeableness**  
Agreeable personalities tend to be sympathetic toward others, altruistic in behavior and believe that others will be equally helpful in return. Components of the agreeable personality include trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness.
- **Conscientiousness**  
Conscientious personalities are characterized by a will to achieve. This personality is characterized by competence, order, dutifulness, achievement striving, self-discipline, and deliberation.
- **Neuroticism**  
Neurotic personalities tend to be vulnerable to psychological stress. Negative emotions such as embarrassment, insecurity, sadness, anger, fear and guilt are more likely to be experienced. Cluster traits that define this personality are anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability (Jha and Iyer, 2006).

Various researchers have stressed the need for different types of skills required by a project manager in order to ensure the project success. Their findings are based either on their experiences or on empirical research. Details are presented in Table 1.

### 3. Psychological Analysis for Selection Process

In the procedure of selecting the appropriate personnel it is possible to use:

- Interviews
- Psychometric/cognitive tests
- References
- Curriculum Vitae

The applied methods in project personnel selection should fulfill certain criteria, which affect the effectiveness in predicting the qualifications of the candidates (Muchinsky, 1986). Analysis has proved

that cognitive tests are more reliable than interviews and also their effectiveness can increase with their proper structure (Korres *et al.*, 2003).

**Table 1: Summary of Project Manager’s Skills Identified in Different Studies (Jha and Iyer, 2006)**

<b>Authors</b>	<b>Description of Skills</b>
Gaddis (1959)	Project manager needs solid basic experience in the relevant field and should be a leader able to carry out planning and follow-up activities.
Katz and Kahn (1978)	Project manager should have technical skills, human skills and conceptual skills.
Stuckenbruck (1976)	A proficient manager must be: multidisciplinary oriented, global problem oriented, an effective problem solver and decision maker, a good manager and administrator, possessing good analytical abilities, creative in dealing with information and problems, an effective communicator, able to motivate his team members to achieve fixed goals, flexible, and able to adapt to change, of the right temperament, and should be able to keep his calm.
Adams and Barndt (1978)	Project manager must have planning, coordination and budgeting skills in addition to team management skills.
Fryer (1979) cited in Odusami	Managing change, recognizing opportunities, handling problems, decision making, social skills are the skills needed in a project manager.
Spitz (1982) cited in Pettersen (1991)	Project manager should have: interpersonal skills, synchronising skills for different technology, technical expertise, and information processing skills.
Goodwin (1993)	Project manager’s effectiveness depends on conceptual, human, and negotiating skills as well as, to a lesser extent, on technical skills, besides verbal and written communication skills.
Meredith <i>et al.</i> , (1995) cited in El-Sabaa (2001)	The skills needed for a project manager are categorised into six skills areas: communication, organisational, team building, leadership, coping, and technological skills.
El-Sabaa (2001)	Three major skills groups: <i>human skills</i> such as communication, coping with situations, delegation of authority, high self-esteem and enthusiasm, <i>conceptual skills</i> such as planning and organizing skills, strong goal orientation, ability to see the project as a whole, and <i>technical skills</i> such as specialized knowledge of project, the technology required, and skill in the use of computer.
Project Management Institute (2000)	The project manager should have the following characteristics: an open positive ‘can do’ attitude, common sense, open mindedness, adaptability, inventiveness, prudent risk taking, fairness and commitment.
Kerzner (2002)	Team building, leadership, conflict resolution, technical expertise, planning, organization, entrepreneurship, administration, management support, resource allocation.

At the same time, concern for the competence of project managers has fuelled interest in the development of standards and certification processes that can be used for assessment, for recognition and as a guide for development of project management competence. Standards include those relating primarily to what project managers are expected to know, such as the PMBOK® Guide, the IPMA’s Competence Baseline, and the APMBok, and standards that address what project managers are expected to be able to do, such as the occupational or performance based competency standards of Australia and the United Kingdom (Crawford, 2000).

All the research conducted till now aimed at identifying the attributes, skills and experiences which should synthesize the best project manager. Experience, technical knowledge can be evaluated and certified even by using a person’s curriculum vitae. But what happens when all the interpersonal skills and communication skills must be measured or evaluated. This cannot be done effectively by studying the curriculum vitae of the future project manager, or by conducting a standard interview for him. It is necessary to implement specific psychometric tools in order to examine all these personal aspects of the project manager and, thus, create a profile of him, not only based on typical questionnaires but on valid psychological numbers and statistical analysis on those. Psychological testing and interviewing can help executives who want to do a better job of hiring key people. Psychological assessments are used in succession planning, employee screening, pre-employment decisions, and employee counseling situations. Which candidate fits the job and the company best? Is the candidate smart enough for the job?

Is there talent to grow? Does the candidate have enough "emotional intelligence" to work effectively as a manager? Which development direction is best for the manager (Muchinsky, 1986).

The use of personality tests for selection is highly controversial, and has been attacked on the grounds of both fairness and utility. Earlier meta-analyses tended to conclude that they are clearly less effective than assessment centres, work samples, and cognitive ability tests in predicting performance at work (Wolf and Jenkins, 2006).

Psychologists have helped executives and managers answer questions about their people, for more than 50 years. Some call it psychological assessment and some call it psychological profiling. Psychological assessment helps knowing more about the people to hire, promote, coach, or counsel (Korres *et al.*, 2003). Typically, a company first uses psychological profiling to help hire or promote key people. Many companies establish a policy to have the psychologist see all final candidates for a position above a specific salary level or grade. Most profile reports address the following topics:

- General intellectual level and problem-solving style
- Emotional maturity and personality
- Insight interpersonal style
- Management style or selling ability
- Decision-making and organizational skills
- Leadership competencies
- Ambition and aspirations

In addition, each position has unique needs and expectations. The psychological profile report addresses those specific position requirements in the summary. Psychological profiles are based on a two-hour behavioral interview, a general intelligence test, and several personality questionnaires, for a total of about four hours with an individual. Some psychologists use as much as a full half-day for just testing. Others use little testing but interview for as much as four-five hours. While the science is far from perfect, the combination of a disciplined interview with valid, standardized testing provides a thorough and objective assessment of an individual's capabilities and personality characteristics.

#### **4. Proposed Approach**

There is a need to hire the right people, develop them effectively, and prepare them for their future and the future of the company. Psychological tests give important insights about people and the people who are the most appropriate for a certain position. They help in making better decisions. From a purely financial view, if psychological tests can prevent someone from making one bad hire, it probably saves tens of thousands of dollars. From a development perspective, psychological profiles focus on organizations training and development money where they can be most effective. From an organizational perspective, there is no better growth strategy than using every tool available to hire and develop the best people. Psychological profiles are most effective when the psychologist has an opportunity to know the company, the incumbent managers, and the specifications of the position in question. This enables the psychologist to look at specific issues rather than general competencies.

To help ensure that a pre-hire or pre-promotion psychological test addresses the key issues for a given situation, it is helpful to provide the psychologist with the information below before he or she begins the evaluation process:

- Characteristics of the position in question
- Core competencies for the position and the company
- Possible barriers that could confront the successful candidate

- History of past incumbents
- Culture of the team surrounding the position and of the organization
- Expected short-term outcomes of the position in question
- Long-term expectations of the position
- Possible career path for the successful candidate

For developmental profiles, the following information is helpful before the assessment begins:

- History of successes and setbacks of the individual
- Relationships with peers and subordinates
- Possible opportunities to expand responsibility
- Recent performance reviews
- Special project opportunities
- Possible career path(s).

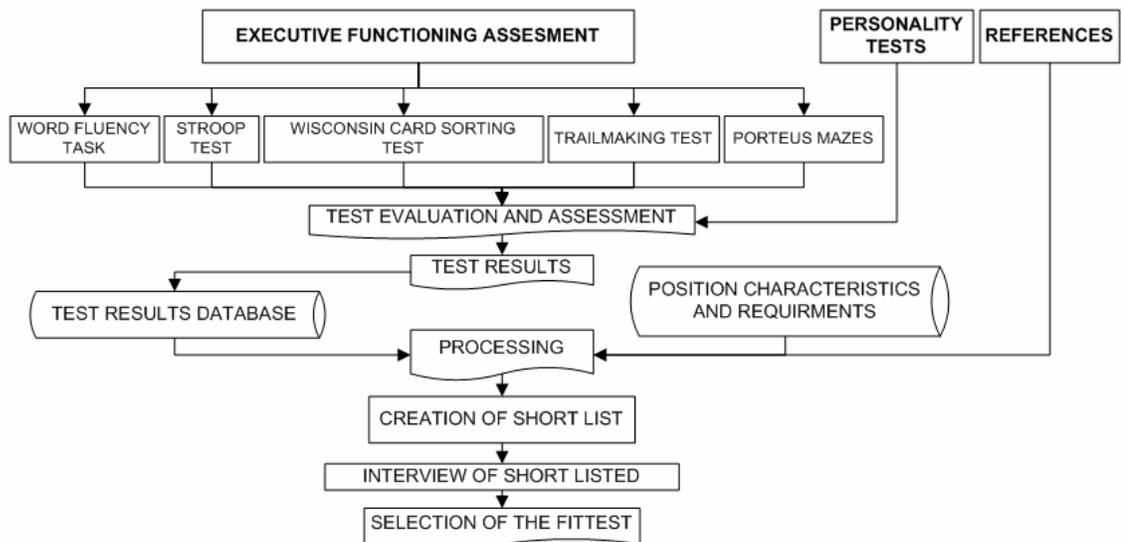
The instruments used to assess executive behavior are intensely demanding of concentration because they require mental agility, foresight, planning, freedom from distraction, and mental set shifting. The most appropriate tests used include the following:

- Word Fluency task
  - ✓ Despite some commonalities, semantic and phonemic fluency require different cognitive processes. Adequate semantic fluency requires intact semantic memory stores and effective search processes. In contrast, phonemic fluency is less dependent on memory stores, and more dependent on effective initiation and shifting skills (Kosmidis *et al.*, 2006).
  - ✓ It also examines the ability to engage in strategic search processes, such as initiation, cognitive flexibility, and mental shifting (Kosmidis *et al.*, 2006)
- Stroop tests
  - ✓ The cognitive dimension tapped by the Stroop is associated with cognitive flexibility, resistance to interference from outside stimuli, creativity, and psychopathology all of which influence the individual's ability to cope with cognitive stress and process complex input. Whether the test is used as a screener or as part of a general battery, its quick and easy administration, validity, and reliability make it an especially attractive instrument (Golden and Freshwater, 2002).
  - ✓ Is useful in determining the individual's cognitive flexibility, creativity, and reaction to cognitive stress (Golden and Freshwater, 2002).
- Wisconsin Card Sorting Test
  - ✓ The Wisconsin Card Sorting Test (WCST) (Heaton *et al.*, 1993) is a well-established measure of executive function. Its value and popularity are illustrated by the ever-increasing number of studies incorporating the WCST. Related abilities include planning, sequencing, concept formation, cognitive set shifting and maintenance, primarily involved in organizing and regulating goal-directed behaviors (Stratta, 1997).
- Trailmaking Test (Lezak, 1995)
  - ✓ The Trail Making Test is a standardized set of five visual search and sequencing tasks that are heavily influenced by attention, concentration, resistance to distraction, and cognitive flexibility (or set-shifting)
  - ✓ It is a timed test of complex visual scanning with a motor component, motor speed, and agility making a strong contribution to success on this task.

- Porteus Mazes (Lezak, 1995).
  - ✓ Is a nonverbal test of performance intelligence
  - ✓ It assesses the ability to plan and change problem-solving approaches
  - ✓ Is a useful nonverbal measure of executive function ability and of general adaptational capacity.

The proposed approach comprises the following steps, which are also presented in Figure 1:

- ✓ Application of personality tests
- ✓ Application of tests to assess executive function tasks
- ✓ Evaluation of test results
- ✓ Creation of subject's profile
- ✓ Update of database with the profile
- ✓ Comparison of profiles with job characteristics and requirements
- ✓ Selection of the fittest candidate



**Figure 1: Proposed Approach for Employee Selection**

## 5. Conclusions and Recommendations for Further Work

There exist significant differences between the traits possessed by a project coordinator of a successful project from those possessed by a project coordinator of a failed project, leading to the conclusion that the personal traits of project coordinators play an important role in influencing the outcome of a project. Studies showed that human skills of project managers have the greatest influence on project management practices while, the technical skills, have the least influence.

The research reported here has attempted to approach the profile of the fittest project manager from a potentially more objective viewpoint, by gathering data on project managers personality characteristics, using established project management standards and literature reviews, and then relating this to separately derived ratings of psychometric tests and evaluations. The aim has been to propose a psychometric test based methodology to select the most appropriate candidate for positions of great responsibility. A combination of personality tests, executive functioning assesment, references and interviews could be a more reliable methodology for selecting the most appropriate individual for a particular project

management assignment with a minimum selection process cost and risk. This study employs a specific set of psychometric tests, namely Stroop Test, Word Fluency Task, Wisconsin Card Sorting Test, Porteus Mazes, Trailmaking Test. The tests are evaluated and assessed and the results are stored in a database. The positions' characteristics and requirements are considered and compared with the tests' results and the available references. This procedure creates a short list of candidates. The successful candidate is chosen after the consideration of the short list along with the interview results.

## 6. References

- Crawford, L. (2000). "Profiling the competent project manager". *Proceedings of PMI Research Conference on Project Management Research at the Turn of the Millenium*, Paris, France, pp. 3-15.
- El-Sabaa, S. (2001). "The skills and career path of an effective project manager". *International Journal of Project Management*, Vol. 19, pp. 1-7.
- Fraser, C. (2000). "The influence of personal characteristics on effectiveness of construction site managers". *Journal of Construction Management and Economics*, Vol. 18, pp. 29-36.
- Golden, C.J. and Freshwater S.M., (2002). *Stroop Color and Word. Manual for Clinical and Experimental Uses*, Test Western Psychological Services, Los Angeles.
- Haynes, S. N. and Love, E.D.P. (2004). "Psychological adjustment and coping among construction project managers". *Journal of Construction Management and Economics*, Vol. 22, pp. 129-140.
- Heaton, R.K., Chelune, G.J., Talley, J.L., Kay, G.G. and Curtis, G. (1993). *Wisconsin Card Sorting Test Manual: Revised and expanded*, Psychological Assessment Resources, Odessa, FL.
- Jha, N.K. and Iyer, C.K. (2006). "What attributes should a project coordinator possess?". *Journal of Construction Management and Economics*, Vol. 24, pp. 977-988.
- Korres G., Goutsos, S., and Kostouros, J. (2003). *Principles of project organization and management*, Greek Open University, School of Exact Sciences and Technology, Vol. A, ISBN: 960-538-410-8.
- Kosmidis, M.H., Vlahou, C.H., Panagiotaki, P. and Kiosseoglou, G. (2004). "The verbal fluency task in the Greek population: Normative data, and clustering and switching strategies". *Journal of the International Neuropsychological Society*, Vol. 10, pp. 164-172.
- Lezak, M. D. (1995). *Neuropsychological Assessment*, Oregon Health Sciences University, Third Edition, New York, Oxford, Oxford University Press, Inc.
- Muchinsky, P. (1986). *Personnel Selection Methods*, in Cooper C.L. and Robertson I., *Review of Industrial and Organizational Psychology*, John Wiley & Sons.
- Pilcher, R. (1994). *Project Cost Control in Construction*, 2nd edition, Blackwell Scientific Publications, Great Britain.
- Royer, K. (1974). *The Construction Manager*, Prentice Hall, Inc., Englewood Cliffs, New Jersey.
- Wolf A., and Jenkins, A. (2006). "Explaining greater test use for selection: the role of HR professionals in a world of expanding regulation". *Journal of Human Resource Management*, Vol 16, pp. 193-213.
- Stratta, P., Daneluzzo, E., Prosperini, P., Bustini, M., Mattei, P., and Rossi, A. (1997). "Is Wisconsin card sorting test performance related to 'working memory' capacity?". *Journal of Schizophrenia Research*, Vol. 27, pp. 11-19.