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Gender Based Perception of Successful Construction of Project Managers' Attributes

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Abstract: Project Managers (PMs) are assets for every construction enterprise. The PM's personality is essential as it defines the way that PMs cooperate with the project team and thus influence drastically the project performance. The current research focused on identifying the way gender influences the perception of required PMs' attributes. In this context, a survey questionnaire was administered over a five-year period. Research survey successfully recorded 497 responses from Greek engineers. The survey identified profile data regarding the respondents and the scores assigned to the desired characteristics of the PMs. Firstly, a database was organized in SPSS and was followed by descriptive statistics analysis, independent sample *t*-test and correlation analysis that succeeded in identifying the way that gender influences the perception of PMs' personality characteristics. It was found that in general, female engineers have a different perspective on the attributes required for competent PM that their male counterparts do. Independent sample *t*-test and correlation analysis led to the same conclusions. More specifically, it became evident that female engineers tend to assign the highest Likert scale based scores (five), whereas male respondents tend to assign lower scores to all considered attributes. It is also worth mentioning that a significant amount of correlation appeared in the sample, significantly greater in number than the previous research initiatives. The most highly ranked abilities include: "Capability of Risk Evaluation", "Promptness on Solution Provision" and "Collaborative—Team Spirit". These attributes are anticipated due to the effects of the financial crisis on the implementation of construction projects in Greece.

Keywords: competent project managers; personality characteristics; attributes; gender; perceptions

1. Introduction

Construction projects are essential for the economic development of a country. Especially in the case of Greece, construction projects implementation could have a positive effect on the national economy and development. Such projects depend primarily on the human capital available. Project teams require coordination, guidance and control to reach peak performance. The person who orchestrates the construction personnel is the project manager. It is no coincidence that literature is greatly focused on the PM roles, duties, responsibilities, capabilities, knowledge, personality traits and facets.

The effectiveness and productivity of organisations have always depended heavily on the quality of their workforce, or their human capital (Wolf and Jenkins 2006). Crawford (2000), Stevenson and Starkweather (2010) emphasize that the importance of the project manager has generated a significant body of research based literature. Project management practices are becoming increasingly crucial, as more and more work is organized through projects and programmes (Winter et al. 2006). It is true that PMs' field of expertise is quite extensive and this creates difficulty in defining the manager's responsibilities and required attributes (Carter 1988).

A project team performs better when team members' personalities are compatible with each other. The current research aims to identify if and how a perception of the competent PM changes based on the gender of the engineer. Thus, this research aims at examining the required attributes of a competent PM, investigate whether gender influences the acknowledgement and assessment of these attributes and finally, the current paper tries to establish the basis for compatible personalities, leading to efficient project teams. Studies concerning the gender and occupation is a topic of interest for many researchers (Griffith and Dasgupta 2018; Sarathchandra et al. 2018; Banchefsky and Park 2018).

In the following sections, a literature review will be presented covering aspects of PMs attributes and identifying as much of the relevant research as possible. Literature review aimed at identifying required attributes of a competent Project Manager and at the same time illustrate the professional environment and conditions met in the case of male and female project managers. The goal was to highlight the different reality that male and female project managers face and provide a background that could facilitate a logical interpretation, of different attitudes and perceptions regarding the significance of the competent PM's attributes. Relevant research also covers aspects of behaviours and attitudes from PMs toward male and female project participants. Literature emphasizes the variations in behaviour and attitude of the PMs towards male and female employees. This fact produces a corresponding emotional reaction on behalf of male and female project stakeholders creating at the same time a continuous feedback loop. The latter may potentially justify the different needs and assessment of PMs. Then the methodological approach that describes the steps taken is depicted. A number of analyses followed that included: reliability analysis, descriptive statistics regarding the respondents' profiles and the scores assigned to attributes, independent sample *t*-test and finally correlation analysis. After considering the findings of the analyses, discussion on the results follows and finally, conclusions and further research.

2. Literature Review on PMs Attributes

Literature on PMs is quite extensive. PM is the person of interest when it comes to construction projects. The current section aims at briefly reviewing critical material regarding the PMs. PM has been identified as the person responsible for orchestrating the entire construction process (Cheung et al. 2004). Dziekoński (2017) introduced a model of construction project managers' competencies in Poland. The findings involved acknowledged literature definitions of competence, such as the behaviourist, the generic and the cognitive but could not determine which ones have the greatest impact on the competence of construction project managers.

As far as gender is concerned, male and female PMs are equally good (Müller and Turner 2007b). Buckle and Thomas (2003) suggest that contemporary gender scholarship reveals that different skill sets are founded on inherently gendered logic systems. It is critical to examine the role of masculine and feminine logic systems in project management. Their study deconstructs portions of the Project Management Body of Knowledge (PMBOK) in order to investigate the means in which gendered logic systems play a role in generally-accepted project management practice.

In the same context, Gale and Cartwright (1995) focus on women in project management. Then, their research embarks on a discussion on gender and organizational culture. The authors wondered whether the quantification of individual differences in the abilities, attitudes and managerial style of men and women could lead to gender polarization. Their research advised that organizational cultures should nurture and promote the behaviours and values of team working.

PIM focuses on the importance of leadership for project managers (Neuhauser 2007). Therefore, leadership style has been the focus of a lot of research dealing with the project manager competence. Men and women have differentiated managerial styles. This conclusion was based on the answers provided by the students of a Master on Project Management to a case study (Rodríguez et al. 2017). It became evident that men and women make different decisions at least in relations to some scenarios regarding project management. Differences were identified in 5 out of 53 situations that were presented to the students. Statistically significant difference was observed in at least one case. It became evident

that men follow a more authoritarian approach, whereas women a more social one, especially when it comes to leadership style (Rodríguez et al. 2017).

Pinto et al. (2017) focused their research on gender bias in selection for a project manager job. A lot of research examines the fact that female managers are subjected to negative stereotypes and bias. The latter influences hiring decisions. Current research aims at a job selection challenge within the context of project management. Findings suggest that in cases where the perceived technical competence of the job candidate was low, male candidates would be preferred. However, as a candidate's perceived technical competence increased, female job seeker was more likely to be hired over a male candidate.

Cartwright and Gale (1995) through statistical analysis revealed that women are underrepresented in managerial positions throughout Europe. This is particularly true in project-based industries such as construction. Parameters that affect this situation include: education, training, women's role in society and discrimination, at all levels of education and selection and promotion. At the same time, Chasserio and Legault (2010) highlight the difficulties that women face in project-based firms such as organization and management of information and communication technologies (ICT) enterprises. This fact leads to: long working hours, unpaid overtime, high management expectations to meet unanticipated client requirements and the need for employees to respond to flexible work arrangements. Women are disadvantaged in such a system. This could explain their under-representation in such sectors. Furthermore, Cavallo and Brienza (2006) identified gender difference. Supervisors rated Females higher in "Adaptability" and "Service Orientation", while Peers rated Females higher on "Emotional Self-Awareness", "Conscientiousness", "Developing Others", "Service Orientation" and "Communication". Direct reports scored Males higher in "Change Catalyst".

Project manager profile and professional or project success have been the focus of research in the last decade. In this context, Obradovic et al. (2013) aimed to identify correlation between project managers' emotional intelligence and their professional success. They emphasized that important skills in project management included: ability of teamwork and the leadership ability. Research highlighted that a person's ability to manage their emotions and the emotions of others would help in teamwork and leadership development process.

In this context, researchers highlight correlation among leadership, team interaction-collaboration and project performance. Turner and Müller (2005) and Müller and Turner (2005, 2007b, 2010) identified the leadership competency profiles of successful PMs in projects of different type. They observed differences in the leadership competencies of managers in different types of projects. In the same context, Carter (1988), suggested that project management skills are a dynamic group of factors, with different importance not only among projects but within different stages of the same project. A number of very interesting additional observations from Müller and Turner (2007a) include the fact that experienced PMs assign higher importance to teambuilding, than their younger colleagues.

El-Sabaa (2001) emphasizes that during project crisis, the corresponding uncertainty and suspense continually test PMs, who much figure out what to do with the execution of their projects through a large and diverse set of people. It is very interesting to note that Ogunlana et al. (2002) suggest that different projects require customizable and corresponding skills and capabilities on the part of the PM. Mastrandrea (1986) mentions that a PM should, at the same time, be a lawyer, economist, accountant, sociologist and psychologist. Social skill, decision making, handling problems, recognizing opportunities, managing change are only a few of the attributes identified by Fryer (1997).

Aitken and Crawford (2007) investigated the reactions of PMs under pressure and suggested the importance of experience. Furthermore, nationality, culture and age of the PM appear to influence the rating of success criteria and performance (Müller and Turner 2007b). Neuhauser (2007) investigates project management leadership behaviours. More specifically, the study focuses on the frequency of use, of such behaviours, by female project managers. The first step was to identify the most efficient project management leadership behaviours and then evaluate the frequency of use by female managers. The survey recorded the ratings provided by female PMs, to each behaviour. The scores assigned to

each attribute, were based on the importance of the specific behaviour towards an effective project manager. The least important behaviours, included: intellectual stimulation, influence, inspirational motivation and individualized consideration. The important behaviours focused on: attributed charisma, delegation and contingent reward. Finally, [Rees-Caldwell and Pinnington \(2013\)](#) emphasized that PMs from different national backgrounds manage similar projects in different ways, due to different PM cognitive schema. Taking into consideration all the above, it is interesting to recognize competent PMs' profiles per each country and gender.

A summary of the main literature review is depicted in the following Table 1 ([Aretoulis et al. 2017](#)):

Table 1. Project Managers' Roles and Factors Affecting Performance ([Aretoulis et al. 2017](#)).

Author/s and Date	Project Managers' Roles and Factors Affecting Performance
Sayles and Chandler (1971)	Scheduling of activities, control systems and responsibilities, monitoring of project
Mastrandrea (1986)	Lawyer, economist, accountant, sociologist, psychologist
Carter (1988)	Project management skills' importance per stages and type of project
Anderson (1992)	High-quality or above-average managerial skills and experience
Sauer (1993)	Not-technical factors, management, organization, culture
Pilcher (1994)	Control over progress, cost, quality and influences from external environment
Briner et al. (1996)	Facilitator, coordinator, motivator, politician cited in Dainty et al. (2004)
Fryer (1997)	Social skill, Decision Making, Handling Problems, Recognizing Opportunities, Managing Change
Sadler-Smith (1998)	Cognitive ability, style and strategies
Shahid and Froese (1998)	Access to a large amount of project information for avoiding problems, delays, claims
El-Sabaa (2001)	Human skill, conceptual and organizational skill, technical skill
Ogunlana et al. (2002)	Different projects require different skills and capabilities
Spony (2003)	Cultural concepts
Cheung et al. (2004)	Managing cost issues, balance of income and expenses, orchestrating construction
Herrbach et al. (2004)	Company's reputation, prestige and social identity
Zeira et al. (2004)	Trust and reliability
Kerzner (2005)	Initiative, leadership, ambition, creativity, flexibility, adaptability, commitment, vision, creating trust, effectiveness, ability to: persuade, make decisions, identify problems, organize work to subordinates
Debrah and Ofori (2005)	Occupational and organizational competencies
Müller and Turner (2005, 2007b, 2010)	Leadership competency profiles per type of project, stage of project, multi-cultural projects
Chen and Partington (2006)	PMs use the attributes described in PM standards based upon their conceptions of the work
Jha and Iyer (2006)	Planning, controlling, negotiating, developing bid proposal, project organization and staffing, leadership, profit generation, new business development
Moore (2006)	Dynamic negotiation
Aitken and Crawford (2007)	Experience
Müller and Turner (2007a)	Teambuilding, certificated, high degree of involvement
Ahadzie et al. (2008)	Contextual and task behaviours
Puck et al. (2008)	Cross-cultural sensitivity
Yang et al. (2011)	Leadership style, team interaction
Fisher (2011)	Understanding behavioural characteristics, Leading, Influencing, Conflict management, Cultural awareness
Lindebaum and Jordan (2012)	Emotional Intelligence
Park and Rainey (2012)	Work motivation and social communication
Yang et al. (2012)	Transformational leadership improves team communication and has positive influences on team collaboration
Diefenbach (2013)	Managers' interests and decision making
Hadad et al. (2013)	Properly match the right person to the right project
Wang et al. (2013)	Cross-cultural competence, conscientiousness, openness
Yang et al. (2013)	Leadership, teamwork
Zhang and Fan (2013)	Emotional intelligence: Emotional self-awareness, emotional self-control, empathy, organizational awareness, cultural understanding, communication
Caputo (2014)	Agreeableness, openness to experience
Sunindijo (2015)	Emotional intelligence, sincerity, budgeting, visioning, interpersonal skill, transformational leadership, quality management, contract administration

3. Methodological Approach

Current research methodology greatly relies on a structured questionnaire survey. The latter assessed the Greek PMs' attributes and identified the relative importance of the various cognitive abilities and personality characteristics. The survey lasted for five years and was administered to engineers from Greece (Aretoulis and Triantafyllidis 2014; Aretoulis et al. 2015a; Aretoulis et al. 2015b; Aretoulis et al. 2017). One of the last samples of questionnaires was collected and added in the last quarter of 2017. The pool of respondents is quite broad. It includes engineers from selected significant Construction Enterprises throughout Greece, Public Authorities, The Ministry of Infrastructure, Transport and Networks, Management Organization Unit of Development Programmes S.A. and Academians. The questionnaires were completed through interviews, emails and google forms.

The survey respondents provided scores on the PMs' attributes. The number of respondents that participated to the current research was 497. The attributes presented in the research survey were all positive in nature. Research is using Correlation Analysis and Independent T Test to identify and highlight the way gender influences the perception of the desired attributes of a PM. The methodology is briefly depicted in Figure 1:

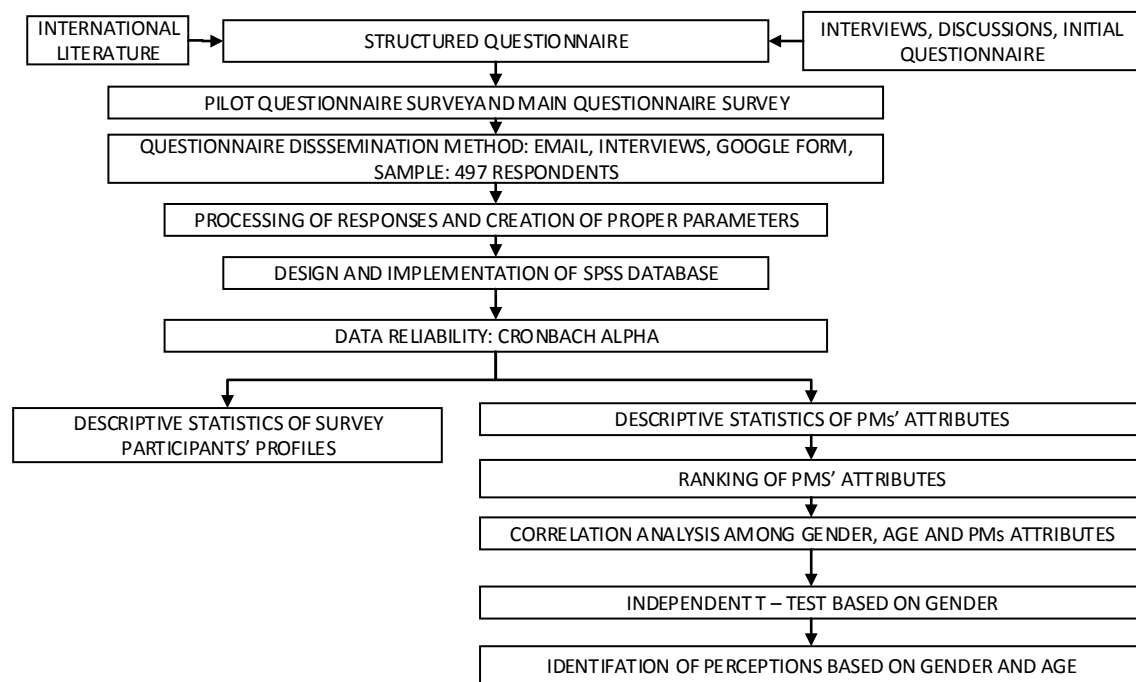


Figure 1. Research Methodology.

3.1. Questionnaire Structure and Survey Respondents' Profiles

The current questionnaire has been used for relevant research in the past (Aretoulis and Triantafyllidis 2014; Aretoulis et al. 2015a; Aretoulis et al. 2015b; Aretoulis et al. 2017). The questionnaire consisted of two main parts, which included:

- Profile of the survey's respondents
- Personality characteristics and abilities of PMs

More specifically, the first part of the questionnaire is devoted to the respondents, which have to answer 13 personal questions, ranging from age to academic and professional background (see Figure 2).

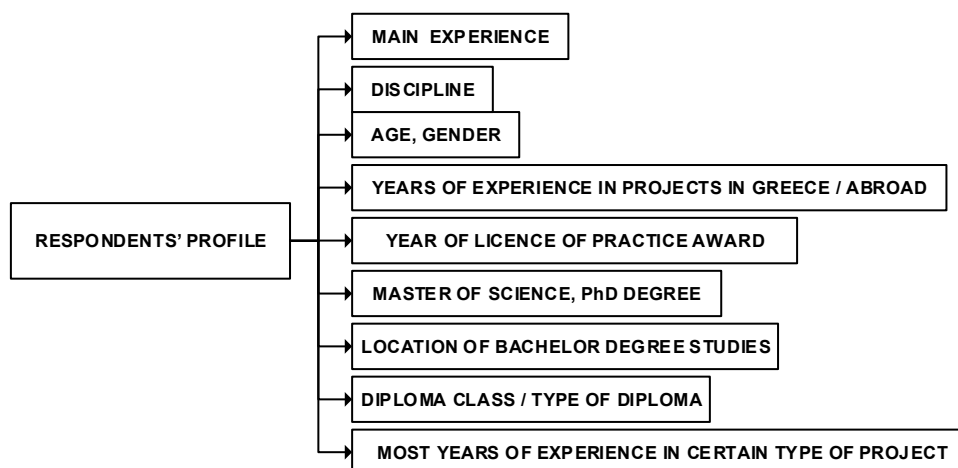


Figure 2. Questionnaire Survey: First-Part's Content Structure Regarding Respondents' Profile (Aretoulis et al. 2015a).

The second part focuses on PM's attributes. Characteristics regarding abilities and personality traits and facets sum up to 47 elements. Survey respondents were asked to assign scores to each PMs' characteristic on the basis of the effect of these attributes to project success. The majority of the answers were collected through check boxes and use of a Likert scale, ranging from 1 to 5. One point represents the lowest value and five points represent the highest value, meaning the most desirable attribute for optimum team collaboration and maximum team performance. The reliability test Cronbach Alpha on the 47 selected attributes returned a value of 0.932. Furthermore, when all 67 variables were selected, the Cronbach Alpha test returned the value 0.908. Both values suggest that the results of the survey are reliable.

The results of the research (valid percents) are based on a sample of 497 Greek Project Engineers. The respondents identified their roles as "Designer Engineers" 58.4%, "Construction Engineers" 14.3%, "PMs" 22.0% and finally "Contractors" 5.0%. Regarding their discipline, the 70.3% were Civil Engineers and another 6.7% Land Surveyors, 7.5% Architects, 4.1% Mechanical Engineers, Electrical Engineers 2.6%, Chemical Engineers 2.0% and Other Engineers 6.7%. In terms of gender breakdown, 58.6% of the respondents were male and 41.4 were female. Their ages varied from 24 to 65, with the 45.9% being among the ages of 27 and 38. Almost half of the respondents, 50.9% were involved in "Building Projects". In absolute numbers, 290 of the respondents were men and 205 were women.

3.2. Descriptive Statistics of the PMs' Attributes

The descriptive statistics were calculated with the aid of SPSS v.22. The replies regarding the questionnaire survey respondents' profile were processed and parameterized into categorical data. Then, an SPSS database was constructed. The scores per each attribute, trait, skill and ability were also included in the database, as well as the knowledge that was considered essential. These were recorded in their original format, as the Likert scale is regarded as categorical data. The final SPSS database consists of 497 cases (respondents) and 67 variables in total. The incorporated variables represented the respondents' profile (13 variables) and at the same time the attributes of the PM (47 variables) and finally variables describing the essential PMs' knowledge (7 variables). The frequency analysis' results concerning the cognitive abilities and personality characteristics of PMs are presented in the following Table 2:

Table 2. Resulting Frequencies Concerning PMs' Attributes.

Attributes	Score Percentages (Likert Scale 1–5)				
	1	2	3	4	5
Diligent	0.4	1.6	18.1	38.2	41.7
Capability of Predicting	0.2	2.7	10.3	34.9	52.0
Capability of Risk Evaluation	0.4	0.8	7.0	28.8	63.0
Respected	0.6	3.7	18.4	43.2	34.0
Practical Way of Thinking		1.6	11.5	41.1	45.8
Diplomacy	3.0	7.0	21.9	40.7	27.5
Conflict Resolution	0.6	2.7	15.4	34.0	47.3
Conflict Management	0.4	1.0	7.1	32.2	59.2
Capability of Outsourcing	0.4	2.1	11.9	38.4	47.2
Capability of Assigning Responsibilities	0.4	4.3	17.7	37.8	39.6
Perception of the Whole Picture	0.4	1.6	11.1	30.5	56.4
Perception of Scale	1.0	2.7	19.3	42.1	34.9
Inspiration	0.2	5.7	17.2	37.7	29.5
Creative	0.2	3.9	15.0	39.1	30.3
Leadership Capabilities	0.6	2.0	9.6	33.6	54.1
Collaborative—Team Spirit		0.4	6.0	35.8	57.8
Communication Skills		0.2	1.0	7.8	34.2
Integrity	1.2	4.1	20.2	38.7	35.8
Ethics	2.7	6.8	19.3	33.6	37.7
Justice	2.3	5.3	19.5	34.0	38.9
Methodical	0.8	1.4	13.7	41.2	42.8
Flexible	0.6	2.2	16.2	40.1	40.9
Capability of Considering Alternative Scenarios	0.6	1.2	13.3	37.1	47.8
Self Confidence	0.6	4.9	21.9	41.5	31.1
Commitment	2.3	7.2	30.5	39.5	20.5
Promptness on Decision Making		1.2	10.2	38.9	49.6
Promptness on Solution Provision	0.2	1.0	7.1	29.2	62.4
Decisiveness		1.8	8.6	39.9	49.7
Effectiveness	0.2	0.8	8.4	36.9	53.7
Self-Control	0.6	5.9	26.6	38.7	28.1
Politeness	3.7	11.3	32.0	35.9	16.8
Understanding	1.6	8.8	32.4	39.8	17.2
Responsible	0.4	0.8	12.3	36.7	49.8
Punctuality	0.6	2.1	11.5	37.0	48.9
Capable of Psychological Evaluation	1.9	9.5	32.4	38.8	17.5
Scheduling Capability	0.8	1.0	8.0	32.9	57.3
Perception of Time	0.2	1.4	8.6	34.2	55.5
Strategic Capability	1.6	3.7	13.3	34.0	47.3
Friendliness	5.9	17.0	39.7	29.0	8.4
Social Consciousness	5.7	15.3	34.6	30.9	13.5
Organizational Skill	0.4	1.0	6.9	34.5	57.1
Patient	1.8	6.2	28.1	34.9	29.0
Persistence	1.4	4.7	18.6	39.7	35.4
Inventive	0.6	6.2	22.2	40.0	30.8
Hardworking	0.8	2.5	17.0	41.3	38.2
Experience	0.4	1.9	13.4	34.4	50.0
Dynamic	0.8	3.7	20.0	39.6	35.9

Moreover, the descriptive statistics regarding the PMs' attributes are presented in the following Table 3 ranked in descending order based on the mean score (rounded to two decimal places):

Table 3. Resulting Mean Scores Concerning PMs' Attributes and Ranking.

Ranking	Attributes	Minimum	Maximum	Mean
1	Capability of Risk Evaluation	1.00	5.00	4.53
2	Promptness on Solution Provision	1.00	5.00	4.53
3	Collaborative Team Spirit	2.00	5.00	4.51
4	Conflict Management	1.00	5.00	4.49
5	Organizational Skill	1.00	5.00	4.47
6	Communication Skills	1.00	5.00	4.46
7	Scheduling Capability	1.00	5.00	4.45
8	Perception of Time	1.00	5.00	4.43
9	Effectiveness	1.00	5.00	4.43
10	Perception of The Whole Picture	1.00	5.00	4.41
11	Leadership Capabilities	1.00	5.00	4.38
12	Decisiveness	2.00	5.00	4.37
13	Promptness on Decision Making	2.00	5.00	4.37
14	Capability of Predicting	1.00	5.00	4.36
15	Responsible	1.00	5.00	4.35
16	Experience	1.00	5.00	4.32
17	Punctuality	1.00	5.00	4.31
18	Practical Way of Thinking	2.00	5.00	4.31
19	Capability of Considering Alternative Scenarios	1.00	5.00	4.30
20	Capability of Outsourcing	1.00	5.00	4.30
21	Conflict Resolution	1.00	5.00	4.25
22	Methodical	1.00	5.00	4.24
23	Strategic Capability	1.00	5.00	4.22
24	Diligent	1.00	5.00	4.19
25	Flexible	1.00	5.00	4.18
26	Hardworking	1.00	6.00	4.14
27	Capability of Assigning Responsibilities	1.00	11.00	4.13
28	Perception of Scale	1.00	5.00	4.07
29	Respected	1.00	5.00	4.06
30	Dynamic	1.00	5.00	4.06
31	Integrity	1.00	5.00	4.04
32	Persistence	1.00	6.00	4.03
33	Justice	1.00	5.00	4.02
34	Self Confidence	1.00	5.00	3.97
35	Ethics	1.00	5.00	3.97
36	Inventive	1.00	6.00	3.95
37	Self-Control	1.00	5.00	3.88
38	Diplomacy	1.00	5.00	3.86
39	Patient	1.00	5.00	3.83
40	Politeness	1.00	5.00	3.71
41	Commitment	1.00	5.00	3.69
42	Understanding	1.00	5.00	3.62
43	Capable of Psychological Evaluation	1.00	5.00	3.61
44	Social Consciousness	1.00	5.00	3.31
45	Creative	0.00	5.00	3.30
46	Inspiration	0.00	5.00	3.19
47	Friendliness	1.00	5.00	3.17

The most important attribute was identified as the “Capability of Risk Evaluation”. This was anticipated as the professional environment was quite volatile. The amount of available jobs was limited, both for public and private projects, the discounts provided for public projects on behalf of contractors were extremely extensive, the profit margin was limited and finally the project financing was difficult as cash liquidity was scarce. The next attribute is “Promptness on Solution Provision”. This is also logical as the “risky” business environment, accompanied by continuous change require preventive and corrective actions and ability to adapt quickly by identifying appropriate course of action. Timely response is a key success factor. The third most important factor includes “Collaborative—Team Spirit”. This attribute is among the top characteristics reported in the international literature. PM is expected

to be a team player inside a project. Furthermore, the workforce in Greek construction projects is multinational and multicultural. Thus, it is important to be able to make arrangements for completely different people and provide a context for smooth collaboration and high performance.

On the other hand, “Inspiration” and “Friendliness” are at the bottom of the list regarding their significance for the project manager, according to the survey respondents. Engineers consider themselves as professionals, being able to guide the project teams, using their leadership capabilities and keeping a required “professional” distance. “Inspiration” is not considered essential for technical projects and therefore, this attribute was assigned very low scores regarding the required characteristics of the project managers. Inspiration is indeed a soft skill, not necessarily needed for a technical project. It is usually connected to projects dealing with art and major breakthroughs. It should be emphasized that the conceptual content, essence or meaning of each term, is different in each language.

3.3. Independent Sample *t*-Test among Gender and PM Attributes

An independent-samples *t*-test was conducted to compare the required personality characteristics’ scores for project managers assigned by female and male survey-participating engineers. The results are presented in detail in the following section. Firstly, mean and standard deviation among male and female respondents per PMs’ attributes are presented in Table 4. Then follows, Table 5, that includes data relevant to: “Attribute”, Mean Score, Standard Deviation (SD), *t* value, Degrees of Freedom and the value of “*p*” (2-tailed significance). Levene’s test for equality of variances has taken place, in order to choose the appropriate data to interpret, based on the validity of the assumption of equal variances (Table 5). The data reveals that there was a statistically significant difference in the scores among male and female engineers:

Table 4. Mean and SD among Male and Female Respondents per PMs’ Attributes.

Attribute	Gender	Mean	Std. Deviation
Capability of Predicting	Male	4.28	0.84
	Female	4.47	0.69
Capability of Risk Evaluation	Male	4.47	0.71
	Female	4.62	0.68
Practical Way of Thinking	Male	4.24	0.77
	Female	4.43	0.68
Diplomacy	Male	3.77	1.00
	Female	4.00	0.87
Capability of Outsourcing	Male	4.21	0.78
	Female	4.42	0.78
Capability of Assigning Responsibilities	Male	4.01	1.00
	Female	4.31	0.79
Perception of The Whole Picture	Male	4.35	0.82
	Female	4.50	0.71
Perception of Scale	Male	4.00	0.90
	Female	4.19	0.79
Inspiration	Male	3.21	1.06
	Female	3.18	1.00
Collaborative Team Spirit	Male	4.47	0.65
	Female	4.58	0.60
Communication Skills	Male	4.41	0.73
	Female	4.55	0.65
Integrity	Male	3.89	0.94
	Female	4.26	0.83
Ethics	Male	3.82	1.12
	Female	4.19	0.88

Table 4. Cont.

Attribute	Gender	Mean	Std. Deviation
Justice	Male	3.86	1.07
	Female	4.26	0.84
Methodical	Male	4.12	0.82
	Female	4.42	0.73
Flexible	Male	4.08	0.83
	Female	4.34	0.81
Capability of Considering Alternative Scenarios	Male	4.22	0.81
	Female	4.41	0.76
Commitment	Male	3.58	0.97
	Female	3.86	0.90
Promptness on Decision Making	Male	4.29	0.74
	Female	4.50	0.66
Promptness on Solution Provision	Male	4.47	0.75
	Female	4.62	0.59
Decisiveness	Male	4.27	0.77
	Female	4.54	0.60
Effectiveness	Male	4.36	0.75
	Female	4.53	0.60
Self-Control	Male	3.78	0.91
	Female	4.02	0.88
Understanding	Male	3.54	0.93
	Female	3.75	0.91
Responsible	Male	4.19	0.82
	Female	4.58	0.59
Punctuality	Male	4.19	0.83
	Female	4.50	0.72
Capable of Psychological Evaluation	Male	3.52	0.98
	Female	3.73	0.88
Scheduling Capability	Male	4.35	0.84
	Female	4.58	0.59
Perception of Time	Male	4.31	0.81
	Female	4.60	0.56
Strategic Capability	Male	4.12	0.95
	Female	4.36	0.87
Friendliness	Male	3.07	1.03
	Female	3.32	0.94
Social Consciousness	Male	3.22	1.11
	Female	3.45	0.99
Organizational Skill	Male	4.42	0.75
	Female	4.55	0.63
Patient	Male	3.72	1.00
	Female	3.99	0.93
Persistence	Male	3.95	0.94
	Female	4.16	0.91
Inventive	Male	3.84	0.94
	Female	4.10	0.87
Hardworking	Male	4.06	0.89
	Female	4.27	0.76
Dynamic	Male	3.94	0.92
	Female	4.24	0.80

PMs' attributes where the independent sample *t* test did not identify statistically significant differences include: "Diligent", "Respected", "Conflict Resolution", "Conflict Management", "Inspiration", "Inventive", "Leadership Capabilities", "Self-Confidence", "Politeness" and "Experience".

The reason may rely on the fact that survey respondents tend to agree on the significance or lack thereof regarding these specific attributes.

It is very interesting to mention that female engineers assigned greater scores to all the considered attributes, except one, which was “Inspiration”. “Inspiration” is the unique attribute identified within the independent sample *t*-test that male engineers assigned a little greater score than female ones. The differences among the mean scores was equal to 0.02629, which was an extremely small difference.

It is also worth mentioning that among the attributes identified in the independent sample *t*-test, the least mean score differences were identified in “Experience”, “Politeness” and “Respected”. The greatest differences among the mean scores focused on: “Justice”, “Responsible”, “Integrity” and “Ethics”.

It could be suggested that “experience” is a key attribute in project management, directly related to project success. “Politeness” refers to the behaviour of the project manager towards his/her colleagues while “Respected” reflects the “feelings”/“opinion” and “beliefs” of colleagues towards the project manager. However, the mean scores tend to largely deviate with regard to attributes focusing on the ethical side of the personality of the project manager.

Table 5. Independent Sample *t*-test results among Male and Female Respondents per PMs’ Attributes.

Attributes	Levene’s Test for Equality of Variances		t-Test for Equality of Means		
	F	Sig.	t	df	Sig. (2-Tailed)
Capability of Predicting	5.918	0.015	−2.804	468.741	0.005
Capability of Risk Evaluation	3.787	0.052	−2.281	442.842	0.023
Practical Way of Thinking	0.704	0.402	−2.816	483	0.005
Diplomacy	13.442	0.000	−2.610	461.065	0.009
Capability of Outsourcing	0.431	0.512	−2.781	483	0.006
Capability of Assigning Responsibilities	0.770	0.381	−3.541	483	0.000
Perception of The Whole Picture	3.121	0.078	−2.152	463.444	0.032
Perception of Scale	0.243	0.622	−2.400	483	0.017
Collaborative Team Spirit	6.059	0.014	−2.027	444.340	0.043
Communication Skills	3.363	0.067	−2.220	455.996	0.027
Integrity	0.841	0.359	−4.514	482	0.000
Ethics	14.502	0.000	−4.096	476.702	0.000
Justice	10.373	0.001	−4.545	478.038	0.000
Methodical	0.003	0.954	−4.077	484	0.000
Flexible	1.998	0.158	−3.468	485	0.001
Capability of Considering Alternative Scenarios	0.100	0.752	−2.558	486	0.011
Commitment	5.417	0.020	−3.244	448.468	0.001
Promptness on Decision Making	1.705	0.192	−3.192	484	0.002
Promptness on Solution Provision	17.972	0.000	−2.531	480.846	0.012
Decisiveness	6.900	0.009	−4.364	480.083	0.000
Effectiveness	9.057	0.003	−2.727	476.401	0.007
Self-Control	1.848	0.175	−2.927	484	0.004
Understanding	1.410	0.236	−2.538	483	0.011
Responsible	13.465	0.000	−6.143	483.573	0.000
Punctuality	2.208	0.138	−4.152	483	0.000
Capable of Psychological Evaluation	5.020	0.026	−2.354	447.486	0.019
Scheduling Capability	18.022	0.000	−3.461	484.990	0.001
Perception of Time	26.959	0.000	−4.679	483.802	0.000
Strategic Capability	0.333	0.564	−2.784	484	0.006
Friendliness	0.036	0.850	−2.766	485	0.006
Social Consciousness	2.274	0.132	−2.415	485	0.016
Organizational Skill	4.906	0.027	−2.053	470.205	0.041
Patient	4.964	0.026	−3.060	446.722	0.002
Persistence	0.000	0.998	−2.486	485	0.013
Inventive	1.767	0.184	−3.140	483	0.002
Hardworking	0.176	0.675	−2.698	483	0.007
Dynamic	0.099	0.753	−3.672	481	0.000

3.4. Correlation Analysis among Gender and PMs Attributes

IBM SPSS 25 software was employed for the statistical analysis. Chi—square test was used to examine the association of respondents' profile and their assessment of skills, personal characteristics and knowledge for the PMs. The analysis revealed a number of interesting correlations. The findings will be presented in the following Table 6. The first column presents the attributes and the next columns highlight the 2-tailed asymptotic significance, adjusted residual and the Likert—score that each group tended to assign to each attribute. They all rated what attributes they considered essential for a competent PM.

Table 6. Asymptotic Significance (AS), Adjusted Residual (AR) and responses of identified correlations regarding “PMs Attributes”.

Attribute	Male Engineers			Female Engineers		
	Asymp. Sig. (2-Sided)	Adjusted Residual	Likert Value Assigned	Asymp. Sig. (2-Sided)	Adjusted Residual	Likert Value Assigned
Capability of Risk Evaluation	0.052	2.803	4	0.052	2.916	5
Practical Way of Thinking	0.041	—	—	0.041	2.4	5
Capability of Outsourcing	0.013	2.7	4	0.013	3.5	5
Capability of Assigning Responsibilities	0.003	3.2	3	0.003	3.3	5
Perception of Scale	0.043	2.4	3	0.043	—	—
Collaborative—Team Spirit	0.011	2.7	3	0.011	—	—
Integrity	0.000	3.4	3	0.000	3.9	5
Ethics	0.002	2.4 / 2.2	2/3	0.002	2.1	5
Justice	0.001	2.2/2.7	1/3	0.001	2.8	5
Methodical	0.001	2.7	3	0.001	3.9	5
Flexible	0.003	2.5	4	0.003	4.0	5
Commitment	0.033	1.9	2	0.033	2.0	5
Promptness on Decision Making	0.015	—	—	0.015	3.0	5
Promptness on Solution Provision	0.016	3.4	3	0.016	—	—
Decisiveness	0.001	2.5/2.0	2/3	0.001	3.4	5
Self-Control	0.047	—	—	0.047	2.7	5
Politeness	0.002	3.3	2	0.002	2.7	5
Responsible	0.000	4	3	0.000	4.8	5
Punctuality	0.001	3.1	3	0.001	4.0	5
Scheduling Capability	0.016	2.1	3	0.016	2.1	5
Perception of Time	0.000	2.2/3.4	2/3	0.000	3.1	5
Strategic Capability	0.053 (tendency)	—	—	0.053 (tendency)	2.8	5
Friendliness	0.025	2.1	2	0.025	2.7	4
Social Consciousness	0.046	2.4	2	0.046	1.9	4
Patient	0.060 (tendency)	—	—	0.060 (tendency)	2.4	5
Inventive	0.041	2.1	3	0.041	2.4	5
Dynamic	0.007	—	—	0.007	3.1	5

3.5. Comparison of Ranking of Attributes Based on Mean Scores Provided by Male and Female Respondents

One final view on the data analysis focuses on a comparison of the ranking provided by female and male respondents. The following Table 7 presents the resulting ranking based on the mean scores assigned by male and female respondents. Grey highlighted attributes are the ones where female respondents assigned a lower rank. Blue highlighted attributes are the ones having same scores assigned to them by both female and male respondents.

The attributes with the same ranking include: “Promptness on Decision Making”, “Hardworking”, “Diplomacy” and finally, “Patient”. The attributes at the bottom of the list are close together with a single ranking position difference. Among almost the top ten places both female and male engineers assign the following attributes: “Capability of Risk Evaluation”, “Promptness on Solution Provision”, “Collaborative—Team Spirit”, “Conflict Management”, “Organizational Skill” and “Communication Skills”. It is worth noting that with the exception of risks, these attributes focus on project team collaboration and cooperation. This is one of the most important goals of each project manager as identified in international literature.

Table 7. Comparison of Ranking of Attributes Based on Mean Scores Provided by Males and Females Respondents.

Rank Males	Rank Females	Attribute
1	2	Capability of Risk Evaluation
2	1	Promptness on Solution Provision
3	4	Collaborative Team Spirit
4	7	Conflict Management
5	9	Organizational Skill
6	8	Communication Skills
7	11	Effectiveness
8	16	Leadership Capabilities
9	6	Scheduling Capability
10	12	Perception of The Whole Picture
11	3	Perception of Time
12	23	Experience
13	13	Promptness on Decision Making
14	15	Capability of Predicting
15	10	Decisiveness
16	17	Practical Way of Thinking
17	20	Capability of Considering Alternative Scenarios
18	25	Conflict Resolution
19	18	Capability of Outsourcing
20	14	Punctuality
21	5	Responsible
22	29	Diligent
23	19	Methodical
24	21	Strategic Capability
25	22	Flexible
26	26	Hardworking
27	35	Respected
28	24	Capability of Assigning Responsibilities
29	32	Perception of Scale
30	37	Self Confidence
31	33	Persistence
32	30	Dynamic
33	27	Integrity
34	28	Justice
35	34	Inventive
36	31	Ethics
37	36	Self-Control
38	38	Diplomacy
39	39	Patient
40	42	Politeness
41	40	Commitment
42	41	Understanding
43	42	Capable of Psychological Evaluation
44	45	Creative
45	44	Social Consciousness
46	47	Inspiration
47	46	Friendliness

4. Conclusions

PMs' performance greatly affects project performance; thus, PM is considered a critical success factor. The tasks that a PM is expected to carry out are many and broad regarding the field of activities. A comparison with general competencies identified in international literature reveals that there is agreement in the required attributes and in many cases this agreement extends to the significance and ranking. The research agendas regarding the PMs include but are not limited to: characteristics, skills, personality traits, performance, success factors, relationship to project success, assignment of the right

PM to the right ‘job’, decision making, career development, international assignments, salaries and gender issues are few of the research agendas focusing on PMs.

The current research investigated the perception of the PM competencies based on the gender of the survey participant. The findings reveal that indeed, statistically significance differences exist among male and female engineers regarding the required competencies. Similar findings were also observed by other researchers, using various yet different approaches. The main tool, of the current research, was the implementation of a structured questionnaire survey, which collected 497 responses from engineers working in Greece. In general, female engineers provided greater scores. This could indicate greater expectations with regard to the required attributes. At the same time, male engineers provided lower scores. It could be mentioned that they are more conservative in selecting attributes and assessing them. This could not be attributed generally to a specific parameter. An effort to justify or explain their different views could rely on the attitude toward the external business environment. Furthermore, relevant research also identified the existence of differences in attitudes and behaviours of male and female PMs. On the other hand, PMs seem to “customize” differently their attitude and behaviours towards male and female employees. The latter could also partly justify the variations in scores provided by male and female respondents.

The previous research (Aretoulis et al. 2017) identified through a questionnaire survey administered to 305 engineers, certain attributes as the most significant that include but are not limited to the following: “Promptness on Solution Provision”, “Capability of Risk Evaluation”, “Collaborative—Team Spirit”, “Organizational Skill”, “Scheduling Capability” and “Conflict Management”. The current research identified the following attributes: Promptness on Solution Provision”, “Capability of Risk Evaluation”, “Collaborative—Team Spirit”, “Organizational Skill”, “Scheduling Capability”, “Conflict Management” and “Communication Skill”. The attribute “Collaborative—Team Spirit” has identical ranking in both research surveys. These attributes are considered essential for project management.

The current survey identified profile data regarding the respondents and the scores assigned to the desired characteristics of the PMs. It became evident that female engineers tended to assign the highest Likert scale based scores, whereas male respondents tended to assign lower scores to all considered attributes. It is also worth mentioning that a significant amount of correlations appeared in the sample, which was a lot greater than the previous research initiatives. The most significant abilities included: “Capability of Risk Evaluation”, “Promptness on Solution Provision” and “Collaborative—Team Spirit”. Regarding identified correlations, female respondents assigned 5 points to almost all the attributes. “Friendliness” and “Social Consciousness” were the only attributes that received 4 points on behalf of the female respondents. These two personality characteristics seem not to align with the strict professional profile of the PM and are not considered so essential for a competent PM.

Regarding the identified correlations and focusing on male respondents this time, it is apparent that they did not assign 5 points on the Likert scale to neither of the considered attributes. Their highest score was four and this was assigned to only three attributes, namely: “Capability of Risk Evaluation”, “Capability of Outsourcing” and “Flexible”. These are all very practical attributes useful for the construction site and in the case of risk, they have been identified as the most significant attributes. In general, male engineers seem to be less “generous”, regarding the assignment of scores, in comparison to female engineers. Another view would be that female engineers seem to be in a good way more “demanding” with regard to the PMs’ competencies.

It is very important to mention that these results originate from engineers working in Greece. An effort to explain or interpret the findings should also take into account the conditions that Greek engineers face today at their professional activities and the surrounding economic and working environment. Most of the research took place during the financial crisis in Greece. Therefore, jobs are limited, there exists an antagonistic environment, margins for errors are almost non-existent, profit margins for enterprises are very limited, risks are high, cash liquidity is very low and large enterprises are the main pillars left in the field of construction. Financing the projects is also a great problem due

to the absence of liquidity in banks. Each engineer relies on his or her experience and knowledge to make sure that he or she continue to be professionally “attractive”. Salaries are not adequate and do not correspond to the working hours, which along with working days stretch beyond the “usual” schedule. Furthermore, there exists insecurity among these engineers regarding their future professional activities and prospects. All the above issues influence the personality of the engineers as well as their professional attitude. This leads to developing specific viewpoints regarding the required PMs’ abilities and personality. It should also be noted that the conceptual content of each attribute may vary across languages and cultures. Thus, it would be expected that the importance of each attribute changes among respondents from different national, cultural background. One final phenomenon that should be considered is the fact that survey respondents may project their own personality when they assign scores to the PM.

Considering the contribution of the current research, it could be argued that it resides on two main areas:

- The identification and understanding of the preferences among different genders of engineers
- Findings that could help build and manage project teams which are more compatible and could facilitate cooperation and optimize project team performance

As part of a further endeavour, it is proposed that other profile attributes should be examined that may influence the assessment of the considered attributes. These could include experience, age, professional and educational background, specific roles and professional positions undertaken by the survey participant. Furthermore, it would be important to investigate potential correlation among the resulting rankings provided in the survey questionnaire with the special characteristics of the construction activity and economy in Greece. Finally, the use of psychometric tests in order to assess the personality characteristics of the survey respondents and correlate it with their scores would provide insightful findings.

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References

- Ahadzie, Divine K., David G. Proverbs, and Paul Olomolaiye. 2008. Towards developing competency based measures for construction project managers: Should contextual behaviours be distinguished from task behaviours? *International Journal of Project Management* 26: 631–45. [\[CrossRef\]](#)
- Aitken, Alicia, and Lynn Crawford. 2007. Coping with stress: Dispositional coping strategies of project managers. *International Journal of Project Management* 25: 666–73. [\[CrossRef\]](#)
- Anderson, Stuart D. 1992. Project quality and project managers. *International Journal of Project Management* 10: 138–44. [\[CrossRef\]](#)
- Aretoulis, Georgios, and Christoforos Triantafyllidis. 2014. “Greek Construction Project Managers’ Cognitive Abilities, Personality and Knowledge”. *International Journal of Operations Research and Information Systems* 5: 32–47. [\[CrossRef\]](#)
- Aretoulis, Georgios, Glykeria Kalfakakou, and Aikaterini Seridou. 2015a. Project Managers’ Profile Influence on Design and Implementation of Cost Monitoring and Control Systems for Construction Projects. *International Journal of Information Technology Project Management* 6: 1–25. [\[CrossRef\]](#)
- Aretoulis, Georgios, Konstantinos Zapounidis, Panagiotis Papaioannou, and Aikaterini Seridou. 2015b. Classifying the Attributes of the Competent Greek Construction Project Manager. *International Journal of Management and Decision Making* 14: 304–44. [\[CrossRef\]](#)
- Aretoulis, Georgios, Konstantinos Zapounidis, Jason Papathanasiou, and Aikaterini Seridou. 2017. Conscientiousness personality trait defines the competent Greek project manager. *International Journal of Business Project Management* 18: 350–80. [\[CrossRef\]](#)
- Banchefsky, Sarah, and Bernadette Park. 2018. Negative gender ideologies and gender-science stereotypes are more pervasive in male-dominated academic disciplines. *Social Sciences* 7: 27. [\[CrossRef\]](#)

- Briner, Wendy, Michael Geddes, and Colin Hastings. 1996. *Project Leadership*. Gower: Aldershot.
- Buckle, Pamela, and Janice Thomas. 2003. Deconstructing project management: A gender analysis of project management guidelines. *International Journal of Project Management* 21: 433–41. [\[CrossRef\]](#)
- Caputo, Andrea. 2014. Relevant information, personality traits and anchoring effect. *International Journal of Management and Decision Making* 13: 62–76. [\[CrossRef\]](#)
- Carter, Norman. 1988. The project manager: An emerging professional. *Information Systems Management* 5: 8–14. [\[CrossRef\]](#)
- Cartwright, Susan, and Andrew Gale. 1995. Project management: Different gender, different culture? A discussion on gender and organizational culture—Part 2. *Leadership & Organization Development Journal* 16: 12–16. [\[CrossRef\]](#)
- Cavallo, Kathleen, and Dottie Brienza. 2006. Emotional competence and leadership excellence at Johnson & Johnson. *Europe's Journal of Psychology*, 2. [\[CrossRef\]](#)
- Chasserio, Stéphanie, and Marie-Josée Legault. 2010. Discretionary power of project managers in knowledge-intensive firms and gender issues. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration* 27: 236–48. [\[CrossRef\]](#)
- Chen, Ping, and David Partington. 2006. Three conceptual levels of construction project management work. *International Journal of Project Management* 24: 412–21. [\[CrossRef\]](#)
- Cheung, Sai On, Henry CH Suen, and Kevin KW Cheung. 2004. PPMS: A web-based construction project performance monitoring system. *Automation in Construction* 13: 361–76. [\[CrossRef\]](#)
- Crawford, Lynn. 2000. Profiling the competent project manager. In *Proceedings of the Project Management Research at the Turn of the Millenium, Paris, France*. Sylva: Project Management Institute.
- Dainty, Andrew R., Mei-I. Cheng, and David R. Moore. 2004. A competency-based performance model for construction project managers. *Construction Management and Economics* 22: 877–86. [\[CrossRef\]](#)
- Debrah, Yaw A., and George Ofori. 2005. Emerging managerial competencies of professionals in the Tanzanian construction industry. *The International Journal of Human Resource Management* 16: 1399–414. [\[CrossRef\]](#)
- Diefenbach, Thomas. 2013. Interests behind managers' decisions: why and when do managers decide for managerial or alternative concepts? *International Journal of Management and Decision Making* 12: 413–32. [\[CrossRef\]](#)
- Dziekoński, Krzysztof. 2017. Project managers' competencies model for construction industry in Poland. *Procedia Engineering* 182: 174–81. [\[CrossRef\]](#)
- El-Sabaa, Salah. 2001. The skills and career path of an effective project manager. *International Journal of Project Management* 19: 1–7. [\[CrossRef\]](#)
- Fisher, Eddie. 2011. What practitioners consider to be the skills and behaviours of an effective people project manager. *International Journal of Project Management* 29: 994–1002. [\[CrossRef\]](#)
- Fryer, Barry. 1997. *The Practice of Construction Management*. Oxford: Blackwell Science Ltd., ISBN 0632041420.
- Gale, Andrew, and Susan Cartwright. 1995. Women in project management: entry into a male domain? A discussion on gender and organizational culture—Part 1. *Leadership & Organization Development Journal* 16: 3–8. [\[CrossRef\]](#)
- Griffith, Eric E., and Nilanjana Dasgupta. 2018. How the demographic composition of academic science and engineering departments influences workplace culture, faculty experience and retention risk. *Social Sciences* 7: 71. [\[CrossRef\]](#)
- Hadad, Yossi, Baruch Keren, and Zohar Laslo. 2013. A decision-making support system module for project manager selection according to past performance. *International Journal of Project Management* 31: 532–41. [\[CrossRef\]](#)
- Herrbach, Olivier, Karim Mignonac, and Anne-Laure Gatignon. 2004. Exploring the role of perceived external prestige in managers' turnover intentions. *The International Journal of Human Resource Management* 15: 1390–407. [\[CrossRef\]](#)
- Jha, Kumar Neeraj, and Chandrashekhar K. Iyer. 2006. What attributes should a project coordinator possess? *Construction Management and Economics* 24: 977–88. [\[CrossRef\]](#)
- Kerzner, Harold. 2005. *Project Management*, 9th ed. John Wiley & Sons: Hoboken.
- Lindebaum, Dirk, and Peter J. Jordan. 2012. Relevant but exaggerated: The effects of emotional intelligence on project manager performance in construction. *Construction Management and Economics* 30: 575–83. [\[CrossRef\]](#)

- Mastrandrea, Francesco. 1986. The liability of the construction project manager. *Construction Management and Economics* 4: 105–34. [\[CrossRef\]](#)
- Moore, Fiona. 2006. Strategy, power and negotiation: Social control and expatriate managers in a German multinational corporation. *The International Journal of Human Resource Management* 17: 399–413. [\[CrossRef\]](#)
- Müller, Ralf, and Rodney Turner. 2005. The impact of principal-agent relationship and contract type on communication between project owner and manager. *International Journal of Project Management* 23: 398–403. [\[CrossRef\]](#)
- Müller, Ralf, and Rodney Turner. 2007a. Matching the project manager's leadership style to project type. *International Journal of Project Management* 25: 21–32. [\[CrossRef\]](#)
- Müller, Ralf, and Rodney Turner. 2007b. The influence of project managers on project success criteria and project success by type of project. *European Management Journal* 25: 298–309. [\[CrossRef\]](#)
- Müller, Ralf, and Rodney Turner. 2010. Leadership competency profiles of successful project managers. *International Journal of Project Management* 28: 437–48. [\[CrossRef\]](#)
- Neuhauser, Charlotte. 2007. Project manager leadership behaviors and frequency of use by female project managers. *Project Management Quarterly* 38: 21. [\[CrossRef\]](#)
- Obradovic, Vladimir, Petar Jovanovic, Dejan Petrovic, Marko Mihic, and Zorica Mitrovic. 2013. Project managers' emotional intelligence—A ticket to success. *Procedia-Social and Behavioral Sciences* 74: 274–84. [\[CrossRef\]](#)
- Ogunlana, Stephen, Zafaar Siddiqui, Silas Yisa, and Paul Olomolaiye. 2002. Factors and procedures used in matching project managers to construction projects in Bangkok. *International Journal of Project Management* 20: 385–400. [\[CrossRef\]](#)
- Park, Sung Min, and Hal G. Rainey. 2012. Work motivation and social communication among public managers. *The International Journal of Human Resource Management* 23: 2630–60. [\[CrossRef\]](#)
- Pilcher, Roy. 1994. *Project Cost Control in Construction*. Oxford: Blackwell Scientific Publications.
- Pinto, Jeffrey K., Peerasit Patanakul, and Mary Beth Pinto. 2017. "The aura of capability": Gender bias in selection for a project manager job. *International Journal of Project Management* 35: 420–31. [\[CrossRef\]](#)
- Puck, Jonas F., Alexander T. Mohr, and David Rygl. 2008. An empirical analysis of managers' adjustment to working in multi-national project teams in the pipeline and plant construction sector. *The International Journal of Human Resource Management* 19: 2252–67. [\[CrossRef\]](#)
- Rees-Caldwell, Kelly, and Ashly H. Pinnington. 2013. National culture differences in project management: Comparing British and Arab project managers' perceptions of different planning areas. *International Journal of Project Management* 31: 212–27. [\[CrossRef\]](#)
- Rodríguez, Perez, Vicente Rodríguez-Montequín, Henar Morán, and Lorena de Arriba. 2017. Gender influence in project management: Analysis of a case study based on master students. *Procedia Computer Science* 121: 461–68. [\[CrossRef\]](#)
- Sadler-Smith, Eugene. 1998. Cognitive style: Some human resource implications for managers. *International Journal of Human Resource Management* 9: 185–202. [\[CrossRef\]](#)
- Sarathchandra, Dilshani, Kristin Haltinner, Nicole Lichtenberg, and Hailee Tracy. 2018. "It's Broader than Just My Work Here": Gender Variations in Accounts of Success among Engineers in U.S. Academia. *Social Sciences* 7: 32. [\[CrossRef\]](#)
- Sauer, Chris. 1993. *Why Information Systems Fail: A Case Study Approach*. Henley-on-Thames and Oxfordshire: Alfred Waller Ltd., Publishers.
- Sayles, Léonard R., and Margaret K. Chandler. 1971. *Managing Large Systems: Organizations for the future*. New York: Harper & Row.
- Shahid, Syed, and Thomas Froese. 1998. Project management information control systems. *Canadian Journal of Civil Engineering* 25: 735–54. [\[CrossRef\]](#)
- Spony, Gilles. 2003. The development of a work-value model assessing the cumulative impact of individual and cultural differences on managers' work-value systems: Empirical evidence from French and British managers. *International Journal of Human Resource Management* 14: 658–79. [\[CrossRef\]](#)
- Stevenson, Deborah H., and Jo Ann Starkweather. 2010. PM critical competency index: IT execs prefer soft skills. *International Journal of Project Management* 28: 663–71. [\[CrossRef\]](#)
- Sunindijo, Riza Yosia. 2015. Project manager skills for improving project performance. *International Journal of Business Performance Management* 16: 67–83. [\[CrossRef\]](#)

- Turner, J. Rodney, and Ralf Müller. 2005. The project manager's leadership style as a success factor on projects: A literature review. *Project Management Institute* 36: 49–61. [\[CrossRef\]](#)
- Wang, Dan, Susan Freeman, and Cherrie Jihua Zhu. 2013. Personality traits and cross-cultural competence of Chinese expatriate managers: A socio-analytic and institutional perspective. *The International Journal of Human Resource Management* 24: 3812–30. [\[CrossRef\]](#)
- Winter, Mark, Charles Smith, Peter Morris, and Svetlana Cicmil. 2006. Directions for future research in project management: The main findings of a UK government-funded research network. *International Journal of Project Management* 24: 638–49. [\[CrossRef\]](#)
- Wolf, Alison, and Andrew Jenkins. 2006. Explaining greater test use for selection: The role of HR professionals in a world of expanding regulation. *Journal of Human Resource Management* 16: 193–213. [\[CrossRef\]](#)
- Yang, Li-Ren, Chung-Fah Huang, and Kun-Shan Wu. 2011. The association among project manager's leadership style, teamwork and project success. *International Journal of Project Management* 29: 258–67. [\[CrossRef\]](#)
- Yang, Li-Ren, Kun-Shan Wu, Fang-Kuo Wang, and Pei-Chu Chin. 2012. Relationships among project manager's leadership style, team interaction and project performance in the Taiwanese server industry. *Quality & Quantity* 46: 207–19. [\[CrossRef\]](#)
- Yang, Li-Ren, Kun-Shan Wu, and Chung-Fah Huang. 2013. Validation of a model measuring the effect of a project manager's leadership style on project performance. *KSCE Journal of Civil Engineering* 17: 271–80. [\[CrossRef\]](#)
- Zeira, Yoram, Orly Yeheskel, and William Newbury. 2004. A comparative analysis of performance assessment: International joint venture managers versus regional headquarters managers. *The International Journal of Human Resource Management* 15: 670–87. [\[CrossRef\]](#)
- Zhang, Lianying, and Weijie Fan. 2013. Improving performance of construction projects: A project manager's emotional intelligence approach. *Engineering, Construction and Architectural Management* 20: 195–207. [\[CrossRef\]](#)



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