

Selection of Ideal Project Managers based on PROMETHEE and the Special Profile of the Decision Maker

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ABSTRACT

The current research aims at ranking and identifying the most efficient Project Manager (PM) based on personality attributes, using PROMETHEE methodology and at the same time considering the personal assessment and preferences of the decision maker. In this respect, it firstly analyzes PMs and their role, responsibilities and the required personality characteristics and attributes of what is considered a successful PM. The paper highlights the results of a structured questionnaire survey that evaluated the importance of the project managers' required attributes based on 497 responses from Greek engineers. The survey was carried out via emails and interviews with experts in project management. The results of the independent sample T – test identified the differences among male and female decision makers regarding the required attributes of competent PMs. Finally, Visual PROMETHEE was applied, in an effort to identify and highlight the most effective Project Manager taking into account the managers' scores regarding specific personality attributes and skills. At the same time, the decisions are taken based on and considering the special characteristics of the decision maker. The proposed methodology aims at identifying potential variations in the decisions in the selection process of the most competent PM based on the gender of the decision maker. It should be emphasized that the ranking of available PMs considers their personality traits and the specific preferences of the decision maker. Random profiles of PMs enter the ranking process. Two different PMs' profiles were considered. The findings suggest that the ranking of PMs both for male and female decision makers remains the same. Finally, a more holistic approach towards the selection of the most competent PM, should consider more special characteristics of the decision maker and at the same time focusing on the PM the personality attributes and abilities and also the technical skills, as these are identified by the project requirements.

Keywords: Project Managers (PMs), Multicriteria Decision Analysis, PROMETHEE, Personality Attributes and Abilities, Decision Maker, Gender.

Introduction

It is critical to select the best performing PM. The selection should rely on the personality, skills, experience, knowledge, and finally the ability to organize and facilitate cooperation across all project stakeholders. It should also be taken under consideration that apart from the above parameters the selection of the project manager relies on the decision maker. Therefore, one goal of the current research is to analyze the degree of influence of the profile of the decision maker on the final assessment and selection of the best PM.

In this context, the current research will be applying PROMETHEE methodology to ranking available PMs, taking into consideration the special characteristics of the decision maker and his/ her own preferences. In a typical multiple criteria decision making problem the aim is to find the best option from a set of similar alternatives. The decision maker uses criteria to judge the alternatives, and solves the problem by usually ranking all the alternatives.

Research regarding Project Managers is quite extensive. In addition, literature focusing on PMs personality is exceptionally detailed (Aretoulis et al. 2015a; Aretoulis and Triantafyllidis 2014; Aretoulis et al. 2015b; Aretoulis et al. 2017; Aretoulis 2018) Project success appears strongly correlated with the PMs' characteristics. Therefore, the properties of PMs influence project performance. In this context, Jha and KIyer (2006) identified a significant difference among the attributes possessed by the PMs in projects that were considered successful, and those that were considered failures. Furthermore, different types of projects require PMs with appropriate competencies (Müller and Turner, 2007a). In exactly the same context, Ogunlana et al. (2002) highlights that different projects need different set of skills and capabilities on the part of the PM.

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) cited in (Aretoulis, 2018) 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. In the following section, follows the methodological approach and presentation of the application of PROMETHEE methodology and consecutive findings. Finally, conclusion and further research are highlighted.

Methodological Approach

The aim of the current study was to provide a methodology for examining the way that decision makers' preferences influence the ranking of available PMs. Seven PMs were randomly created. PROMETHEE is implemented in order to rank the selected PMs based on their personality and the decision makers' profiles. The proposed methodology relies on the personality traits. Selected personality traits were used as the selection criteria. These namely include: Capability of Assigning Responsibilities, Integrity, Ethics, Justice, Methodical, Responsible, Punctuality. A questionnaire survey among 497 experienced engineers was used to estimate the required weights per criterion (personality trait). The weights are estimated as the mean values originating from the questionnaire survey. The research implemented independent sample T test in order to identify which of the criteria have significantly different values among male and female decision makers. These criteria were used to compare the rankings of PMs based on Visual PROMETHEE.

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 1. 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. The data reveals that there was a statistically significant difference in the scores among male and female engineers (Aretoulis 2018):

Table 1. Mean and SD among Male and Female Respondents per PMs' Attributes (Aretoulis 2018).

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
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

The considered personality traits were selected from the abovementioned list. The attributes that exhibited the maximum differences among the mean scores are selected for the current research and their values are presented in the following Tables 2 and 3.

Table 2. Average Scores per Personality Trait According to Female Engineers

Attribute	Mean Score
Capability of Assigning Responsibilities	4,31
Integrity	4.26
Ethics	4.19
Justice	4.26
Methodical	4.42
Responsible	4.58
Punctuality	4.50

Table 3. Average Scores per Personality Trait According to Male Engineers

Attribute	Mean Score
Capability of Assigning Responsibilities	4.01
Integrity	3.89
Ethics	3.82
Justice	3.86
Methodical	4.12
Responsible	4.19
Punctuality	4.19

The randomly created PMs profiles are presented in the following Table 4.

Table 4. PMs Scores per Personality Trait

	Capability of Assigning Responsibilities	Integrity	Ethics	Justice	Methodical	Responsible	Punctuality
PM1	5	4	3	2	1	2	3
PM2	4	5	4	3	2	1	2
PM3	3	4	5	4	3	2	1
PM4	2	3	4	5	4	3	2
PM5	1	2	3	4	5	4	3
PM6	2	3	4	5	4	3	2
PM7	3	4	5	4	3	2	1

Results and Findings

Visual PROMETHEE is implemented, in this study, in order to rank the selected seven PMs. All the criteria need to be maximized. The results are presented in the following Tables 5 and 6:

Table 5. PMs Ranking Based on Net Flow Considering Male Engineers Preferences

	Phi+	Phi-	Phi
PM1	0.4812	0.4237	0.0576
PM7	0.4643	0.4414	0.0229
PM6	0.4613	0.4444	0.0169
PM5	0.4519	0.4526	-0.0008
PM2	0.4479	0.4567	-0.0088
PM4	0.4421	0.4847	-0.0426
PM3	0.4179	0.463	-0.0452

Table 6. PMs Ranking Based on Net Flow Considering Female Engineers Preferences

	Phi+	Phi-	Phi
PM1	0.4792	0.4255	0.0537
PM7	0.462	0.4438	0.0183
PM6	0.4607	0.4451	0.0156
PM5	0.4527	0.4516	0.001
PM2	0.4479	0.4564	-0.0085
PM4	0.4447	0.4826	-0.0378
PM3	0.4195	0.4618	-0.0423

The PM₁ is ranked as the best project manager. The PM₁ is the one that scores the higher net / total Phi. This is the result of Phi+ - Phi-. In this case PM₁ had a score of 0.0576, 0.0537 based on the male and female preferences correspondingly. It is interesting to note that the ranking in both male and female engineers remain identical in both male and female engineers – decision makers. Finally, it is worth mentioning that in the case of female engineers four PMs have positive flows whereas in the case of male engineers – decision makers three PMs have positive flows.

Results, Conclusions and Further Research

The aim of the present study was to identify the variations in ranking and selecting PMs based on the gender of the decision maker. This methodology focuses on the personality characteristics of the candidate PMs. Therefore, the goal is to ensure that the project team will reach maximum performance under the guidance of the best PM. The study applied PROMETHEE methodology. The criteria were the seven personality traits. Then, weights per criterion were required and the performance of each PM against each criterion. Towards, this end, the present analysis focused on questionnaire surveys.

The results of the analysis successfully ranked the available PMs. The results identified the most promising PM based on the total performance on the seven selected personality traits. This approach relies on the personality of the PM and not on his technical skills and knowledge and on the preferences of male and female decision makers. Therefore, more emphasis is placed on the ability of the PM to work inside a project team and cooperate in the best possible way with the project personnel. This is extremely valuable if the significance of the human capital is considered. Finally, it is worth mentioning that the top ranked PM is the one that scores exceptionally well in the “Capability of Assigning Responsibilities” personality trait.

The focus of the current approach is on the soft skills, especially traits regarding ethics. Selecting a PM that is “customized” for the needs of the team then the team performance would be maximized and therefore, the project performance would be optimum. This is an additional benefit for the society, especially in the delivery of public infrastructure projects.

A more holistic approach should integrate both the personality characteristics’ and technical skills’ assessment in the final decision and selection of the most efficient PM. A limitation of the proposed method is that the traits scores are specifically evaluated for Greek people. Therefore, application in another country would require a corresponding test appropriate for the specific country’s citizens.

As part of a future research effort, a larger sample of experts would be the first priority, in the case of assigning scores to the personality traits, to the personality traits. In addition, the analysis could be based on the scores of more criteria. More specifically, on all criteria exhibiting statistically significant differences among male and female engineers. This new approach would require more effort. In the current study, seven personality traits were used as the selection criteria. Finally, alternative methodologies and approaches could be examined for evaluating the weights. This could provide alternative rankings of the PMs but most importantly allow for useful comparisons between methodologies.

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