IMPACT OF PROJECT MANAGER AND TEAM MEMBER CHARACTERISTICS ON THEIR PERSONAL GROWTH AND SATISFACTION

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ABSTRACT
Numerous studies have been conducted which prove that a satisfied employee contributes to efficient business, i.e., a project success. One of the key determinants of project success are the essential characteristics of the project manager and their impact on the personal development and satisfaction of employees as well as the resulting success of the project. The attitudes of employees of 5 construction design companies on the characteristics of project managers and project’s performance were examined and analyzed using the factor analysis and multiple linear regression analysis. The research refers to employees working on large infrastructure projects that are considered to be important for a country due to their effects on the development of that country, its economy, and the lives of its inhabitants. Therefore, the results of this research are also considered particularly important. Based on the established correlation between the major project manager and team member traits this research aims to define how their combination affects personal development and satisfaction of individuals as well as the fact that the project was finished on schedule and with profit. Research has shown that the success of a project is more strongly influenced by the project manager's attributes than the team member characteristics in terms of personal development and satisfaction.

KEYWORDS
Project manager, Team member, Personal growth, Satisfaction, Communication.
1. INTRODUCTION

Due to their complexity and significant financial resources (Al-Fadhli, 2020) required for their implementation, infrastructure projects are considered challenging projects in the field of construction. These are projects that bring together a large number of stakeholders, with their design and implementation requiring a serious approach. Each infrastructure project is specific and they differ significantly from each other. They are of great importance because they affect the life and work of all inhabitants as well as the economic stability of a country. They rely on methodologies, knowledge, innovation and project management experience (Cole, 2017) that must be developed to reduce the risks of their failure. It is therefore important that the project managers define goals for each project (Scott-Young and Samson, 2007), set the tasks, and define guidelines for performing the tasks, coordinate the performance of tasks and at the same time encourage their team to complete the tasks (Hackman, 1987). The manner in which they realize these goals and conduct interactions defines the satisfaction of work group associates (Chow et al. 2015). The longer the team members work and develop together, the more efficient the project implementation will be (Kessler and Chakrabarti, 1999), and consequently more successful, which will aid in the organization's long-term success (Shenhar et al., 2001) and its employees. One of the critical elements in the execution of effective endeavors is their coordination and communication (Bubashait et al, 2014), which contributes to the project team management, builds mutual trust, and strengthens the team (Lee and Kim, 2018).

The research presented by this manuscript aims to determine how the characteristics of project managers and team members affect their personal growth and satisfaction under the assumption of a successful infrastructure project that meets all the parameters of the iron triangle. Therefore, hypothesis have been defined as follows:

- project manager and team member characteristics impact the personal growth and satisfaction under the assumption of the iron triangle project success
- a successful project strongly depends on the team members and the project manager communicating effectively.

2. THEORETICAL FRAMEWORK

2.1 Project success

There are various views of project success (Freeman & Beale, 1992) because it is not equivalent for all types of projects, although typically, the success of building projects depends on the project team's success (Chow et al., 2015). The two most challenging management jobs are finishing a project on time and completing assignments on time (Avots, 1969). Due to the large financial impact on the economy of each country, it is important to ensure and adopt project management (PM) practice during every stage of the project (Haron
et al., 2017). In order for the projects to be completed on time, it is important to establish criteria that will enable the projects to be successful. Furthermore, as these projects are, in addition to financial significance (profitability), important for the community as a whole as well as for all organizations participating in the project, this research assumes that the success of an infrastructure project should not be judged only regarding its timely completion within the budget and with a certain level of quality (iron triangle), but that its success must be observed taking into account other factors such as employee traits.

The iron triangle forms the traditional PM framework and as such is easier to measure, while communication and risk related to employee traits and are more difficult to quantify (Papke-Shields et al., 2010). Due to such complexity of project success measurement, many authors have studied the topic. Jha and Iyer (2007) define that the level of success of the iron triangle is impacted by the project director’s ability, engagement of participants, owner's competence and stakeholders coordination. Yang et al. (2011) list the PM’s leadership style, communication, collaboration and cohesiveness of the project team as the key factors of project success. Shenhar et al. (2001) established four success dimensions - project effectiveness, customer impact, direct business, and organizational success, and future planning. In their research, Freeman and Beale (1992) also recognized the importance of involving stakeholders in the project achievement.

Radujković and Sjekavica (2017) state that the project success includes multidimensional criteria - social, political, economic, environmental, educational and other dimensions, while Lipovetsky et al. (1997) use a multifaceted approach to project success measurement consisting of four categories: achieving design objectives, customer benefits, organisational development benefits, and benefits to the nation's infrastructure and defense. Out of those, customer benefits are regarded as the most important progress factor. Furthermore, inadequate project foundations, hiring the unsuitable project manager, unsupportive top management, poorly defined duties, improper use of management techniques, unplanned project termination, and a lack of commitment to the project are all reasons why projects fail (Avots, 1969).

Continuing to the aforementioned, under the assumption that the project meets the parameters of the iron triangle, the goal is to determine which characteristics of the project participants and their manager led to their satisfaction and personal growth.

2.2 Project manager characteristics

Project managers are responsible for the development of team members (Thompson, 1990) and they undertake full responsibility for the project success (Shenhar et al., 2001). Numerous studies have been conducted that define a large list of required competencies of project managers. According to Gulati et al. (2020), enhancing team motivation and performance are competencies including leadership, team building, motivation, communication, influence, decision-making, political and cultural awareness, negotiation, trust building, conflict management, and coaching.
The presented research aimed to determine whether the project manager characteristics impact the multidimensional project success as well as how and to what extent does a successful project lead to increased satisfaction and personal growth of the project manager.

2.3 Team member characteristics

By introducing teams into the organization, the manner to increase the productivity of the organization has been simplified (Ross et al., 2008), primarily through efficient teams whose task is to prepare a successful project and meet the iron triangle requirements (Atkinson, 1999; Jha & Iyer, 2007). In the construction sector, team members are chosen to meet the requirements of the global market and the investor. Their effectiveness, according to Azmy et al. (2012), is measured and evaluated through surveys.

In order to create effective teams, Hackman (1987) outlines four levels: pre-work, performance conditions, forming and building the team, and ongoing support, whereby the last phase emphasizes the development of team learning based on their experiences. According to Campion and Higgs (1993), performance criteria are Productivity, Satisfaction and Manager Judgments, which are impacted by team job design, interdependence, composition, context and team process. According to Adams et al. (2002), an effective team is determined by: capable communication, clear roles, accountable interdependence, clear goals, a shared purpose, and psychological safety, while Ross et al. (2008) map these variables into Performance, Behavior and Attitude in order to translate a qualitative assessment into a quantitative description of a successful work group. According to Hu and Liden (2015), the highest level of team efficiency was realized in cases of the highest prosocial motivation (contribution to the team, collaboration) and task independence. When motivation is high, project managers must support team members to take on new tasks and acquire additional knowledge and skills (Caniëls et al. 2019), i.e., to enable them their personal development and satisfaction with well-planned activities (Borcherding and Oglesby, 1974). According to Caniëls et al. (2019), collaboration within the team increases with the development of motivational climate, which defines all the positive and negative criteria in the workplace, and the more positive it is, the more the mutual collaboration increases (Nerstad, 2013). Increase in collaboration and positive interactions within the team is due to the commitment to perform tasks (Chow et al. 2015) as well as greater emotional stability of the team members. A team with such characteristics has a greater ability to sustain itself (Barrick, 1998).

The subject research aims to determine whether the team member characteristics impact the project success as well as how and to what extent does a successful project lead to increased satisfaction and personal growth of the team members.

2.4 Communication between team members

One of the key aspects of project management is communication because it is a part of most project activities (Muszynska, 2017). According to Forcada et al. (2017), the accuracy and timeliness of information make up the most important communication performance indicators, and the key communication indicators are project target, clarity of scope, goals
and objectives, challenges, and availability of resources (Safapour et al., 2019). Lack of quality communication leads to reduced productivity and poorer results in construction projects (Rahimian et al. 2022). Implementation of communication depends on the project size, its form, and the number of people participating in the project (Moore, 1982). More frequent communication increases trust between team members (Becerra and Gupta, 2003) and minimises the need to maintain conflict situations (Leung et al., 2013). An important role in the implementation of communication within the project is played by the project manager acting as liaison between the organization, the investor, team members and other participants in the project.

The project manager must communicate with all project participants (Moore, 1982) to manage the information flow, which is a mediator between trust and project performance (Cheung et al., 2013). The inability of the project manager to communicate and motivate the team, solve problems as well as understand the business objectives leads to failed projects (Belzer, 2001) and exceeding the deadlines and budget (Changali et al., 2015). Therefore, project managers must constantly develop their communication and management skills, provide team members with feedback related to their performance (Thompson, 1990) and encourage communication and collaboration of their team members (Doolen et al., 2006). Rahimian et al. (2022) developed a model that links interpersonal abilities and communication effectiveness in construction projects. The model predicts interpersonal conflicts before they occur and thus allows project managers to develop interpersonal skills.

The research presented in this paper also examined the impact of communication on the successful project implementation.

### 3. METHODOLOGY AND METHODS APPLIED

The methodology that deemed appropriate for this research is based on a mixed-method approach, as the premises were first tested by qualitative methods such as induction and deduction in the theoretical part of the research, upon which conclusions were drawn about appropriate quantitative methods for the empirical part of the research.

#### 3.1 Methods applied

The basic research method in the empirical part was a survey, and the instrument used was a structured questionnaire of attitudes and opinions of project team participants and executives about their own competencies and project characteristics. The questions were graded on a Likert scale of 1 to 5, with 1 denoting "strong disagreement" and 5 denoting "strong agreement," for the respondents' responses. The questionnaire's questions were created using data from earlier studies (Campion et al., 1993; Doolen et al. 2006) and according to the guidelines of Van de Ven and Ferry (1980). These were then modified for use in factor analysis study on team member opinions and attitudes in design firms. As such, the questionnaire generated 31 variables in total.
By using Cronbach's alpha (Cronbach, 1951), the final collection of survey items was evaluated for confirmed adequate (0.901).

After the questionnaire was formed, Kendall's Tau values of rank-order correlation were calculated, on the basis of which research-relevant variables were identified (8 variables in total) that correlated with personal growth and satisfaction. After that, a factor analysis was performed by which the number of components that contributed to mutual variance was decreased (2 variables) including the rotation of the factors to obtain the interpretive variables (Kiss, 2011). The analysis provided two variables (independent variables) the team member characteristics and the project manager characteristics. The obtained independent variables are predictor variables in multiple linear regression, while the criterion variable is defined based on previous research and a survey. It is consisting of questions on the project manager's and team members' opinions on the success of the project. Only those samples that answered affirmatively to the question of project success were included in the analysis, and the variables of personal growth and satisfaction were defined as relevant factors of the criterion variable (provided that the project is successful). Both factors were included in the analysis as they made up a criteria variable for project success - personal growth and satisfaction.

The conducted multiple linear regression determined the connection of the criterion variable (personal growth and satisfaction) with predictor variables (project manager characteristics and team member characteristics).

3.2 Data collection

The research was conducted in small and medium enterprises involved in design, during March 2019. In the observed companies, employees are divided into project teams that develop infrastructure projects of different scopes in terms of complexity and duration. Team members alternate from project to project, and project managers simultaneously coordinate and manage multiple projects. The research included directors, designers and associates. The total number of respondents was 63, which meets the acceptable absolute minimum when assessing the psychometric properties of social constructs (Sapnas & Zeller, 2002). The biggest portion of respondents are designers with a total of 53.2%, then associates, who represent 35.1% of the total, and finally executives, who cover 11.7% of respondents. The majority of respondents are men (66%). The age of most respondents is between 36 and 45.

Using statistical data processing tool (SPSS), the gathered data were analysed and calculated.

4. RESULTS AND DISCUSSION

Independent variables of team member characteristics and project manager characteristics were determined based on the conducted factor analysis. The variable of the team member characteristics consists of 3 factors (gender, experience and collaboration), while the variable of project manager characteristics is composed of 5 factors (team management, leadership skill, conceptual skill, human resource management and communication) (table 1).
Table 1. Independent variables

<table>
<thead>
<tr>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team member characteristics</td>
<td>Project manager characteristics</td>
</tr>
<tr>
<td>TM Gender</td>
<td>PM Team management</td>
</tr>
<tr>
<td>TM Experience</td>
<td>PM Leadership skill</td>
</tr>
<tr>
<td>TM Collaboration</td>
<td>PM Conceptual skill</td>
</tr>
<tr>
<td></td>
<td>PM Communication</td>
</tr>
<tr>
<td></td>
<td>PM Human resource management</td>
</tr>
</tbody>
</table>

The Kaiser-Meyer-Olkin measure of 0.840 confirmed that the variables were adequate for factor analysis, and the Bartlett's test result for the null hypothesis (sig.=0.000) rejected the null hypothesis (the initial variables do not significantly correlate with one another). Table 2 indicates the values of the correlation matrix, extracted factors and rotated factor matrix.

Table 2. Factor matrix analysis

<table>
<thead>
<tr>
<th>Communalities</th>
<th>Component Matrix</th>
<th>Component Transformation Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>Extraction</td>
<td>Component</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>TM Experience</td>
<td>.791</td>
<td>.889</td>
</tr>
<tr>
<td>TM Collaboration</td>
<td>.766</td>
<td>.859</td>
</tr>
<tr>
<td>TM Gender</td>
<td>.757</td>
<td>.765</td>
</tr>
<tr>
<td>PM Team management</td>
<td>.472</td>
<td>.418</td>
</tr>
<tr>
<td>PM Leadership skill</td>
<td>.891</td>
<td>.935</td>
</tr>
<tr>
<td>PM Conceptual skill</td>
<td>.622</td>
<td>.672</td>
</tr>
<tr>
<td>PM Human resource management</td>
<td>.896</td>
<td>.934</td>
</tr>
<tr>
<td>PM Communication</td>
<td>.507</td>
<td>.368</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 3 iterations.

Communalities of variables (Table 2) show acceptable values. Orthogonal factor rotation ("Varimax with Kaiser normalization") was used in the research because the obtained matrix does not have the characteristics of a simple structure. By rotating the factors, two factors were obtained (Table 2) that make up the input data (independent variables) for conducting the linear regression analysis.

The adequacy of the gathered information for factor analysis of the main components was established by inspection of the correlation matrix and Kaiser-Meyer-Olkin measure, where the main diagonal displays the initial communalities. Based on the explained variance, two factors were formed - team member characteristics and project manager characteristics, and after the Varimax rotation, the factors were interpreted. The team member characteristics factor was explained with 3 characteristics and is based on the characteristics of team members, experience and mutual sharing of information, while the second factor, the project
manager characteristics factor, explains the key factors that a project manager must possess. They relate to their ability to manage and understand team members.

The dependent variable consists of the variables of personal growth and satisfaction examined through a survey, whereby both were included in the analysis.

Multiple linear regression analysis determined the correlation and statistical significance of both variables with increase in personal growth and satisfaction, and both variables were included in the regression model where the variable of project manager characteristics has greater statistical significance compared to team member characteristics (Figure 1).

The aim of the regression analysis was to determine the patterns of realizing project success in accordance with a linear collection of team member and project manager characteristics.

The Pearson correlation coefficient shows the correlation of the two variables but does not show their mutual impact on each other (Horvat and Mijoč, 2019). The obtained values of correlations of the subject research indicate statistically significant linear correlations of project success with predictor variables of project manager and team member characteristics. We are discussing a correlation between the project success and the project manager characteristics that is fairly strong (42.1%, sig. 0.000), and a significant correlation between the project success and the team member characteristics (28.3%, sig. 0.012). The obtained results confirm the first hypothesis of this research which states that the project manager characteristics and team member characteristics affect the personal growth and satisfaction under the assumption of iron triangle.
The findings (Table 3) show that the dependent and independent variables have a strong correlation (correlation coefficient $R=0.516$) and that a linear combination of independent variables can be used to explain 26.6% of variability from the population.

Null hypothesis testing - the linear combination of predictor variables and the criteria variable do not correlate.

$H_0 : P^2 = 0 \quad (1)$

The value of $F$ is 10.893 with an adequate corresponding probability value (sig. 0.000), based on which the null hypothesis on the absence of linear correlation is jilted, and the regression model is suitable for analysing the state of the population.

Table 4. Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>8.127</td>
<td>.154</td>
</tr>
<tr>
<td>1</td>
<td>.397</td>
<td>.156</td>
</tr>
<tr>
<td>REGR factor score 1 for analysis 1</td>
<td>.397</td>
<td>.156</td>
</tr>
<tr>
<td>REGR factor score 2 for analysis 1</td>
<td>.609</td>
<td>.156</td>
</tr>
</tbody>
</table>

As was previously established, the relationship between the criterion and predictor variables is linear. Appreciating this research’s regression model, based on the results from Table 4, it can be stated as follows:

\[ Y = 8.127 + 0.397x_1 + 0.609x_2 \quad (2) \]

Where: $x_1$ – team member characteristics, $x_2$ – project manager characteristics

Hypothesis testing concluded that the project success - SGS is impacted by both variables. Increasing the team member characteristics by 1% at constant values of project manager characteristics, the project success increases by 0.397%, or that by increasing the project manager characteristics by 1%, the project success increases by 0.609%. Therefore, it can be concluded that any increase in characteristics (either of team members or the project manager) leads to personal growth and satisfaction. The following diagram (Figure 2) shows
that this is an increasing linear regression of the dependent variable PS – personal growth and satisfaction.

Figure 2. Regression model PS – personal growth and satisfaction

By conducting individual hypothesis tests, the influence of each predictor variable on project success is ascertained. Two features are used to describe the dependent variable in this paper’s theoretical section – personal growth and satisfaction based on the survey, while factor analysis formed independent variables of project manager characteristics (5 characteristics) and team member characteristics (3 characteristics). The information gathered regarding the traits of the work group participants and their manager enabled an increase in personal development and satisfaction, i.e. an increase in project success.

Null hypothesis testing – Team member characteristics (TMC) significantly impacted the increase of project success (PS). The null hypothesis is:

$$H_0: X_1 < \beta, \text{ and the alternative hypothesis is } H_0: X_1 > \beta, \beta = 0$$

Null hypothesis is rejected because \(0.397/0.156 = 2.54\), which led to conclusion that TMC is a significant predictor for increase in self-esteem and personal growth, provided that the second predictor variable remains unchanged.

Statistically most significant variable of team member characteristics is experience (Pearson coeff. 0.400, sig. 0.001). For the benefit of the team, it is crucial that project manager and each team member carry out the responsibilities for which they have the necessary level of
expertise. Additionally, sharing experience enables the acquisition of new knowledge within the project team and thus facilitates personal development (Yap et al., 2018). As a result, they have more faith that the projects will be completed on schedule and at a high standard.

Collaboration among team members as they carry out their given jobs is also a crucial quality (Pearson 0.384, sig. 0.002). Without collaboration it is impossible to develop a project (Olatunji and Akanmu, 2014), and as it increases, the uncertainties within the project diminish (Barutha et al., 2018). Any acceptable collaboration between the team members and project manager allows sharing important information related to the project development, where human behavior and work environment significantly impact the collaboration and increase in performance (Xue et al., 2010). Consequently, the risk factors for project success are lower because each team member, in addition to obtaining clear information, has the support of their team members who can be relied on when preparing a project.

Although the least significant, gender variable also impacts the personal development and satisfaction. Salary, benefits and job security are actually the most crucial factors for women (Dabke et al., 2008).

It is crucial to place a high value on this characteristic within the team in order to promote team efficiency since trust between team members is gradually created by establishing and growing trust in the traits and reliance on one another (Mickan and Rodger, 2000).

Null hypothesis testing – Project manager characteristics (PMC) have a significant impact on the increase of PS. The null hypothesis is:

\[ H_0: \beta < 0, \text{ and the alternative hypothesis is } H_0: \beta > 0 \]

If the team member attributes do not change, the same hypothesis predicts how the project manager's traits will affect the project's success. The hypothesis is rejected because \( \frac{0.609}{0.156} = 3.904 \).

As previously elaborated, the independent variable of the project manager competencies consists of the following factors: team management, leadership skill, conceptual skill, human resource management and communication skill. At the end of results presentation and discussion, it should be stated that the highest correlation factor was determined for the variable of communication skill (0.472, sig. 0.000), it supports the second hypothesis of this study: that the key to personal development is communication between the project manager and the team members. This is in compliance with previous findings that the higher the efficiency of communication, the greater the probability of successful delivery of a construction project (Lee and Kim, 2018).
5. CONCLUSION

Due to intense market competition today, the objective is to deliver the infrastructure project on time, within budget, and with a certain level of quality while also taking into account all the advantages that a successful project entails, specifically the advantages it brings to the organization and the project team.

This study highlighted the relationship between project team members' personal development and job satisfaction with the development of successful infrastructure projects. The research found that the project manager characteristics and team member characteristics affect personal growth and satisfaction, whereby the project manager characteristics (leadership skill, conceptual skill, human resource management, team management, communication skill) have a more significant impact on personal growth and satisfaction than the team member characteristics (experience, collaboration and gender). This is explained by the fact that regardless of the characteristics that the team members have, the project manager must have a wider range of characteristics that will, in addition to project management, manage and develop their team and set clear goals and tasks for a successful project.

The key variable tested was the communication skill variable. The conducted research has proven that communication between the team members and project manager is the key factor in personal development. As such, it improves team management, develops mutual trust and contributes to the satisfaction of team members and their personal development.

REFERENCES


