THE INFLUENCE OF SELECTED FACTORS ON PROJECT PERFORMANCE IN PROJECT-BASED ORGANIZATIONS: A QUALITATIVE COMPARATIVE ANALYSIS

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Abstract: Previous research demonstrates the importance of social capital, environmental complexity, goal orientation, and project performance. However, the influence of these factors on project performance is unclear and was examined singly, i.e., each factor was studied separately in connection with project performance. The aim of this paper is to examine which configurations of selected factors, such as goal orientation, social capital, and environmental complexity, affect project performance in project-based organizations. This paper argues that these factors simultaneously affect project performance, in different configurations. This study applies fuzzy set Qualitative Comparative Analysis (fs/QCA), which points to three configurations of conditions that influence project performance in project-based organizations. These findings help complement some of the results of previous studies on project performance.

Keywords: project performance, project-based organization, fuzzy-set qualitative comparative analysis.

1. Introduction

Today, organizations operate on a market where technological development is progressing faster and faster. Huge — often global — competition, shorter product life cycles and constant reorganization of business put increasing demands on companies. As a result of globalization, the application of new technologies, and a turbulent, complex environment, organizations must cope with the ongoing transformational process. In this context, the project-based organization (PBO) emerges as an ideal type of organizational structure to deal with the emerging features of the temporary and unique demands within a complex market.

The literature has several names for a project-based organization (Sydow et al., 2004; (Turner, Keegan, 2000, 2001): a project-based company (Jerbrant, 2013; Lundin et al., 2015), a project-based firm (Lindkvist, 2004; Prencipe and Tell, 2001), a project-oriented organization (Huemann, 2015), a project-oriented company (Gareis and Huemann, 2007), a multi-project

firm (Geraldi, 2009), a multi-project organization (Canonico and Söderlund, 2010), and a projectified matrix organization (Arvidsson, 2009).

Turner and Keegan (2001) defined a project-based organization as one in which the majority of the products or services delivered are against bespoke designs for customers. A project-based organization, also referred to as a project organizational structure, is a collection of diverse project participants (individual and team participants and organizations), and by combining their cooperation they can effectively implement projects (Trocki, 2014). The PBO is an organizational form in which the project is the primary unit for production organization, innovation, and competition (Hobday, 2000). Miterev et al. (2017) define a project-based organization as one which makes the strategic decision to adopt project, program, and project portfolio management as business processes to manage its work, and one which views itself as being project-oriented.

Despite the fact that the project-based or project-oriented organization has been recognized in the literature for almost 30 years (Gareis, 1991; Hobday, 2000; Lindkvist, 2004; Whitley, 2006; Cattani et al., 2011, Bocean, 2011; Pemsel and Wiewiora, 2013; Trocki, 2014; Kaczorowska, 2017), there has been no global view to indicate how different factors simultaneously affect project performance. Previous research has provided a broad view on single determinants or factors which affect project performance in project-based organizations. The purpose of this paper is to investigate what configurations of selected factors — such as goal orientation, social capital, and environmental complexity — influence project performance in project-based organizations, specifically Polish consulting firms. Achievement goal orientations are commonly measured in two ways: by mastery goal orientation and by performance goal orientation (Elliot and Church, 1997; Gong et al., 2013); therefore, further in the discussion goal orientations will be analyzed and divided into mastery goal orientation and performance goal orientation.

In this empirical study, a qualitative comparative analysis using fuzzy sets (fs/QCA) was adopted to examine the links between project results and selected conditions, such as mastery goal orientation, performance goal orientation, social capital, and the complexity of the environment. These factors were selected on the basis of a critical literature analysis. The first section of this paper is a brief review of the literature on a set of factors, namely variables affecting project performance. Then, the research methodology (qualitative comparative analysis of fuzzy sets) is presented. Finally, the results of the analysis and the application are discussed in the last section.

2. Theoretical background

There are many factors that affect project performance. These factors are connected with the project team, the resources and conditions of a particular organization, goal complexity, the environment of the organization and the project, and the complexity of a particular project, among other things. Based on an extensive review of the interdisciplinary literature, the following factors were selected: goal orientation, social capital, and environmental complexity. These factors will be discussed below.

The three basic constraints (called "the golden triangle") in project management — which are found in every project — are time, budget, and scope (Spałek, 2014). The success of a project is indicated by project performance. According to previous studies, it is not possible to design a single set of typical criteria for project success and performance, because every project has its own criteria based on the project's complexity, size, and unique features (Westerveld, 2003). Mainly, project success is based on the golden triangle, which includes cost, time, and quality (Drury-Grogan, 2014). If a project is completed within the expected budget and duration while maintaining the desired quality level, then that project is considered successful.

Project performance within an organization is a measure of how well the project has achieved its objective. A conceptual critical success factor model for projects suggested by Gudiene et al. (2013) organizes factors in seven major groups, namely external factors, institutional factors, project-related factors, project management/team member-related factors, project manager-related factors, client-related factors, and contractor-related factors. The performance of a project will be dependent on various factors, including project complexity, contractual arrangements, relationships between participants in the project, the competence of the project manager, and the abilities of the key members in the project (Leong, et al., 2014). Project performance is related to the outcome or perceived success of the project team in meeting project goals, budget, schedule, and operational efficiency considerations.

Goal orientation is a predisposition to adopt and pursue certain goals in achievement contexts (Dweck and Leggett, 1988; Van de Walle, 1997). In the achievement goal literature, two types of goals have by far received the most attention: mastery goals and performance goals. A performance goal has been also called an ego goal (Duda, 2001), an ability-focused goal (Ames, 1992), a relative ability goal (Midgley, et al., 1998), an extrinsic goal (Pintrich and Garcia, 1991), and a competitive goal (Roberts, and Ommundsen, 1996). A mastery goal has also been called a task goal (Duda, 2001), a learning goal (Dweck, 1999), and an intrinsic goal (Pintrich and Garcia, 1991). Mastery goals involve the aim of improving one's own performance and gaining task mastery, whereas performance goals reflect the pursuit of outperforming others and displaying superior performance (Ames, 1992; Dweck, 1986).

Research on the impact of achievement goal orientations in the context of the project primarily focuses on exploring how achievement goal orientations affect work engagement and performance in terms of team performance, rather than the overall performance of the project (Chi and Huang, 2014; Gong et al., 2013). Achievement goal orientations are usually measured in two ways: by mastery goal orientation and by performance goal orientation (Elliot and Church, 1997; Gong et al., 2013).

Team goal orientation captures the shared understanding of the extent to which a team emphasizes learning or performance goals and, consequently, helps to facilitate group decision-making, collaborative problem-solving, and intragroup coordination, which maintains the group's emphasis on learning or performance goals (Bunderson and Sutcliffe, 2003). A team-mastery goal orientation is a state when team members perceive themselves as working towards learning goals and having challenging tasks, whereas a team-performance goal orientation occurs when team members work toward favorable evaluations and promotions (Mehta et al., 2009). A team-mastery goal orientation is generally positively associated with commitment within teams, which in turn is expected to generate positive team and project performance. A team-performance goal orientation is a focus on demonstrating competence by receiving positive evaluations and outperforming others (Colquitt and Simmering, 1998; Dweck, 1999). Intrinsically motivated individuals desire to learn new things, to stretch their possibilities, and to strive to perform better in their work (Shalley et al., 2009), resulting in team-performance goal orientations being positively associated with team performance. Patanakul et al. (2016) state that a mastery goal orientation drives teams to perform assigned tasks better and more efficiently. Therefore, in a project context, it is expected that overall project performance is positively associated with team goal orientations.

Social capital provides information and controls benefits by creating relationships between people who could otherwise be disconnected in the social structure (Lang, 2004). It provides an opportunity to gain access to the resources embedded within and derived through actors' social network ties supporting the attainment of goals (Bartsch, et al., 2013). Di Vincenzo and Mascia (2012) suggest that through an appropriate management of social capital, project units can increase coordination and knowledge integration, in turn producing high levels of performance at the project level. More specifically, the social capital is useful not only in improving the performance of the project, but also in reducing the number of quality problems, which are some of the main causes of additional costs in construction projects (Vincenzo and Mascia, 2012). Project-based organizations thus need to mobilize their inner social capital to access distributed knowledge about their internal processes. Project researchers are aware of the importance of social interactions within and between organizations and their role as determinants of the project's performance. Bhandar et al. (2007) insist on the importance of intra-organizational social capital as a motivator to launch projects realization, as an integrator of diverse knowledge during project realization, and as a facilitator to achieve changes when the project affects the whole organization. Social capital, reflected in the intra-organizational

social connections of project team members, has been positively linked to learning (Bartsch et al., 2013) and to the integration of knowledge and project performance (Di Vincenzo and Mascia, 2012; Prencipe and Tell, 2001). Social capital has been conceptualized as a multidimensional construct (Nahapiet and Ghoshal, 1998) composed of three dimensions: structural capital (which is manifested in social interaction ties), relational capital (which is manifested in trust), and cognitive capital (which is manifested in a shared vision).

Many organizations have to deal with the dynamics, hostility and complexity of the environment in which they operate, trying to survive and be as competitive as possible. Environmental factors have a significant impact on the execution and performance of projects. The factors identified by Walker (1989) and Hughes (1989) that constitute the environment of projects are political, legal, institutional, cultural, sociological, technological (resources), economic, financial, and physical (infrastructure). The authors paid attention to some factors within the environment, that pose greater than others challenges to project's realization, management and organizational structure and suggested that these factors should form the main component of the management of the project's environment. Akanni et al. (2015) explored the impact of environmental factors on project performance, and they concluded that environmental factors have a positive impact on project success.

Complexity increases the perception of the comprehensiveness of the strategic decision-making process (Dess, and Beard, 1984) and hinders organizations from maintaining and meeting customer needs. Complexity in the business environment is generally defined as the proliferation and diversity of factors and issues in that environment. The greater the number of factors in the general business environment a manager perceives and must cope with, the greater the differences among those factors and the more complex the business environment (Aragon-Correa and Sharma, 2003). Complexity is a multidimensional construct that has been overly narrowly operationalized in many cases (Cannon and John, 2007). Complexity indicates the degree of perceptible diversity and the comprehensiveness of the environment of the organization (Miller and Friesen, 1982). The environment influences the operating conditions of the organization (Aldrich and Wiedenmayer, 1993; Baum et al. 2001), defines the rules of the game as well as development opportunities, and creates opportunities — but also barriers and threats. Organizational theory and strategic management have conceptualized environment as one of the key constructs for understanding performance (Kwiotkowska, 2018).

3. Methodology of research

To examine the association between combinations of selected factors and project performance, this paper applies fuzzy set Qualitative Comparative Analysis (fs/QCA), which is particularly suitable for comparing a small number of cases: 10-50 (Rihoux and Ragin, 2009).

Fs/QCA offers the unique opportunity to identify configurations of conditions which are difficult to identify by means of other methods. Contrary to correlational methods, which estimate the net effect of an independent variable on a dependent variable, fs/QCA identifies the conditions that lead to a given outcome (Cheng et al., 2013; Schneider et al., 2010; Stokke, 2007). In this way, fs/QCA supplements conventional correlational analyses thanks to its three main advantages: 1) asymmetry (i.e., the relationships between independent and dependent variables are treated as asymmetric), 2) equifinality (i.e., multiple pathways lead to the same outcome), and 3) causal complexity (the focus is not on net effects, but on combinatorial effects) (Fiss, 2011; Ganter and Hecker, 2014; Skarmeas et al., 2014).

The fs/QCA 2.5 software developed by Ragin and Fiss (2008) was used to analyze the data. fs/QCA is based on a set-theory approach that develops causal claims by means of supersets and subsets (Ragin and Fiss, 2008). The first stage of the analysis is to identify the various factors that work in combination to influence project performance in project-based organizations. The raw data was then calibrated into fuzzy sets (Ragin and Fiss, 2008). Fuzzy sets allow researchers to account for the varying degree of membership of cases to a particular set by using the anchors of 1 to designate "fully in" a particular set, 0 for non-membership (fully out), and 0.5 as the point of maximum ambiguity to mean neither in nor out of a particular set. The point of maximum ambiguity (or the crossover point) designates when a case is more in or more out of the set. The next stage includes the analysis of the truth table, which consists of all logically possible combinations of condition sets (Ragin and Fiss, 2008). After that, using Boolean algebra, fs/QCA computes the commonalities among the configurations that lead to a given outcome. Finally, the Quine-McCluskey algorithm provides a logical reduction of statements (Ragin and Fiss, 2008). Reduction of the truth table provides several useful statistics. Overall solution consistency indicates the degree to which the subset relationship holds for sufficiency. The overall solution coverage refers to the joint importance of all causal paths. Unique coverage of causal conditions is similar to unique R-square calculations in regression analysis in that it illustrates the relative weight of each path by measuring the degree of empirical relevance of a certain cause or causal combination to explain the outcome.

A necessity test was executed to examine whether there is a single condition for project performance in all configurations. A condition is necessary when its consistency is above 0.9 (Skaaning, 2011), which indicates the degree to which a condition is present in all cases with the same outcome. In this study no necessary conditions were found.

Data on the 17 cases of Polish consulting firms were collected by a series of surveys (January 2018–January 2019). Most project-based organizations are service firms, and the findings of the literature on service development apply to project-based firms (Sundbo, 1997). Project-based organizations are companies that are set up around projects and that produce complex services for their clients (Gann and Salter, 2000). Consulting firms are a well-suited research subject for this study because they rely on project organizing to deliver professional services to their clients; thus, they constitute the pure form of project-based organizations. The survey includes five scales (goal orientations — mastery goal orientation and performance

goal orientation — social capital, environmental complexity, and project performance) in the form of statements to which respondents indicate their level of agreement/disagreement on a five-point Likert scale. All item loadings are higher than 0.7. An extensive review of the relevant literature supports the validity of the scales.

Project performance was measured by a 6-item form (Jones and Harrison, 1996; Huang and Li, 2012) (Cronbach's Alpha = 0.87). The project performance measure concerns the outcome or perceived success of the project team in meeting project goals, budget, schedule, and operational efficiency considerations (Jones and Harrison, 1996; Huang and Li, 2012). Respondents assess the project performance with six items (Jones and Harrison, 1996; Huang and Li, 2012), namely, the ability to meet project goals, adherence to schedule, adherence to budget, expected amount of work completed, quality of work completed, and efficient task operations.

Team goal orientation was measured by multi-item scales from Sujan et al. (1994) and Van Yperen and Janssen (2002). Team goal orientation was measured as team-mastery goal orientation and team-performance goal orientation. The former was measured by a 4-item scale (Cronbach's Alpha = 0.84). The latter was measured by a 3-item scale (Cronbach's Alpha = 0.82).

Social capital was measured through each of its three dimensions according to Nahapiet and Ghoshal (1998): the existence of social interaction ties among researches (structural dimension of social capital), the existence of trust (relational dimension of social capital), and the existence of a shared vision (cognitive dimension of social capital). First, social interaction ties were measured by a 4-item scale based on Levin and Cross (2004), Kang et al. (2012), and Prieto-Pastor et. al (2018) (Cronbach's Alpha = 0.79). Trust was measured through a 5-item scale based on Lee and Choi (2003) and Kang et al. (2012) (Prieto-Pastor et al. [2018]) (Cronbach's Alpha = 0.91). Finally, the shared vision was measured by a 6-item scale from Prieto-Pastor et al. (2018) (Cronbach's Alpha = 0.87).

Environmental complexity was measured with a 2-item scale from Kwiotkowska (2018) in reference to project performance in project-based organizations (Cronbach's Alpha = 0.84).

The research model is presented in Figure 1, and it is verified in the process of scientific research.

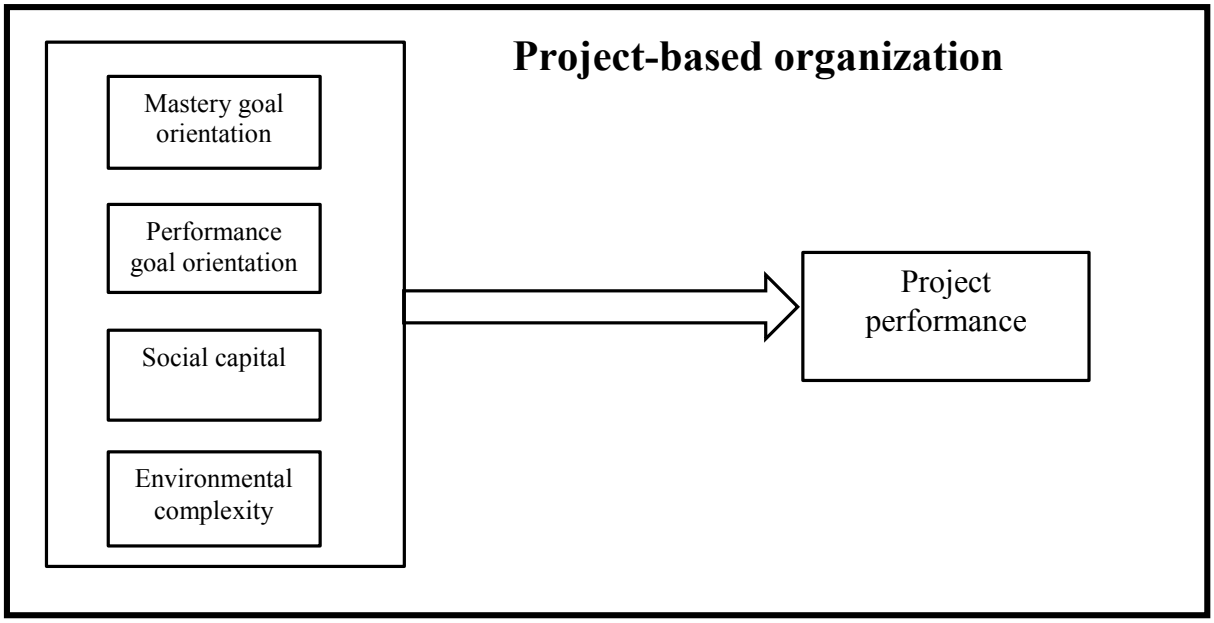

Figure 1. Conceptual model. Source: author's own work.

4. Results and discussion

After the hypothetical model was developed, a questionnaire-based survey was carried out for data collection relative to project performance and chosen factors in project-based organizations. The results are presented in Table 1. In this table, each column represents a constellation of causal conditions with their corresponding raw coverage, unique coverage, and solution consistency. The numbers at the bottom of the table represent the coverage and consistency of the solution as a whole. In brief, consistency measures the degree to which cases sharing a given condition agree in displaying an outcome. Raw coverage measures the overall coverage of a combination that may overlap with other combinations. Unique coverage refers to coverage uniquely due to a combination. Solution consistency measures the degree to which membership in the solution (the set of solution terms) is a subset of membership in the outcome. Lastly, solution coverage refers to the combined coverage of all combinations leading to the outcome (Ragin, 2008). The parsimonious and intermediate solutions were presented and analyzed (Ragin and Fiss, 2008). Full circles (●) indicate the presence of a condition, while barred circles (⊖) indicate the absence of a condition. Each panel represents the alternative causal combinations or recipes for the outcome (Ragin, 2008). These are consecutively numbered C1, C2, and C3.

Table 1.
Configurations of conditions

Condition (factors)	Configurations		
	C1	C2	C3
Team-mastery goal orientation		●	●
Team-performance goal orientation	●		●
Social capital	●	●	
Environmental complexity	⊖		●
Consistency	0,74	0,96	0,86
Raw coverage	0,48	0,24	0,42
Unique coverage	0,38	0,13	0,32
Solution consistency	0,78		
Solution coverage	0,63		

Source: own study.

According to the results of the analysis, the solution yields a coverage close to 63% and a consistency of 78%. The first configuration of conditions, C1, combines team-goal performance and social capital, but not environmental complexity. This configuration indicates that the focus on demonstrating competence by receiving positive evaluations and outperforming others, on structural capital (which is manifested in social interaction ties), relational capital (which is manifested in trust), and cognitive capital (which is manifested in a shared vision, without the proliferation and diversity of factors and issues in that environment) affect project performance in project-based organizations. The second configuration of conditions, C2, combines team-mastery goal orientation and social capital. This configuration indicates that teams' performing tasks better and more efficiently along with the opportunity access the resources embedded within and derived from the actors' social network ties supporting the attainment of goals influence project performance in PBOs. The third configuration, C3, combines team-mastery goal orientation, team-performance goal orientation, and environmental complexity. This configuration indicates that when team members perceive themselves as working towards learning goals and having challenging tasks, and when occurs working toward favorable evaluations and promotions, when competence is demonstrated by receiving positive evaluations and outperforming others, and the degree of perceptible diversity and comprehensiveness of the environment of the organization are indicated, these lead to project performance in project-based organizations.

5. Conclusion

Numerous benefits have been associated with the adoption of a PBO. They refer to better processes, control and lead-time reduction, higher output quality (Bresnen, 1990), and an improved ability to respond quickly and flexibly to each customer's needs (Hobday, 2000) and

to innovate in collaboration with clients and suppliers (Pinto and Rouhiainen, 2001). Examining the factors within configurations in order to explain and understand project performance is important from the organizational point of view of a project-based organization because it can indicate the future directions of activities that can help achieve project performance. The use of fs/QCA is an original contribution to the wide range of research on project performance in PBOs which studies the effect of all selected factors simultaneously. Specially, team-goal performance and social capital without environmental complexity (C1), and team-mastery goal orientation and social capital (C2) influence project performance. Another configuration which affects project performance in project-based organizations combines team-mastery goal orientation, team-performance goal orientation, and environmental complexity (C3). The practical implication of the results is that project performance is influenced by the three configurations of conditions of selected factors mentioned above. These results provide project-based organizations with a more holistic understanding of the paths that lead to project performance, and they can be implemented in order to achieve project performance and project success.

There are several limitations to this study that might indicate opportunities for future research. Because the empirical study is based on project-based organizations — Polish consulting firms — research in other project-based organizations from different industries is needed to examine whether the findings hold true in those contexts. Also, it might be fruitful to examine other variables affecting project performance, for example, innovative strategy or organizational size.

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