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Innovation projects performance: Analyzing the impact of organizational characteristics☆

José Ramón Cobo-Benita [a,*], Enrique Rodríguez-Segura [b], Isabel Ortiz-Marcos [b], Luis Ballesteros-Sánchez [b]

[a] ESCP Europe Business School, France
[b] Technical University, C/José Gutiérrez Abascal, 2, 28006 Madrid, Spain

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ABSTRACT

This study analyzes the effect of organizational characteristics on the innovation project performance. This research applies fuzzy set Qualitative Comparative Analysis (fsQCA) to a large sample of Spanish firms appearing in the Community Innovation survey (CIS). The results show that the combination of organizational innovation, firm size and cooperation with national and, especially, international firms is a sufficient condition for the success of innovation projects within the organization. Evidence also suggests that variables such as the investment on R&D per employee or the seniority of the company do not affect the success of innovation projects. These findings help complement some results in previous studies on innovation projects performance.

1. Introduction

A discussion exists among academics and practitioners about the importance of studying the factors of success and failure of projects exist (Balachandra & Friar, 1997; Dvir et al., 1998; Ika et al., 2012; Pinto & Mantel, 1990; Scott-Young & Samson, 2008). Firms design, develop and implement different projects, both internal and external, and their success directly affects significant economic benefits, economic and intellectual growth for its employees, and important loses that can lead to failure.

In the literature, two blocks of investigation aim at highlighting the factors of success and failure of projects within an organization. On one side, some investigations exist about management methodologies using own elaboration surveys as research methods for specific sectors or geographical regions (Bloom & Van Reenen, 2010; Motohashi, 2005). On the other side, some investigations focus on success and failure of projects, building on specific case studies and success criteria about management (Cooke-Davies, 2002; Dilts & Pence, 2006). In addition, several studies analyze in detail the factors that improve organizational innovation (Crossan & Apaydin, 2010; Damanpour & Aravind, 2012; Ganter & Hecker, 2014; García-Vega & López, 2010), but do not link the effect of these factors on the success of innovation projects.

According to several authors (Belso Martínez et al. 2013; Cantner et al., 2011), a greater number of successful innovation projects leads to higher incomes for shareholders and higher learning for their employees. Linking innovation with project-based organizations, this study demonstrates the effect of certain organizational characteristics in the success of innovation projects a firm develops.

This study introduces fuzzy set Qualitative Comparative Analysis (fsQCA) to the research on innovation projects and applies this approach to a large representative sample of 10,163 Spanish firms. FsQCA is suitable for exploring complex relationships among several factors influencing an expected outcome (Cheng et al., 2013; Fiss, 2011; Ragin, 2006). By facilitating that analysis, this approach presents a practical way to organize several interdependent cause-effect relationships into a framework explaining variance in performance of innovation projects. Implications to a bigger population are therefore feasible using fsQCA (Woodside, 2013).

The results suggest that no single organizational characteristic is key for ensuring the success of innovation projects, and no particular causal path leads to that outcome. Because of significant interdependencies, the main contributing organizational characteristics to the success of innovation projects within the company relate to organizational innovation, national and international cooperation, firm size, and holding firm membership.

Following this introduction, Section 2 contains the theoretical framework. Section 3 describes the method. Section 4 presents research findings. Section 5 offers conclusions and further research.

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* Corresponding author at: ESCP Europe, C/Arroyofresno, 1, 28035 Madrid, Spain.
E-mail addresses: jcobo@escpeurope.eu (J.R. Cobo-Benita), ersegura@navantia.es (E. Rodríguez-Segura), isabel.ortiz@upm.es (I. Ortiz-Marcos), luisignacio.ballesteros@upm.es (L. Ballesteros-Sánchez).

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2. Literature review

Many diverse factors contribute to success on innovation projects performance. According to Lovallo and Kahneman (2003) more than 70% of new manufacturing plants in North America close during its first decade of operation. Debacles like that staged the governments of Britain, Germany, Italy and Spain when they announced the joint construction of advanced military jets, are very common in business. The project starts in the 80s and even though the deadline was the year 1997, in 2003 the project was still in process with a budget increase from 20 to 45 trillion dollars. Likewise, Whittaker, B. (1999) explains the failure rate of projects of Information Technology; a 2008 study in the US finds that customers cancel 31% of projects software before their completion. More than half of the projects cost on average a 189% of its original estimate, 250 billion dollars of expenses each year in the United States in developing IT applications.

According to Ika et al. (2012), underperforming projects and the disappointment of stakeholders, especially final consumers, is the rule rather than the exception nowadays. According to World Bank statistics, failure of projects exceeds 50%, whereas a study of the IEG (Independent Evaluation Group) states a failure rate of 39% of World Bank projects around the world in 2010.

According to Matta and Ashkenas (2003), economic theory could easily help to explain why firms, despite knowing that a high risk of failure exists in performing them, agree to design and implement innovation projects. The benefits in the long term of successful projects are higher than the losses of failed projects. Project efficiency explains the profitability of having failed projects despite having other projects in the firm's portfolio Having a greater number of successful projects results in higher incomes for shareholders and greater learning for their employees.

Considering Matta and Ashkenas' (2003) results, this study aims to identify the organizational characteristics that make a firm successful in their innovation projects in Spain during the period 2008–2010 using the Spanish Community Innovation Survey (CIS).

Within the literature on variables for the analysis of success and failure of innovation projects, the use of the CIS is common because the CIS provides information on a large number of firms with different characteristics for different countries.

Because all these surveys are conducted under the same methodology proposed by the OECD, is possible to compare the results of studies based on these surveys for different countries.

Faria and Lima (2009) conduct an investigation about the two types of strategy that a firm can implement to their innovation projects: focusing on product and on process. Using data from the Portugal CIS in the period 1998–2000 and applying a Logit model to a sample of 821 firms, the authors conclude that organizational innovation leads firms to improve the performance of their innovation projects.

Polder et al. (2010) conduct a study on innovation's effect on productivity, claiming that productivity increases process and organizational innovation. Likewise, Battisti and Stoneman (2010) conduct a research with UK CIS in 2004 and a sample of 16,383 companies seeking the complementarities between the two major types of innovation: organizational and technological (comprising product innovation, process, machines, market, organization, management, and strategy). The authors clarify that these two groups are complementary but not substitutes and suggest that technological innovation in the absence of organizational innovation cannot create competitiveness. Other authors find that this innovation capacity in firms tends to persist over time and that differences in levels of innovation among firms owe partially to the way firms address these differences (Mas-Verdú et al., 2015).

Another significant research variable under study is the cooperation with different stakeholders participating in a project: partners, customers, suppliers, etc. On this subject, Belderbos et al. (2004)conduct an investigation in Dutch companies using data from the CIS from 1996 and 1998 with data from 2056 companies. The authors determine whether different types of cooperative R&D affect business growth in added value per employee and growth in sales of new products on the market per employee. Their results show that cooperation with suppliers and partners has a significant effect on the growth of added value per employee. In this sense, Lhuillery and Pfister (2009) identify the characteristics contributing to 'failure of cooperation'.

The literature review shows that there exists a lack of analysis about the impact of organizational characteristics on the success of innovation projects. Several researches using CIS as the main data source conclude that organizational innovation is complementary to other types of innovation and generally increases the likelihood of successful innovation.

To maintain consistency with previous investigations, the authors of this research work upon: the studies of Battisti and Stoneman (2010), Faria and Lima (2009) and Fiss (2011); and the formal structure of the Community Innovation Survey regarding selection and definitions of variables influencing the performance of innovation projects.

Hypothesis. Organizational innovation, degree of cooperation (with national and international partners), education level of employees, firm size, firm seniority, membership to a holding company and R&D investment impact on performance of innovation projects.

3. Data and method

3.1. Data

This research uses data from the database Technology Innovation Panel (PITEC), including information since 2003, and aims to provide additional information to databases on innovation activities in Spanish firms. This data panel builds on the Community Innovation Survey (CIS), which covers the time span between 2008 and 2010. The Spanish gross sample consists of 31,636 firms. The data gathering process considered the organizational innovation variable to collect the questionnaires in those firms. This measure leaves a final sample of n = 10,163 firms observations. Thus, for this study the researchers consider the study of Greckhamer et al. (2013), who apply fsQCA to large data samples. These are the definitions of variables:

Organizational innovation, variable reflecting the implementation of organizational innovation during the period considered. 1 if the firm adopted at least one organizational innovation (knowledge management, workplace organization, or external relation) between 2008 and 2010. *Degree of cooperation with national partners*, variable reflecting the firm cooperation with other national firms/partners. *Degree of cooperation with international partners*, variable reflecting the firm cooperation with international firms/partners. *Education*, the share of employees with a doctoral degree (within the firm working in R&D projects) operationalizes the education level of the workforce. *Firm size*, continuous variable specifying the number of employees in 2010. *Firm seniority*, continuous variable specifying the seniority of a firm designing, developing and delivering innovation projects. *Holding company*, variable indicating if firms belong to a holding company. R&D investment, continuous variable measuring the total investment in R&D per employee.

3.2. FsQCA in innovation research

The fsQCA approach is an appropriate methodology to analyze complex nonlinear relationships between variables (Ragin, 2008; Woodside, 2013). This type of analysis conceptualizes variables as combinations of attributes. By comparing cases, fsQCA allows a comprehensive understanding of how the various causes combine to produce a particular outcome that suits causal complexity levels and identifies, in this case, the necessary and sufficient conditions of innovation project performance. This approach offers a practical way to organize the complex and interdependent relations of cause–effect that can explain the variation in the innovative behavior of firms (Fiss, 2011; Short et al., 2008).