Leadership competencies revisited: A causal configuration analysis of success in the requirements phase of information systems projects

Filipa Pires da Silva*, Helena Mateus Jerónimo, Pedro Rino Vieira

Advance/CSG, ISEG, Universidade de Lisboa, Rua Miguel Lupi 20, 1249-078 Lisboa, Portugal

ARTICLE INFO

ABSTRACT

The research on information systems shows significant project failure rates. The requirements-related problems and the lack of management and leadership skills are the most cited causes. Thus, this study uses a fuzzy-set qualitative comparative analysis (fsQCA) to explore which types of leadership competencies (emotional, intellectual, and managerial) are the most relevant for each activity in the requirements phase. This study also examines whether gender and holding a project management certification contribute to the success of this phase. The results show that different activities call for different leadership competencies and that gender is the most consistent condition that leads to success. The findings also indicate that formal certification may not be a proxy for all the required skills and knowledge needed in the requirements phase. These results enable a better fit for those professionals that are involved in the requirements phase to improve their success probabilities.

1. Introduction

Projects in information systems (IS) have been a hot research topic for decades, particularly as regards the key factors that lead to successful projects. Nevertheless, recent surveys continue to show significant failure rates with no great improvement from previous ones (PMI, 2018; The Standish Group International, 2013, 2015). One of the major causes of project failure is the requirements phase, which involves the early activities in the IS project's life cycle (Pressman & Maxim, 2015; The Standish Group International, 2013).

The requirements phase is very much dependent on project managers and teams, who have to apply the most adequate tools and skills to meet the desired outcomes (Russo, Ruiz, & Cunha, 2005; Skulmoski & Hartman, 2010) and who should be able to effectively involve and communicate with the relevant stakeholders (The Standish Group International, 2013). In this respect, the CHAOS report, one of the most popular reports on IS projects, provides a list of the ten main causes of project failure. This report consistently includes topics related to unclear or inadequate requirements along with inadequate stakeholder involvement, poor skills and expertise, and the lack of emotional maturity of both team members and the project manager (The Standish Group International, 2013). The Project Management Institute (PMI) has recently reported that projects also fail due to the lack of standardized project management practices (PMI, 2018). The possession of a project management certification (PMC) should indicate the knowledge

of those standardized practices that the manager needs to succeed in all the activities in the project and the possession of the skills that he or she needs for effective leadership (Millhollan & Kaarst-Brown, 2016).

A consensus exists in the literature on the fact that effective leadership plays a critical role in achieving successful teams and IS projects (Bennett, 2009; Xu & He, 2008). Leaders are responsible for creating an environment that emphasizes teamwork and that fosters a spirit of cohesion, motivation, and trust (PMI, 2017). However, the literature is less consensual with regards to what makes a leader effective (Bennett, 2009; Componation, Youngblood, Utley, & Farrington, 2008; Turner & Müller, 2005). Several factors exist for both personal and institutional leadership; namely, the leader's personality and gender, the project's life cycle, the degree of innovation and complexity, and the tasks' structure (Müller & Turner, 2007; Pafford & Schaefer, 2017; Skulmoski & Hartman, 2010). One of the main leadership responsibilities is emotional maturity, which is defined as the ability of people to work together in a project. Emotional maturity represents the second most important factor for project success (The Standish Group International, 2015).

Although the literature on general projects gives good insights into the field of IS, Eom (2006) argues that more studies are needed to overcome the specificities of this business area. For instance, the IS field is traditionally characterized as a male predominant field (Brescoll, 2016). The literature on gender differences has found that this predominance can influence the firm's perception of the manager's ability

* Corresponding author.
E-mail addresses: fps@iseg.ulisboa.pt (F.P. da Silva), jeronimo@iseg.ulisboa.pt (H.M. Jerónimo), rinovieira@iseg.ulisboa.pt (P.R. Vieira).

to succeed and lead (Heilman, 2012).

So far, no study has integrated all the above-mentioned elements by focusing its research on the conditions that lead to a successful requirements phase. Furthermore, few studies examine the role and impact of leadership throughout the IS development project's life cycle, and their focus is mainly on variations among phases rather than on exploring just one phase in detail. This focus may seem contradictory as the literature shows that for each phase, different professionals carry out different sets of activities (Russo et al., 2005; Skulmoski & Hartman, 2010). Likewise, studies have not examined the practices and skills that result from a PMC to ascertain their influence on the execution of the various phases in the project, especially those considered more critical. Finally, only a limited number of studies include the impact of gender on effective leadership in the context of IS projects despite the well-documented perceptions of distinctive male and female leadership roles (Brescoll, 2016; Pafford & Schaefer, 2017).

The aim of this study is to explore which combinations of leadership competencies contribute to successfully carrying out all the activities in the requirements phase along with the impact of standards and practices derived from having a PMC. This study also takes into consideration the influence of gender as a means to include the context specificities of this business area and how it may influence the success of the activities in this phase. This study contributes to the awareness of practitioners regarding the requirements' demands to allow them to achieve a better fit for the project leader who has to carry out the activities in this phase. This study also encourages discussion regarding the effectiveness of holding a PMC as a proxy to ensure the knowledge about the best management practices and to ensure the necessary leadership competencies and emotional maturity that a project manager needs for success.

The paper is organized as follows: Section 2 reviews the relevant literature on this research topics. Section 3 describes the methods. Section 4 presents preliminary analysis and then a discussion of the results. Section 5 concludes the study with limitations and suggestions for future research.

2. Literature review

This review covers the relevant literature on the main causes of IS project failures. The review begins by contextualizing the requirements phase and its criticality and then presents the previous work on the influence of leadership, professional certification, and gender on IS projects.

2.1. IS projects and a successful requirements phase

According to PMI (2017, p.18), a project reaches completion through a systematic "collection of logical related project activities that culminates in the completion of one or more deliverables." These activities are usually grouped into a series of phases that a project passes through its completion. This process is called the project's life cycle. PMI dictates a set of management processes (initiating, planning, executing, controlling, and closing) to improve the chances of successful project execution (PMI, 2017). However, the early stages are more prone to risk because managers must identify and agree on the main development issues (Procaccino, Verner, Darter, & Amadio, 2005). Additionally, Iqbal, Ahmad, Nasir, and Khan (2017) state that an error that managers do not detect during an early phase can cost 10 to 200 times more to resolve during the subsequent phases.

In IS projects, the research often considers the requirements phase to be a prerequisite for project success as it includes the most demanding and critical tasks (Chakraborty, Sarker, & Sarker, 2010; Chatzoglou & Macaulay, 1997; Verner et al., 2007). A requirement is a condition or capability that must be met or possessed by a system (Nicolás & Toval, 2009). The requirements phase involves project managers and other project stakeholders working together to gather and compile the requirements to understand the client's needs and to negotiate and specify a reasonable solution (Pressman & Maxim, 2015). Once managers and stakeholders find and agree on the main guidelines for the solution, they can execute the subsequent activities of the project. Pressman and Maxim (2015) argue that seven activities are intrinsic to this phase:

- Inception: analysts establish the basic requirements of the problem, define the constraints, and agree on the key features that must be present in the system.
- Elicitation: analysts refine the information from the first function.
- Elaboration: analysts use all information to develop an analysis model.
- Negotiation: as conflicting requirements are relatively common, this function intends to solve or minimize them.
- Specification: after negotiating the requirements, systems analysts create the documents that present the results of previous phases.
- Validation: whereby analysts analyze the specifications of the requirements and agree to ensure that all requirements are stated correctly and are unambiguous.
- Management: analysts carry out activities to help the project team identify, control, and track requirements along the project's life cycle.

Elicitation, negotiation, and validation require critical interactions with the stakeholders, namely to gather requirements and to negotiate and confirm a reasonable solution. Inception and elaboration focus on understanding what the client needs to conceptualize a solution. Specification focuses on producing and documenting the solution. Management activities are related to the requirement changes as the project progresses and are frequently described as an iteration of the previous activities with an update to the documentation of the requirements change. Accordingly, Chatzoglou and Macaulay (1997) describe these requirements activities as iterative. Each iteration starts whenever the information is insufficient, or when a change in information occurs.

The requirements process can also be seen from the social and behavioral standpoint, and therefore is equally a dynamic and context-specific function of the collaborative interaction of all participants (Chakraborty et al., 2010; Eman, Quintin, & Madhavji, 1996). Pressman and Maxim (2015) also state that requirements activities are difficult due to the problems in scope, understanding, and volatility and the difficulty in communicating with both clients and system developers alike.

The success of the requirements phase is difficult to measure and to separate from the final success of the project. The current literature on defining and addressing the success measures for this phase and its outputs is scarce. However, several authors agree that the main outcome of the requirements phase is to achieve consensus about the system to be built (Pressman & Maxim, 2015; Ramingwong, 2012). In other words, since the requirements documents determine the system to be implemented, clients should validate and confirm that their content is good enough to proceed with the project's development. Procaccino et al. (2005) argue that the acceptance of requirements should be included among the measures of project success, as acceptance indicates an understanding of achievement between clients and the development team.

However, while good requirements, customer/user involvement, and effective requirements management are good predictors of a project's success (Verner, Cox, Bleistein, & Cerpa, 2007), they are not sufficient to forecast the final success of a project, because errors can occur during the remaining phases of its development. The concept of project success is outside this study's scope; however, this study argues that addressing issues arising from the requirements phase contributes to the probability of this phase's success, which can positively influence the overall success of IS projects.

2.2. Leadership competencies

The literature shows that leadership is a critical factor for the success of IS projects (Turner & Müller, 2005). Leaders should be able to establish and maintain vision, strategy, and communication throughout the project by influencing, guiding, monitoring, and evaluating the performance of their team.

The literature defines leadership in terms of individual traits and behaviors (Müller & Turner, 2007). Dulewicz and Higgs (2003) develop a leadership competencies framework that comprises 15 dimensions in three categories of quotients: intellectual (IQ), managerial (MQ), and emotional (EQ). This framework emphasizes the skills and characteristics that a leader needs to develop. The IQ category comprises critical analysis and judgment, vision, imagination, and strategic perspective; MQ comprises resource management, engaging communication, empowering, developing, and achieving; and EQ comprises self-awareness, emotional resilience, intuitiveness, interpersonal sensitivity, influence, motivation, and conscientiousness. This framework shows the importance of all these categories, although EQ is the quotient most commonly associated with leadership (Dulewicz, Higgs, & Slaski, 2003).

Studies find that different competencies are critical during various project phases (Russo et al., 2005; Skulmoski & Hartman, 2010). For instance, the ability to deal with ambiguity, sales ability, persuasiveness, political awareness, and decisiveness are all particularly relevant during the early stages of a project.

The literature demonstrates that appropriate leadership depends on several factors, namely the project itself (Müller & Turner, 2007), the tasks' complexity and structure, the maturity and knowledge of the team members (Faraj & Sambamurthy, 2006), and gender stereotypes (Brescoll, 2016; Pinto, Patanakul, & Pinto, 2017). These variations in the relevance of different leadership skills and behaviors according to different situations leads to the question of whether different leadership competencies are relevant in carrying out the activities in the requirements phase of the IS project's life cycle.

2.3. Project management certification

The literature shows that the presence of ambiguous tasks requires the need for distinct leadership styles and competencies to be effective and to provide guidance to subordinates (Faraj & Sambamurthy, 2006). For example, elicitation is such an intrinsically ambiguous task that it might benefit from a structured approach (Laporti, Borges, & Braganholo, 2009). The existence of the PMC is commonly understood to mean the knowledge of the standardized procedures and the needed skills that support the structuring of the tasks.

Recently, PMI reported that one of the pitfalls of project success is the lack of consistently used standard project management practices (PMI, 2018), although most (72%) project managers feel that certification is relevant to improve the necessary skills, especially leadership. The empirical evidence also shows that a structured approach is a necessary condition for success or, at least, is a sign of experience and technical knowledge (Millhollan & Kaarst-Brown, 2016; Starkweather & Stevenson, 2011).

2.4. Gender

Women are underrepresented in the IS sector and project management (Bureau of Labor Statistics, 2013). The literature claims that the perceptions on the ability to succeed are quite different between men and women. When work responsibilities are traditionally assigned to men, or when men are the overwhelming majority in management, these perceptions are even more pronounced (Heilman, 2012). Male leadership and female leadership call for different sets of competencies (Pafford & Schaefer, 2017). While male leadership is strategic and visionary, female leadership is more social; the research sees women as

communal leaders (calm, warm, and kind) and men as agentic leaders (aggressive, dominant, and independent). Women are frequently thought to be more emotional, which can mean being unstable, irrational, lacking objectivity, and not tough enough to make difficult decisions (Brescoll, 2016).

Historically, the literature has considered agentic leadership to be more effective (Pafford & Schaefer, 2017). However, when women tend to assume a more agentic behavior, or display some traits commonly perceived as male characteristics, they are penalized on account of their lack of communality—known as "the backlash effect" (Brescoll, 2016). The role congruity theory explains that coworkers view women negatively when they adopt male behaviors and characteristics due to their social expectations for the female gender (Eagly & Karaus, 2002).

According to Conyon and He (2017), gender diversity in the boardroom has a positive effect on the quality of decision-making, and thus an organization's performance. However, the literature argues that gender homogeneity can foster critical decision-making, consensus achievement, and trust relationships (Eagly & Karaus, 2002; Heilman, 2012). Further, the requirements phase involves several activities that need a trustable and efficient communication channel in order to achieve consensus (Procaccino et al., 2005) in a male-dominated context. Therefore, attention is paid to the leader's gender to ascertain whether it is a relevant condition for success during this phase, which will enable a deeper understanding of how gender can overcome or substitute for some of the other required competencies.

3. Methods

This research is a part of an exploratory attempt to better understand the main conditions that lead to success during the requirements phase. The focus is on examining which leadership competencies are necessary to effectively carry out the different activities of this phase. Additionally, the analysis also examines the influence of holding a PMC and the impact of gender on achieving the outcome—the success of the requirements phase.

3.1. Data collection and sample

Data collection was carried out through semi-structured interviews in order to capture the leader's perceptions of the subjects at stake in this study. Following the recommendations of Yin (2013), an interview guide was developed that was based on the main insights from the review of the literature.

Twelve of the largest companies in the Portuguese IS industry participated in the study (Sousa, 2010). A total of 32 interviews were held between June and December 2014 with professionals that held different roles in the requirements phase. The eligibility criteria for project managers was the following: (a) belonging to a Portuguese software house that demonstrated diversity in project profiles, (b) at least two years of experience in managing IS projects, and (c) involvement in software development projects that were recently finished or were still in progress.

The number of interviews was not defined a priori. Instead, the interviews continued being carried out until no new information emerged. In addition, four more interviews were performed to reinforce the theoretical saturation, as recommended by some authors (Eisenhardt, 1989).

The sample was predominantly male (23 men; 9 women) and the majority (19) were 30–40 years of age. In terms of education, the minimum level was university attendance (some did not finish their degree). About one third of the participants had a PMC. Most participants were IS senior project managers with extensive professional experience (at least six years), albeit gained from different positions within their companies.

3.2. Conditions

Leadership competencies were operationalized with the leadership competencies framework proposed by Dulewicz and Higgs (2003). These competencies were combined with the study's context and outcome, taking into consideration those activities that are performed during the requirements phase (Pressman & Maxim, 2015). A double entry table was provided during the interviews where participants were required to indicate, for each cell, whether a particular competency was relevant or not to carrying out each requirements activity. Information on gender and PMC was also collected during the interviews.

3.3. Outcome

We consider the success of the requirements phase to be the acceptance of the requirements documents. As explained in the literature review, these documents describe the system to be implemented. Therefore, their successful validation means that the stakeholders are satisfied enough with the conditions to proceed with the projects' development. Therefore, participants were questioned about the client's agreement with the requirements artifacts, as a proxy to measure the phase's success.

3.4. Fuzzy-set qualitative comparative analysis (fsQCA)

We use fsQCA to identify the conditions (or combinations of conditions) that lead to success during the requirements phase of an IS project. fsQCA is particularly well suited for exploratory studies with small sample sizes. Its analysis is grounded in set theory and permits the formulation of combinations of causal measures to explain a given outcome (Ragin, 2008). The fuzzy analysis' distinctiveness, when compared to traditional statistical techniques, is that it allows for the presence of an outcome that is not the logical opposite of the absence of the outcome (asymmetric causality), identical conditions that lead to different outcomes (multifinality), multiple paths that lead to the same outcome (equifinality), and combinations of conditions that lead to the outcome (causal complexity) (Basedau & Richter, 2014; Rihoux & Ragin, 2009).

This study explores which conditions lead to the requirements phase's success and which conditions lead to the absence of success. The model is the following:

$$Suc = f(IQ, EQ, MQ, Gen, PMC)$$

and

$$\sim Suc = f(IQ, EQ, MQ, Gen, PMC)$$

where Suc stands for success, IQ for intellectual competencies, EQ for emotional competencies, MQ for managerial competencies, Gen for gender, and PMC for project management certification. The symbol $\sim$ represents the absence of the outcome, or of a condition.

3.5. Calibration

FsQCA requires dividing the cases into degrees of membership. This process, which is called calibration, refers to the transformation of the original data into fuzzy sets that can range from zero (full exclusion from a set) to one (full inclusion) (Ragin, 2008). Following conventional recommendations (Crilly, Zollo, & Hansen, 2012; Ragin, 2008; Woodside, 2013), this study uses three qualitative anchors; namely, 0.95 for full membership, 0.05 for non-membership, and 0.50 to indicate the crossover point. Table 1 shows the statistics as well as the scores regarding the three calibration values for each condition, and the distribution for the binary conditions (Suc, Gen, PMC).

The competencies are calibrated differently by using the fuzzy set scheme in Rihoux and Ragin (2009, p. 91). The IQ variable with three competencies is calibrated using the four-value fuzzy set: no relevant

Table 1
Descriptive statistics and calibration values for conditions and outcome.

		Mean	SD	Min.	Max.	Calibration values		
						0,95	0,50	0,05
Inception	IQ	0,71	0,34	0,00	1,00	1,00	0,84	0,00
	MQ	0,60	0,31	0,00	1,00	1,00	0,60	0,09
	EQ	0,62	0,31	0,00	1,00	1,00	0,60	0,05
Elicitation	IQ	0,62	0,33	0,00	1,00	1,00	0,67	0,00
	MQ	0,49	0,28	0,00	1,00	1,00	0,40	0,20
	EQ	0,53	0,31	0,00	1,00	1,00	0,60	0,05
Elaboration	IQ	0,66	0,31	0,00	1,00	1,00	0,67	0,17
	MQ	0,63	0,28	0,00	1,00	1,00	0,60	0,20
	EQ	0,51	0,24	0,00	1,00	0,95	0,60	0,10
Negotiation	IQ	0,63	0,29	0,33	1,00	1,00	0,67	0,33
	MQ	0,61	0,21	0,00	1,00	1,00	0,60	0,30
	EQ	0,68	0,33	0,00	1,00	1,00	0,90	0,10
Specification	IQ	0,41	0,38	0,00	1,00	1,00	0,33	0,00
	MQ	0,50	0,29	0,00	1,00	1,00	0,40	0,00
	EQ	0,54	0,28	0,00	1,00	1,00	0,40	0,10
Validation	IQ	0,39	0,33	0,00	1,00	1,00	0,33	0,00
	MQ	0,56	0,22	0,20	1,00	1,00	0,60	0,20
	EQ	0,52	0,30	0,00	1,00	1,00	0,40	0,05
Management	IQ	0,52	0,42	0,00	1,00	1,00	0,67	0,00
	MQ	0,56	0,26	0,00	1,00	1,00	0,60	0,20
	EQ	0,54	0,32	0,00	1,00	1,00	0,60	0,05

Gen	Binary condition: 0 = man; 1 = woman
PMC	Binary condition: 0 = no to have; 1 = to have
Suc	Binary condition: 0 = no success; 1 = success

IQ = Intellectual Competencies; MQ = Managerial Competencies; EQ = Emotional Competencies; Gen = Gender; PMC = Project Management Certification; Suc = Success.

competency is coded as 0 (fully out), only one relevant competency is coded as 0.33 (more out than in), two relevant competencies are coded as 0.67 (more in than out), and all relevant competencies are coded as 1 (fully in). For both the MQ and EQ variables, more than six values could exist. Accordingly, the analysis groups the responses and carry out the calibration by considering the six-value set recommended by the same authors. For MQ, the calibration codes are the following: no relevant competency as 0 (fully out), just one relevant competency as 0.1 (mostly but not fully out), two relevant competencies as 0.4 (more or less out), three relevant competencies as 0.6 (more or less in), four relevant competencies as 0.9 (mostly but not fully in), and all five relevant competencies as 1 (fully in). The calibration rationale for EQ is similar to the only difference being the number of relevant competencies: none as 0, two or three relevant competencies as 0.4, four or five relevant competencies as 0.6, six relevant competencies as 0.9, and seven relevant competencies as 1.

The other two conditions (gender and PMC) are measured as dichotomous variables. Gender is coded as 0 (outside the set) for males and 1 (fully in a set) for females. With regards to PMC, the analysis distinguishes those participants who do not have a PMC (coded as 0, outside the set) from those without one (coded as 1, fully in a set). The outcome (Suc) is also a dichotomous variable whose codification results from the client's acceptance of the requirements: whenever the client signs the document, the phase is considered successful and the outcome assumes a value of 1; otherwise the absence of success is the case and assumes a value of 0.

4. Results and discussion

In fsQCA, a condition, or a combination of conditions, is considered necessary if that condition is always present when the outcome is present (Rihoux & Ragin, 2009). It is necessary or almost always necessary if the consistency score exceeds 0.90 or 0.80, respectively

Table 2
Summary of necessary conditions.
Outcome: *Suc.*

Cond.	Inception		Elicitation		Elaboration		Negotiation		Specification		Validation		Management	
	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.
IQ	0.69	0.82	0.51	0.69	0.60	0.80	0.46	0.71	0.35	0.51	0.39	0.56	0.39	0.59
~IQ	0.31	0.53	0.49	0.73	0.40	0.61	0.54	0.71	0.65	0.90	0.61	0.85	0.61	0.81
MQ	0.45	0.59	0.60	0.86	0.62	0.83	0.56	0.78	0.58	0.73	0.42	0.68	0.41	0.64
~MQ	0.55	0.82	0.40	0.56	0.38	0.58	0.44	0.64	0.42	0.68	0.58	0.73	0.59	0.77
EQ	0.53	0.66	0.48	0.75	0.46	0.79	0.61	0.95	0.51	0.60	0.60	0.73	0.43	0.65
~EQ	0.47	0.75	0.52	0.67	0.54	0.65	0.39	0.51	0.49	0.87	0.40	0.68	0.57	0.76
PMC	0.38	0.62	0.36	0.62	0.36	0.62	0.36	0.62	0.36	0.62	0.36	0.62	0.36	0.62
~PMC	0.62	0.76	0.64	0.78	0.64	0.78	0.64	0.78	0.64	0.78	0.64	0.78	0.64	0.78
Gen	0.24	0.56	0.23	0.56	0.23	0.56	0.23	0.56	0.23	0.56	0.23	0.56	0.23	0.56
~Gen	0.76	0.76	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77

Cond. = Conditions; Cons. = Consistency; Cover. = Coverage; IQ = Intellectual Competencies; MQ = Managerial Competencies; EQ = Emotional Competencies; PMC = Project Management Certification; Gen = Gender.

(Ragin, 2000). A condition, or a combination of conditions, is considered sufficient when it produces a given outcome. All possible combinations of those conditions that lead to a given outcome are logically listed in the truth table (Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015; Ragin, 2008).

4.1. Analysis of necessary conditions

Tables 2 and 3 show the results on whether any of the conditions are necessary for the presence of success (Suc) in the requirements phase, or the lack thereof (~Suc). Table 2 shows that none of the conditions are necessary, which means that no condition on its own guarantees success. Regarding the absence of the outcome (~Suc), the results in Table 3 show three conditions above the required threshold: ~EQ is a necessary condition for ~Suc in Negotiation, and EQ and IQ are almost always necessary for ~Suc in Elicitation. Negotiation is highly interactive and demanding, and thus the absence of EQ competencies is not surprising because they can lead to the unsuccessful accomplishment of such an activity. In contrast, neglecting the need for EQ and IQ to carry out Elicitation contradicts the literature, as previous studies state that the ability to communicate, to foster a good relationship with the stakeholders, and to critically analyze outputs are all highly relevant for carrying out this activity (Keil, Lee, & Deng, 2013; Skulmoski & Hartman, 2010).

4.2. Analysis of sufficient conditions

Table 4 shows the different configurations for each activity in the requirements phase and the values for the overall solution coverage and

consistency. All configurations comply with the minimum acceptable value of 0.75 for consistency, although preferably that score should be greater than or equal to 0.80 (Ragin, 2008; Woodside, 2013). The analysis excludes the paths with a consistency value lower than 0.75. The same rule of 0.75 applies to the consistency cutoff. The coverage range suggested in the literature is between 0.25 and 0.90 (Ragin, 2008). Regarding Suc, the overall consistency ranges from 0.82 to 0.97, and thus exceeds the minimum values (Ragin, 2008; Woodside, 2013). The overall coverage ranges from 0.25 to 0.57 with the exception of Validation where the score is just 0.15. This value is acceptable when considering the causal configuration in this activity because all the conditions are absent.

The absence of the outcome (~Suc) is also tested, but the results show that several activities do not meet the threshold for overall solution coverage. A possible explanation might be that the study's participants did not perceive the absence of success to the same degree as this paper assumes. Another explanation might be that despite the non-signature of the requirements documents, participants have fulfilled the leadership competencies table for a successful phase. Elaboration and Management do not meet the threshold for overall solution consistency, and thus no conclusion is possible. A similar finding is reported by Mas-Verdú et al. (2015), and the explanation might be related to problems of asymmetry (Woodside, 2013).

The presentation of the results follows the best practices by displaying the causal configurations that lead to the outcome and its absence along with its core and peripheral conditions (Crilly et al., 2012; Ragin & Fiss, 2008). Core conditions are those that indicate "a strong causal relationship with the outcome of interest," whereas peripheral conditions are those for which "a causal relationship with the outcome

Table 3
Summary of necessary conditions.
Outcome: *~Suc.*

Cond.	Inception		Elicitation		Elaboration		Negotiation		Specification		Validation		Management	
	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.	Cons.	Cover.
IQ	0.35	0.18	0.55	0.31	0.37	0.20	0.45	0.29	0.82	0.49	0.74	0.44	0.65	0.41
~IQ	0.65	0.47	0.45	0.27	0.63	0.39	0.55	0.29	0.18	0.10	0.26	0.15	0.35	0.19
MQ	0.72	0.41	0.24	0.14	0.31	0.17	0.40	0.22	0.52	0.27	0.49	0.32	0.57	0.36
~MQ	0.28	0.18	0.76	0.44	0.69	0.43	0.60	0.36	0.48	0.32	0.51	0.27	0.43	0.23
EQ	0.63	0.34	0.38	0.25	0.30	0.21	0.08	0.05	0.82	0.40	0.54	0.27	0.56	0.35
~EQ	0.37	0.25	0.62	0.33	0.70	0.35	0.92	0.49	0.18	0.13	0.46	0.32	0.44	0.24
PMC	0.56	0.38	0.56	0.38	0.56	0.38	0.56	0.38	0.56	0.38	0.56	0.38	0.56	0.38
~PMC	0.44	0.24	0.44	0.22	0.44	0.22	0.44	0.22	0.44	0.22	0.44	0.22	0.44	0.22
Gen	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
~Gen	0.56	0.24	0.56	0.23	0.56	0.23	0.56	0.23	0.56	0.23	0.56	0.23	0.56	0.23

Cond. = Conditions; Cons. = Consistency; Cover. = Coverage; IQ = Intellectual Competencies; MQ = Managerial Competencies; EQ = Emotional Competencies; PMC = Project Management Certification; Gen = Gender.

Table 4
Intermediate solution for the outcome (*Suc*).
　Intermediate solution – Suc.
　Model: Suc = f {IQ, MQ, EQ, Gen, PMC}.

Causal conditions	Phases										
	Inception			Elicitation					Elaboration		
	1	2	3	1a	1b	1c	2	3	1	2a	2b
IQ	●	●	●			●	○	●	○	●	●
EQ		●	●	○	●	●	○	●	○	●	○
MQ		●	○	●	●	●	○			●	●
Gen	○	○	●	○	○	○	○	○	○	○	●
PMC	○		●	●	○		○	○	○		
Consistency	0,98	0,85	0,77	0,95	0,87	0,89	0,83	0,88	0,88	0,88	0,94
Raw coverage	0,36	0,24	0,04	0,13	0,17	0,23	0,12	0,19	0,18	0,27	0,09
Unique coverage	0,25	0,12	0,04	0,08	0,03	0,03	0,08	0,04	0,10	0,20	0,09
Overall solution coverage	0,52			0,45					0,46		
Overall solution consistency	0,91			0,93					0,89		

Causal conditions	Phases										
	Negotiation		Specification			Validation	Management				
	1	2	1a	1b	2	1	1a	1b	2a	2b	3
IQ		○	○	●	○	○	○	○		●	○
EQ	●	○	○	●	●	○	●	○	○	●	●
MQ	●	○	●	●	●	○	●	○	○	●	○
Gen	●	○	○	○	○	○	○	○	○	○	●
PMC	○	○	○	○	●	○	●		○	○	○
Consistency	0,95	0,82	0,95	0,77	0,78	0,97	0,91	0,87	0,91	0,76	0,83
Raw coverage	0,13	0,12	0,11	0,14	0,12	0,15	0,08	0,31	0,25	0,13	0,07
Unique coverage	0,13	0,12	0,07	0,10	0,12	0,15	0,05	0,12	0,04	0,04	0,07
Overall solution coverage	0,25		0,33			0,15	0,57				
Overall solution consistency	0,88		0,82			0,97	0,83				

Suc = Success; IQ = Intellectual Competencies; MQ = Managerial Competencies; EQ = Emotional Competencies; Gen = Gender; PMC = Project Management Certification.
Full black circles (●/●) indicate the presence of a condition, and blank circles ○/○) indicate its absence. Large circles indicate core conditions, and small ones indicate peripheral conditions. Blank spaces indicate "don't care".

is weaker" (Fiss, 2011, p. 394). The first are part of both the parsimonious and intermediate solutions; the second is only present in the intermediate solution (Fiss, 2011, p. 403). The parsimonious solution is contained within the intermediate and only includes core conditions that are highly linked to the outcome. The intermediate solutions are more conservative because they benefit from the most plausible simplifying solutions (Crilly et al., 2012, p. 1439).

Table 4 shows different causal combinations that lead to success throughout the activities in the requirements phase.

For Inception, the results show three configurations for success. The most consistent one (Path 1) emphasizes IQ and ~PMC as core conditions. Most previous studies do not highlight IQ as one of the important dimensions (Dulewicz & Higgs, 2003; Müller & Turner, 2007), however exceptions exist (Turner, Müller, & Dulewicz, 2009). Its relevance relates to the need for a visionary and strategic perspective to foresee a suitable solution and to the need for critical analysis to align the project with the stakeholders' interests. The other configurations (Path 2 and 3) highlight MQ and EQ with contrasting Gen values. When Gen is present (which equals a woman), EQ is core (Path 3); but when the leader is a man, MQ and IQ are core (Path 2). Inception frequently calls for a first interaction with the client and the establishment of an engaging supplier-client relationship. This interaction explains the need for communication skills (MQ) and interpersonal sensitivity (EQ) (Turner et al., 2009). However, a higher EQ in Path 3 as well as the presence of PMC indicates that these conditions become critical only when a female leader has to deal with the eventual obstacles and her technical competencies have to be externally validated. This situation confirms

previous studies on the different perceptions of capabilities by gender (Eagly & Karaus, 2002; Pafford & Schaefer, 2017).

For Elicitation, three different configurations lead to success: Path 1 in which MQ and ~Gen are core conditions; Path 2 in which ~IQ, ~Gen, and ~PMC are core; and Path 3 in which EQ is a core condition. The context of this activity is often ambiguous, since the necessary information is frequently difficult to obtain, and the project scope is unclear (Pressman & Maxim, 2015). Therefore, the necessary involvement with the client and stakeholders calls for interpersonal sensitivity (EQ), engaging communication, and achievement (MQ). The highlighting of these competencies is in line with previous studies that find that they enable the leader to adapt and behave appropriately with the client and to come up with a solution that satisfies all of the stakeholders (Müller & Turner, 2007; Skulmoski & Hartman, 2010). Moreover, being a male leader is also crucial, regardless of the other competencies (~Gen is core in almost all configurations).

For Elaboration, two configurations for success exist: Path 1 in which ~IQ, ~Gen, and ~PMC are core with the presence of ~EQ; and Path 2 that highlights the centrality of MQ. The leader must be able to translate the client's needs, to be able to deal with ambiguity, to conceptualize an optimal solution, and to identify inconsistencies. Surprisingly, EQ competencies are not very relevant. The expectation had been that intuitiveness would go hand-in-hand with achieving as well as effective writing ability (Skulmoski & Hartman, 2010). However, the delegation of tasks to team members might be the reason, as suggested by a higher MQ. Accordingly, the results corroborate the literature that points out the relevance of developing, empowering, and

managing resources (all MQ competencies) (Skulmoski & Hartman, 2010). The absence of a PMC indicates that it does not help a leader deal with a task's ambiguity. However, being a man (~Gen) affects the need for EQ in Path 2. One possible explanation might be the recognition of the greater need for competencies such as intuitiveness and motivation to perform these production tasks for male leaders.

In Negotiation, the first configuration calls for EQ, MQ, Gen, and ~PMC, with special emphasis on EQ; the second indicates the absence of all conditions in which ~Gen and ~PMC are core conditions. The interactive nature of this activity calls for leaders to deal with clients and stakeholders to solve conflicting requirements (Pressman & Maxim, 2015). Thus, these results are in line with Skulmoski and Hartman (2010) whose research highlights the leader's need to be able to effectively communicate (MQ) with the client, to be sensitive and emphatic (EQ) in order to foster a good relationship, and to influence (EQ) stakeholders to achieve consensus. Furthermore, because this task is demanding, leaders must maintain emotional resilience and self-awareness (EQ) in order to prevent tension and new conflicts. These results show an increased importance for these competencies in cases of female leadership. Once again, the results show that empathy and partnership recognition might be facilitated by the similarities between the pairs, which confirms that female leaders may well face difficulties due to gender stereotypes and role congruity (Eagly & Karaus, 2002; Heilman, 2012).

Frequently, Specification activities are assigned to the team members, as leaders might feel that team members can manage the production of such documents. This assignment explains why the results emphasize MQ (core for Path 1). Furthermore, being a man and not holding a PMC prove to be core conditions for success. However, these results contrast with the literature that finds having a PMC is important to knowing the standard practices that would guide the production of a quality requirements document. The objective seems to be achieving a result, rather than guaranteeing a standardized one. The exception is Path 2, where having a PMC is relevant along with having EQ, MQ, being male, and with ~IQ being core. Thus, standardized procedures are relevant when no creative thinking or critical and strategic analysis is present. Once again, being male is important for this activity. Considering that women are frequently perceived as being less pragmatic and strategic than men (Brescoll, 2016), their ability to produce good documents or manage the team that produces such documents does not seem to be sufficient to succeed.

Validation has one configuration for success where all conditions are absent, and ~IQ and ~PMC are core. The aim of this activity is to examine the specification artifacts to ensure its correction (Pressman & Maxim, 2015). The expected outcome is the client's confirmation of the final document of requirements, which might give rise to tension and conflicts during the process of getting the document approved. The results show that being male is the only condition for achieving success as men are equated with effective agentic leadership, and this trait might be a relevant condition to ensure that the clients sign the documents.

Management activity presents significant variations regarding the relevance of leadership competencies, gender, and PMC. As described in the literature review, several authors argue that management consists of iterations of the remaining requirement activities; namely, to gather new information, to negotiate, to change the requirements documents, and to validate the project. Both configurations in Path 1 emphasize ~IQ and ~Gen (being a man) as core conditions, although the configurations vary when considering the presence of EQ, MQ, and PMC (1a) or the absence of EQ and MQ (1b). In the first case, for a man with no IQ competencies, holding a PMC seems to be important, probably to overcome some missing competencies or at least to ensure compliance with the processual standards to deal with a requirement change. MQ and EQ are also important, as these tasks can be demotivating and stressful (fixing an error as the project progresses can exponentially lead to greater cost, according to Pressman & Maxim, 2015). The leader

might need additional motivation, and emotional resilience (both EQ), but also the ability to manage resources (MQ). Furthermore, communication and negotiation with the stakeholders can be more complex and demanding due to the eventual deterioration of the relationship throughout the project's execution that increases the need for achievement, sensitivity, and influence. In Path 2, the core conditions are ~Gen and ~PMC. Configuration (2a) also shows ~EQ and ~MQ; whereas the second configuration (2b) links IQ, EQ, and MQ. Thus, the most important condition for achieving success in this activity is to be a man, considering all the characteristics described above that are inherent to being male. Path 3 is the only configuration that considers being a woman and associates this condition with ~IQ and EQ as core conditions. Contrary to the remaining paths with ~Gen as a core, this path means that a woman needs greater EQ competencies to perform this activity in order to achieve the same results as a man. Once again, Path 3 reinforces the issues of gender bias and stereotypes on the perception of a woman's performance (Brescoll, 2016; Heilman, 2012).

5. Conclusions

This study assesses the relevance of the leadership competencies proposed by Dulewicz and Higgs (2003) in the requirements phase of IS projects. As these activities have different goals, this study's aim is to understand whether each activity requires distinct competencies and if other conditions, such as gender and holding a PMC, are important.

As expected, different activities require different competencies. In general, IQ, EQ, and MQ are far more present in conceptual and interactive activities (from Inception to Specification). A comparison shows that EQ has less emphasis than in previous studies (Dulewicz & Higgs, 2005; Turner & Müller, 2005). As leadership relies heavily on emotional issues, EQ should assume greater relevance throughout all the activities. Nevertheless, these competencies remain strongly present in activities with greater interaction with stakeholders, which indicates that these are probably the most emotionally demanding competencies. With regard to IQ competencies, the analysis finds them to be less relevant than their counterparts, although they are present in activities that need to present a workable solution. These results support previous studies that find that IQ is important but generally less significant for explaining effective leadership (Müller & Turner, 2010). Surprisingly, MQ is present in all activities, except for Validation. Although Dulewicz and Higgs (2005) suggest a need for MQ and IQ together with EQ, for effective leadership, the results of this study show a higher MQ, sometimes more than EQ. Comparing the results with those of Skulmoski and Hartman (2010), this study questions whether the responders were focusing on management competencies rather than leadership.

Despite the relevance of a structured approach in a requirements phase, the causal configurations show that certification is irrelevant in most of the activities. Such results diverge from the main recommendations, as they establish that holding a PMC is a critical factor for project success (PMI, 2018). However, some authors argue that having the skills to lead successful projects is more critical than holding a PMC (Starkweather & Stevenson, 2011). The possession of a PMC may be a sign of experience and knowledge, but not necessarily of possessing the necessary soft skills for managing projects, at least in the context of this study.

Furthermore, the results show that being a man (~Gen) is the most consistent dimension for achieving success, regardless of the requirements activity. This result shows that a relevant differentiation exists regarding the necessary competencies for male and female leaders. For instance, respondents identify the need to be a man as a necessary condition for achieving success in negotiation activities, whereas women need to possess many more competencies. This is a typical case of gender bias (Brescoll, 2016) in which the role congruity theory may be applicable, since the male leader seems to have tasks simplified due to the homogeneity of his companions. However, with the increasing

presence of women in these industries, this bias should soon dissipate, as the literature does not suggest any evidence of lower performance by gender (Pafford & Schaefer, 2017). Nevertheless, the hope is that this study may contribute to making IS professionals more aware of the existence of such a gender bias and its main consequences. In fact, the presence of diversity in management positions has demonstrated better results for organizations' performance and less risk-taking (Conyon & He, 2017; Perryman, Fernando, & Tripathy, 2016). Accordingly, efforts should be made to ameliorate this current practice.

This study contributes to theory by providing in-depth knowledge of the conditions that influence the success of the requirements phase of an IS project. It also contributes by presenting new insights on the relevance of gender or holding project management certification. Due to the advantages of the fsQCA, this research brings to light alternative paths that lead to success in each activity of the requirements phase.

In terms of managerial implications, the results present a set of practical concerns involving this critical phase of the IS project's life cycle that are linked to social issues rather than technical ones, as is commonly inferred in previous studies. Practitioners can now be more aware of what kind of leadership skills need to be developed to ensure the effective carrying out of all the activities in this phase. Further, this study should encourage some reflection about the relevance of leadership and emotional issues, together with managerial ones, when compared to what the literature has suggested and emphasized.

5.1. Limitations and future research

The first limitation is that the results cannot be generalized to other contexts due to the relatively small sample size, and particularly to the context-specific nature of the collaborative interaction with the interviewees. The second is the disproportionality between male and female participants in the study, although this reflects the type of job at stake and is in accordance with similar studies (Faraj & Sambamurthy, 2006). The third limitation is that the participants' perception of success in the requirements phase might not coincide with this study's theoretical assumption that success is implied by the act of signing the requirements documents. Instead, the participants might have attributed the leadership competencies to a successful phase, regardless of the signing of the requirements documents. Some cases exist where the client might even have confirmed the final system during a later phase of the project's life cycle.

Future research in this area should explore the influence of other conditions, such as an IT background, the organizational context, and the gender composition of the supplier–client relationship. Considering clients' opinions would provide important alternative perspectives of this leadership relationship.

Declarations of interests

None.

References

Basedau, M., & Richter, T. (2014). Why do some oil exporters experience civil war but others not? Investigating the conditional effects of oil. *European Science Review, 6*(4), 549–574.

Bennett, T. M. (2009). A study of the management leadership style preferred by IT subordinates. *Journal of Organizational Culture, Communications, and Conflict, 13*(2), 1–25.

Brescoll, V. L. (2016). Leading with their hearts? How gender stereotypes of emotion lead to biased evaluations of female leaders. *The Leadership Quarterly, 27*(2), 415–428.

Bureau of Labor Statistics (2013). *Women in the labor force: A databook.* Washington, DC: U.S. Department of Labor.

Chakraborty, S., Sarker, S., & Sarker, S. (2010). An exploration into the process of requirements elicitation: A grounded approach. *Journal of the Association for Information Systems, 11*(4), 212–249.

Chatzoglou, P. D., & Macaulay, L. A. (1997). The importance of human factors in planning the requirement capture stage of a project. *International Journal of Project Management, 15*(1), 39–53.

Componation, P. J., Youngblood, A. D., Utley, D. R., & Farrington, P. A. (2008). A preliminary assessment of the relationship between project success, system engineering, and team organization. *Engineering Management Journal, 20*(4), 40–46.

Conyon, M. J., & He, L. (2017). Firm performance and boardroom gender diversity: A quantile regression approach. *Journal of Business Research, 79*, 198–211.

Crilly, D., Zollo, M., & Hansen, M. T. (2012). Faking it or muddling through? Understanding decoupling in response to stakeholder pressures. *Academy of Management Journal, 55*(6), 1429–1448.

Dulewicz, V., Higgs, M., & Slaski, M. (2003). Measuring emotional intelligence: Content, construct and criterion-related validity. *Journal of Managerial Psychology, 18*(5), 405–420.

Dulewicz, V., & Higgs, M. J. (2003). A new approach to assessing leadership dimensions, styles and context. *Competency & Emotional Intelligence Quarterly, 11*(2), 224–232.

Dulewicz, V., & Higgs, M. J. (2005). Assessing leadership styles and organisational context. *Journal of Managerial Psychology, 20*(2), 105–123.

Eagly, A. H., & Karaus, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review, 109*(3), 573–598.

Eisenhardt, K. (1989). Building theories from case study research. *The Academy of Management Review, 14*(4), 532–550.

Eman, K. E., Quintin, S., & Madhavji, N. H. (1996). User participation in the requirement engineering process: An empirical study. *Requirements Engineering, 1*(1), 4–26.

Eom, M. T.-I. (2006). *The impact of IS leadership on the IS unit's effectiveness. Doctor, Graduate School of Binghamton University.* State University of New York.

Faraj, S., & Sambamurthy, V. (2006). Leadership of information systems development projects. *IEEE Transactions on Engineering Management, 53*(2), 238–249.

Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal, 54*(2), 393–420.

Heilman, M. E. (2012). Gender stereotypes and workplace bias. *Research in Organizational Behavior, 32*, 113–135.

Iqbal, J., Ahmad, R., Nasir, M., & Khan, M. (2017). Significant software requirements engineering practices in systems engineering context. *International conference on engineering, computing & information technology, ICECIT 2017*.

Keil, M., Lee, H. K., & Deng, T. (2013). Understanding the most critical skills for managing IT projects: A Delphi study of IT project managers. *Information & Management, 50*(7), 398–414.

Laporti, V., Borges, M., & Braganholo, V. (2009). Athena: A collaborative approach to requirements elicitation. *Computers in Industry, 60*(6), 367–380.

Mas-Verdú, F., Ribeiro-Soriano, D., & Roig-Tierno, N. (2015). Firm survival: The role of incubators and business characteristics. *Journal of Business Research, 68*(4), 793–796.

Millhollan, C., & Kaarst-Brown, M. (2016). Lessons for IT project manager efficacy: A review of the literature associated with project success. *Project Management Journal, 47*(5), 89–106.

Müller, R., & Turner, J. R. (2007). Matching the project manager's leadership style to project type. *International Journal of Project Management, 25*(1), 21–32.

Müller, R., & Turner, J. R. (2010). Leadership competency profiles of successful project managers. *International Journal of Project Management, 28*, 437–448.

Nicolás, J., & Toval, A. (2009). On the generation of requirements specification from software engineering models: A systematic literature review. *Information and Software Technology, 51*(9), 1291–1307.

Pafford, S., & Schaefer, T. (2017). Women at work and business leadership effectiveness. *Journal of Organizational Culture, Communications, and Conflict, 21*(1), 1–18.

Perryman, A. A., Fernando, G. D., & Tripathy, A. (2016). Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation. *Journal of Business Research, 69*(2), 579–586.

Pinto, J. K., Patanakul, P., & Pinto, M. B. (2017). "The aura of capability": Gender bias in selection for a project manager job. *International Journal of Project Management, 35*(3), 420–431.

PMI (2017). A guide to the project management body of knowledge. *PMBOK guide* (6th ed.). Pennsylvania: Project Management Institute.

PMI (2018). PMI's pulse of the profession. *9th global project management survey: Project Management Institute*.

Pressman, R. S., & Maxim, B. R. (2015). *Software engineering: A practitioner's approach* (8th ed.). New York, NY: McGraw-Hill.

Procaccino, J. D., Verner, J. M., Darter, M. E., & Amadio, W. J. (2005). Toward predicting software development success from the perspective of practitioners: An exploratory Bayesian model. *Journal of Information Technology, 20*, 187–200.

Ragin, C. C. (2000). *Fuzzy-set social science.* Chicago: University of Chicago Press.

Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond.* Chicago: University of Chicago Press.

Ragin, C. C., & Fiss, P. C. (2008). Net effects versus configurations: An empirical demonstration. In C. C. Ragin (Ed.). *Redesigning social inquiry: Fuzzy sets and beyond* (pp. 190–212). Chicago: University of Chicago Press.

Ramingwong, L. (2012). A review of requirements engineering processes, problems and models. *International Journal of Engineering, Science and Technology, 4*(6), 2997–3002.

Rihoux, B., & Ragin, C. C. (Eds.). (2009). *Configurational comparative methods: Qualitative comparative analysis (QCA) and related techniques.* Los Angeles: Sage.

Russo, R., Ruiz, J., & Cunha, R. (2005). Liderança e influência nas fases da gestão de

projectos. *Revista Produção, 15*(3), 362–375.

Skulmoski, G. J., & Hartman, F. (2010). Information systems project manager soft competencies: A project phase investigation. *Project Management Journal, 41*(1), 61–80.

Sousa, A. (2010). Ranking geral das 200 maiores empresas de TI [Online]. *Semana Informática*. Available: http://www.semanainformatica.xl.pt/996/esp/101.html.

Starkweather, J. A., & Stevenson, D. H. (2011). PMP® certification as a core competency: Necessary but not sufficient. *Project Management Journal, 42*(1), 31–41.

The Standish Group International (2013). *Chaos manifesto.* 2013.

The Standish Group International. CHAOS report 2015. (2015). https://www.infoq.com/articles/standish-chaos-2015 (Accessed 03 September 2018).

Turner, J. R., & Müller, R. (2005). The project manager's leadership style as a success factor on projects: A literature review. *Project Management Journal, 36*(1), 49–61.

Turner, J. R., Müller, R., & Dulewicz, V. (2009). Comparing the leadership styles of functional and project managers. *International Journal of Managing Projects in Business, 2*(2), 198–216.

Verner, J., Cox, K., Bleistein, S., & Cerpa, N. (2007). Requirements engineering and software project success: An industrial survey in Australia and the US. *Australasian Journal of Information Systems, 13*(1), 225–238.

Woodside, A. G. (2013). Moving beyond multiple regression analysis to algorithms: Calling for adoption of a paradigm shift from asymmetric thinking in data analysis and crafting theory. *Journal of Business Research, 66*(4), 463–472.

Xu, X., & He, X. (2008). Impact of team attitude and behavior on IS project success. *Communications of the IIMA, 8*(4), 41–52.

Yin, R. (2013). *Case study research: Design and methods* (5th ed.). USA: SAGE Publications Inc.

Filipa Pires da Silva (PhD, University of Lisboa) is an Assistant Professor of Information Systems and Operations Management at the School of Economics and Management (ISEG), University of Lisboa, Portugal. She is a research member at CSG – Advance (Research in Social Sciences and Management). Her research interests include project management, information systems methodologies, leadership, management teams and also a particular interest on Requirements Engineering.

Helena Mateus Jerónimo (PhD, University of Cambridge) is an Assistant Professor of Organizational Behavior and Human Resources Management at the School of Economics and Management (ISEG), University of Lisboa, Portugal, and researcher at CSG – Advance (Research in Social Sciences and Management). Her research interests and publications are in science and technology studies, sustainability, and human resources management and organizational behavior. She has published in the Journal of Risk Research and Journal of Cleaner Production.

Pedro Rino Vieira (PhD, University of Lisboa) is an Assistant Professor of Finance at the School of Economics and Management (ISEG), University of Lisboa. He is also a research member at CSG – Advance (Research in Social Sciences and Management). His research interest are on attitudes towards risk, including cross-country studies and gender effects, agents rationality, behavioral finance, efficient market hypothesis and empirical asset pricing.