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Impact of risk management on project performance: the importance of soft skills

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This study aims to elucidate the relationship between risk management and project success, considering the contingent effect of project complexity. This approach also combines aspects of soft and hard skills. This methodological approach involves a literature review to underpin the conceptual framework and a survey for empirical validation, using structural equation modelling. The hypotheses were tested based on a field study involving 263 projects distributed among eight industries. The fieldwork involved interviews with project managers and risk managers and an analysis of internal company documents about the projects' performance. The structural model presented herein provides a means for correlating the hard and soft sides of risk management with project success, understanding the moderating effect of project complexity. The soft side of risk management appears most prominently and explains 10.7% of the effect on project success. Moreover, the soft side supports the hard side, since we found a significant correlation that explains 25.3% of the effect on the hard side.

Keywords: project management; risk management

1. Introduction

The widespread dissemination of project management practices today is driven by the adoption of reference guides (*bodies of knowledge* – BoKs) such as the *Project Management Body of Knowledge* – PMBoK (PMI 2013) and the *Competence Baseline* – ICB (IPMA 2006). These guides focus strongly on project risk management. However, risk management shows a wide gap between theory and practice in organisations (Ibbs and Kwak 2000; Raz, Shenhar, and Dvir 2002; Zwikael and Globerson 2006; Zwikael and Sadeh 2007; Thamhain 2004, 2013). Ahlemann et al. (2013) state that the prescriptive characteristics of project management in general and risk management in particular lead to numerous problems, such as non-acceptance in practice, limited effectiveness and ambiguous application scenarios.

The more prescriptive approach to risk management in BoKs usually disregards uncertainty management in projects. In a survey on the concept of risk and uncertainty, Perminova, Gustafsson, and Wikstrom (2008) identified a clear distinction between risk and uncertainty in fields such as economics and psychology, but found that this distinction is unclear in the context of project management. In two frequently cited articles (Meyer, Loch, and Pich 2002; Pich, Loch, and Meyer 2002), Meyer, Loch, and Pich (2002) go further by stating that different approaches must be developed according to the types of uncertainties, and that risk management (contingent action) represents an instructionist, pre-specified approach that is only feasible if adequate information is available.

The relationship between risk management and project success or failure has been studied extensively, particularly in the field of Information Technology (IT) (Ropponen and Lyytinen 1997, 2000; Yetton et al. 2000; Kwak and Stoddard 2004; Na et al. 2004; Zwikael and Globerson 2006; Han et al. 2007; Jiang et al. 2009; Bakker, Boonstra, and Wortmann 2010, 2012). These studies have come up with controversial findings. Although some surveys (Ropponen and Lyytinen 1997, 2000; Zwikael and Globerson 2006) have found that risk management has a low impact on project performance, Bakker, Boonstra, and Wortmann (2010) suggested that even moderate levels of risk management planning suffice to reduce the negative effects of risk on project success.

These distinct findings may be explained by the contingency approach, in which the type of project can affect not only project performance but also the effectiveness of project management practices (Shenhar and Dvir 1996; Shenhar 2001; Cleland and Ireland 2002; Shenhar et al. 2002, 2005; Schwalbe 2007). Another explanation for the contradictory findings is that these studies focus on risk management, neglecting relevant aspects in uncertainty management, such as the soft skills of project stakeholders (Grabher 2004; Crawford et al. 2006; Gladwell 2006; Sharma and Gupta 2012; Söderlund and Maylor 2012).

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Soft skills involve the management of interpersonal relationships and the notion of project ecology (Grabher 2004). Furthermore, the organisational context can affect risk and uncertainty management, e.g. organisational culture, organisational climate and demographics (Crawford et al. 2006; Sharma and Gupta 2012; Söderlund and Maylor 2012), as well as individual aspects, e.g. expectations, intuition and judgement, biases, power conflicts, trust and learning (Gladwell 2006; Söderlund and Maylor 2012). According to Thamhain (2013), effective project risk management requires broad involvement and collaboration across all segments of the project team and its environment. Söderlund and Maylor (2012) argue that risk management requires more time and effort invested in soft skills.

The purpose of this study is to elucidate the relationship between risk management and project success, considering the contingent effect of project complexity. This approach also combines aspects of soft and hard skills, as suggested by Söderlund and Maylor (2012). This methodological approach involves a literature review to underpin the conceptual framework and a survey for empirical validation, using structural equation modelling.

This paper comprises six sections. Section 2 offers an overview of the conceptual framework for project risk management, its impact on project success and the variable contingencies that may moderate this relationship. The research model and hypotheses are also presented in Section 2. Section 3 describes the methodological approach of this research, while Sections 4 and 5, respectively, present and discuss the findings. Lastly, Section 6 outlines the conclusions and limitations of this study.

2. Project risk management: literature review

2.1 *Risks and uncertainties in project management*

As mentioned in the introductory section, risk and uncertainty management has become an increasingly important topic of discussion in the literature on project management in the academic context and in BoKs of the area.

Risks and uncertainties are inherent to projects because, by definition, a project is unique and therefore faces unknown factors. However, several authors claim that there is a plethora of studies focusing on risk management to the detriment of uncertainty management (Meyer, Loch, and Pich 2002; Pich, Loch, and Meyer 2002; Atkinson, Crawford, and Ward 2006; Perminova, Gustafsson, and Wikstrom 2008; Cleden 2009), and that strategies for managing risks and uncertainties may require different approaches.

Perminova, Gustafsson, and Wikstrom (2008) conducted a survey of the concept of risk and uncertainty in several areas of knowledge. In fields such as economics and psychology, there is a clear distinction, and risks are events subject to a known probability, whereas uncertainty is a situation for which a numerical probability, characterised by a conscious lack of knowledge about the results of an event, cannot be specified. According to Wideman (1992), the distinction between the unknown and certainty constitutes the limits of the field of uncertainties.

Conversely, in the context of project management, Perminova, Gustafsson, and Wikstrom (2008) suggest that this distinction is ambiguous. They exemplify this ambiguity with the definition of PMI (2008), which does not provide a clear distinction between risks and uncertainties: Risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one of the project goals, such as time, cost, scope or quality. It is noteworthy that the 5th edition of the PMI guide (2013, 310) uses this definition.

In two widely cited articles (Meyer, Loch, and Pich 2002; Pich, Loch, and Meyer 2002), Meyer, Loch, and Pich (2002) argue that there is a need for different approaches based on types of uncertainties. Meyer, Loch, and Pich (2002) suggest four types of uncertainty: variation, foreseen uncertainty, unforeseen uncertainty and chaos.

Pich, Loch, and Meyer (2002) argue that in practice, more attention focuses on the first type of uncertainty, i.e. variability, which can be understood as random variations in which the occurrence and impact on project goals can be modelled. These researchers posit that risk management (contingent action) represents an instructionist, pre-specified approach, triggering actions based on signals, which is only possible if adequate information is available. Thamhain (2013) reinforces this idea by arguing that complex projects require management interventions that go beyond simple analytical approaches. In his study of high-tech companies, almost 50% of the contingencies that occurred during projects were detected only after they had affected the performance of the project. Chapman and Ward (2000, 2003), Hillson (2002), Atkinson, Crawford, and Ward (2006), Perminova, Gustafsson, and Wikstrom (2008), and Cleden (2009), among others, make similar critiques.

What strategies should be adopted when information about a project is inadequate or when a series of factors and their possible impacts are unknown?

Pich, Loch, and Meyer (2002) suggest that the reason for insufficient information is unknown events or causality (ambiguity) or an inability to assess the effects of actions due to the interaction of many variables (complexity). Xiang et al. (2012) also highlight the problem of information asymmetry, which gives rise to opportunistic behaviour and increased risk in the context of the construction industry. Pich, Loch, and Meyer (2002) argue that a combination of learning (an ability to conduct new and original planning in the middle of the project) and selectionism (a search for multiple solutions until the best alternative is identified) is required to manage projects in these environments. Along these lines, Ward and Chapman (2003) suggest uncertainty management as a substitute for risk management, because the former involves a more comprehensive approach.

With regard to the impacts of risks and uncertainties on the project, the consensus is that a dual approach is needed that focuses not only on the negative standpoint or threat but also on the positive standpoint or opportunity (Hillson 2002, 2004; Ward and Chapman 2003; Perminova, Gustafsson, and Wikstrom 2008). Bernstein (1998) postulates that this idea is an evolution of the concept, which theretofore was associated solely with the negative impact, and in the late 1990s the literature began to discuss positive impacts and propose strategies to strengthen them.

This initial discussion suggests that there is a continuum between risk and uncertainty in projects and that management approaches should consider this entire spectrum, which involves different strategies.

2.2 *Project risk and uncertainty management*

Söderlund and Maylor (2012) state that, '[The] risk management area has received considerable attention in the PM literature'. In addition, the BoKs of reference of associations and institutes dedicated to project management postulate that risk is a key area. However, several authors state that risk management practices are still rarely applied in the daily routine of projects, even large and complex ones, thus characterising a gap in the area (Ibbs and Kwak 2000; Raz, Shenhar, and Dvir 2002; Zwikael and Globerson 2006; Zwikael and Sadeh 2007).

The literature offers models that focus on risks, such as those of BoKs (DoD 5000.2-R 2006; IPMA 2006; ISO 31000 2009; PMI 2013) and the ones that apply project uncertainty management (Chapman and Ward 2000, 2003; Green 2001; Jaafari 2001; Meyer, Loch, and Pich 2002; Pich, Loch, and Meyer 2002; Atkinson, Crawford, and Ward 2006; Perminova, Gustafsson, and Wikstrom 2008; Cleden 2009).

The terminology is not consolidated, since several authors refer to processes (Kliem and Ludin 1997; Patterson, Neailey, and Kewley 1999; IPMA 2006; ISO 2009; PMI 2013; Chapman and Ward 1997, 2003) while others refer to phases (Boehm 1991; Dorofee et al. 1996), steps (Fairley 1994), stages (Raz and Michael 2001) or even activities (Bakker, Boonstra, and Wortmann 2010, 2012). The term adopted in this paper is 'process', which is the one that is most widely employed in the analysed studies.

Most of the models found in the literature propose a set of processes for managing risk. Table 1 summarises our content analysis of the literature review.

A diagram of affinities was used to create the groups listed in Table 1. In some cases, such as risk identification, the authors use very similar terms. In our analysis, the terms were grouped into *risk prioritisation* (Boehm 1991), *qualitative and quantitative risk analysis* (PMI 2013), *risk assessment* (ISO 2009), *extension estimation* and *evaluation of the magnitude of uncertainties* (Chapman and Ward 1997).

In Table 1, processes are also grouped into soft skills and hard skills. According to Söderlund and Maylor (2012), 'Hard skills focus on administrative tasks using PM toolsets, while soft skills enable working through and with people and groups'.

Table 1 indicates that some processes are frequently cited, such as risk identification and analysis (13), followed closely by monitoring and control process (11) and risk response (8).

A more recent interest in the literature is stakeholder-related processes in risk and uncertainty management. Lee and Yu (2011) argue that there are multiple stakeholders with complex interrelationships in complex and uncertain project environments, which can lead to conflicts that affect its success; these authors also propose a model for evaluating the risk of these conflicts. The ISO 31000 standard (ISO 2009) also suggests communication and consultation with internal and external stakeholders during all the phases of the risk management process, to ensure that they and those responsible for risk management understand the foundations that underpin decisions and specific actions, thus enabling them to adjust their perception of risk. Other authors emphasise the importance of *stakeholder* management in order to align the expectations for and goals of the project (Besner and Hobbs 2006; Barclay 2008; Ellatar 2009; Bakker, Boonstra, and Wortmann 2010, 2012; Toor and Ogunlana 2010; PMI 2013; Carvalho 2014).

The majority of approaches to project risk management follow the logic of process groups throughout the life cycle, which requires the use of several techniques and tools (Wideman 1992; Fairley 1994; Williams 1995; Raz and Michael 2001; Raz, Shenhar, and Dvir 2002; Keelling 2006).

Raz and Michael (2001) identify 38 tools for risk management, grouped as follows: identification (four tools), analysis (six tools), planning (six tools), traceability (six tools), control (six tools) and background (10 tools). The authors allocated tools to the background group, which may affect risk management but are not specifically related to the other

Table 1. Risk management processes: summary of the literature review.

RM dimension	Manifest variable (MV)	%	#	References
Soft approach RM_SA	Context, strategic approach to risks and uncertainties	4	2	Chapman and Ward (1997), ISO 31000 (2009)
	Risk communication and information	10	5	Kliem and Ludin (1997), Dorofee et al. (1996), ISO 31000 (2009), Bakker, Boonstra, and Wortmann (2010, 2012), Chapman and Ward (1997)
	Attitude, assignment, and relationship with stakeholders	6	3	Prasanta and Ogunlana (2004), Bakker, Boonstra, and Wortmann (2010, 2012), Chapman and Ward (1997)
	Crisis management	2	1	Fairley (1994)
Hard approach RM_HA	Risk planning	10	5	PMI (2013), Bakker, Boonstra, and Wortmann (2010, 2012), Boehm (1991), Raz and Michael (2001)
	Risk identification	25	13	Boehm (1991), Kliem and Ludin (1997), Prasanta and Ogunlana (2004), Patterson, Neailey, and Kewley (1999), Dorofee et al. (1996), ISO 31000 (2009), IPMA (2006), PMI (2013), Fairley (1994), Bakker, Boonstra, and Wortmann (2010, 2012), Chapman and Ward (1997), Raz and Michael (2001)
	Risk analysis – Qualitative and Quantitative	25	13	Boehm (1991), Kliem and Ludin (1997), Patterson, Neailey, and Kewley (1999), Dorofee et al. (1996), PMI (2013), ISO 31000 (2009), Bakker, Boonstra, and Wortmann (2010, 2012), IPMA (2006), Prasanta and Ogunlana (2004), Fairley (1994), Chapman and Ward (1997), Raz and Michael (2001)
	Risk monitoring and control	22	11	Boehm (1991), Kliem and Ludin (1997), Dorofee et al. (1996), PMI (2013), ISO 31000 (2009), Bakker, Boonstra, and Wortmann (2010, 2012), Fairley (1994), Chapman and Ward (1997), Patterson, Neailey, and Kewley (1999), Raz and Michael (2001)
	Risk response	16	8	ISO 31000 (2009), IPMA (2006), PMI (2013), Prasanta and Ogunlana (2004), Fairley (1994), Chapman and Ward (1997), Patterson, Neailey, and Kewley (1999), Dorofee et al. (1996)
	Total	100	51	

five stages of risk management, such as prototyping, simulation, requirements management and configuration control, among others. In the PMBoK (PMI 2013), 27 tools and techniques are related to the six processes: planning (one tool), identification (seven tools), qualitative analysis of risks (six tools), quantitative analysis of risk (three tools), risk response planning (four tools) and risk monitoring and control (six tools). Other authors mention lists of techniques, such as decision analysis and Monte Carlo simulation, among others (Akintoye and Macleod 1997).

These tools focus mainly on hard skills. However, according to Söderlund and Maylor (2012), 'More time and effort should be put into the soft side'.

2.3 *Risk management and project success*

Several studies have focused on identifying the state of project risk management practices. One of the most recent and comprehensive studies was conducted by Zwikael and Ahn (2011) in three countries (New Zealand, Israel and Japan), involving 701 project managers in seven industrial sectors. The study highlights the importance of project context, considering the industry's and country's levels of project risk. The authors suggest that even moderate levels of risk management planning will suffice to reduce the negative effects of risk on project success. Bakker, Boonstra, and Wortmann (2012) support these findings and emphasise the importance of identifying risks as having more widespread effects on project success, followed by risk reports.

Risk identification stands out in two recent studies. In the survey conducted by Bakker, Boonstra, and Wortmann (2012), most of the stakeholders (over 75%) claimed this is the most important factor.

Bakker, Boonstra, and Wortmann (2012) indicate that the main concerns of stakeholders include (in descending order) risk reports, risk records, risk allocation, risk control and risk analysis.

Reeves et al. (2013) argue that inefficiencies in the process of identifying risks in the development of complex systems are the cause of failures. According to these researchers, the way in which this process is handled often fails to lead to the identification of events and circumstances that truly challenge project performance, thus generating additional costs and schedule delays.

Bakker, Boonstra, and Wortmann (2012) suggest that risk management activities contribute to project success via four different effects: action, perception, expectation and relation. Action effects are instrumental to the stakeholders' ability to cause and stimulate an effective action. Perception and expectation effects involve the stakeholders' ability to establish a consensual view of the final expected outcome and to motivate their behaviour during execution of the project to deal with objective and subjective differences. The researchers conclude that in addition to the instrumental effects of risk management, communication effects play a key role by establishing a shared vision of the project's uncertainties and the expectations for its success. Other studies also highlight communication in assessing project performance, identifying the impact of information sharing and managing the gaps in perception of the interested parties about the project's success (Browning et al. 2002; Han et al. 2007; Chen et al. 2009; Jiang et al. 2009). Söderlund and Maylor (2012) support this view by stating that, 'To implement projects successfully, it is necessary to combine both hard and soft skills'.

The above suggests the following hypothesis:

- H1: The soft side has a significant and positive impact on the hard side.

A set of studies in the area of IT established a link between risk management and project performance (Yetton et al. 2000; Kwak and Stoddard 2004; Na et al. 2004; Han et al. 2007; Jiang et al. 2009). However, their findings are controversial because some of these studies found that risk management has a low impact on project success (Ropponen and Lyytinen 1997, 2000; Zwikael and Globerson 2006).

Notably, most of the studies cited in this literature review (as a proxy for the construct of performance/project success) adopt the triad of compliance to deadlines, budget and delivery requirements, which is usually called the iron triangle. A few risk and success studies expand on this proxy, e.g. Jiang and Klein (2000), who include the impact of risks on team performance. Bakker, Boonstra, and Wortmann (2010) identified this characteristic in their review of the literature about the impact of risk management on the success of IT projects. In their survey, they concluded that 62% of the studies usually adopted the traditional definition of success, i.e. compliance to deadlines, cost constraints and requirements.

However, the dimensions for project success have been the target of fruitful discussion in the project management literature, in particular, with the relevant contributions of Israeli researchers Shenhar and Dvir. Based on a literature review and empirical studies, Shenhar and Dvir (2007) grouped five dimensions of success: efficiency, impact on clients, impact on staff, direct business and success, and preparation for the future. However, they point out that these five dimensions are not applicable to all types of projects and that they vary over time (short and long term).

Thomas and Mullaly (2008) discussed a shift to a more strategic value perspective to evaluate project management, from financial metrics such as ROI to strategic maps (Balanced Scorecard – BSC) and organisational project maturity models assessment.

Another important issue in the literature of project success is the distinction between the success of project management and that of its product/service, as emphasised by several authors (Pinto and Slevin 1988; Wit 1988; Cooke-Davies 2002; Shenhar and Dvir 2007; Barclay and Osei-Bryson 2010).

To summarise the literature review, we have structured the construct Project Success as described in Table 2.

In addition to the dimensions proposed by Shenhar and Dvir (2007), a sixth dimension which appears in several publications is included, particularly in the construction industry, involving sustainability-related topics (Kometa, Olomolaiye, and Harris 1995; Kumaraswamy and Thorpe 1996; Chan and Chan 2004; CII 2006).

The above discussion leads us to propose the following hypotheses:

- H2a: The hard side of risk management has a significant and positive impact on project success.
- H2b: The soft side of risk management has a significant and positive impact on project success.

2.4 *Contingency approach to risk management*

The contingency approach in the area of project management has evolved, with studies that demonstrate the significant impact of the variable project type. Shenhar and Dvir have performed research using this approach since the mid-1990s. In their first studies, these authors classified project types into two dimensions: technological uncertainty and system scope (Shenhar and Dvir 1996; Shenhar 2001; Shenhar et al. 2002). In their subsequent studies, the authors sought to create other dimensions until they came up with a significant model called Diamond, which includes four dimensions: novelty, complexity, technology and stage (Shenhar et al. 2005; Shenhar and Dvir 2007). Some of these dimensions,

Table 2. Success dimensions: literature review.

Success dimension	Manifest variable (MV)	References	#	%
Project management SD1	Schedule compliance (time)	Pinto and Sleven (1983), PMI (2008), Berman (2007), Lipovetsky et al. (1997), Bizan (2003), Kenny (2003), Raz, Shenhar, and Dvir (2002), Atkinson (1999), Belassi and Tukel (1996), CII (2006), Wit (1988), Gray (2001), Hatush and Skitmore (1997), Katz and Allen (1985), Kumaraswamy and Thorpe (1996), Larson and Gobeli (1989), Lim and Mohamed (1999), Ling (2004), Navarre and Schaan (1990), OGC (2005), Shenhar and Dvir (2007), White and Fortune (2002), Cooke-Davies (2002)	23	19
	Budget compliance (cost)	Pinto and Sleven (1983), PMI (2008), Berman (2007), Lipovetsky et al. (1997), Kenny (2003), Raz, Shenhar, and Dvir (2002), Atkinson (1999), Belassi and Tukel (1996), CII (2006), Wit (1988), Gray (2001), Hatush and Skitmore (1997), Katz and Allen (1985), Kumaraswamy and Thorpe (1996), Larson and Gobeli (1989), Lim and Mohamed (1999), Ling (2004), Navarre and Schaan (1990), OGC (2005), Shenhar and Dvir (2007), White and Fortune (2002), Cooke-Davies (2002)	22	19
	Economic-financial measures of the project: ROI, ROE, cash flow, etc.	Ghasemzadeh et al. 1999, Wit (1988), Ellatar (2009), Shenhar and Dvir (2007), Thomas, Delisle, and Jugdev (2002)	5	4
	Compliance with human resource dimension target	Carvalho and Rabechini Jr. (2011), and Kessler and Winkelhofer (2002)	2	2
	Reduce deviations and risks	CII (2006), Wit (1988), OGC (2005), Shenhar and Dvir (2007), Jiang and Klein (1999)	5	4
	Reduce issues with suppliers and regulatory approval	Atkinson (1999), Katz and Allen (1985), Bizan (2003), Shenhar and Dvir (2007)	4	3
Project' product/service SD2	Product/service quality	Pinto and Sleven (1983), PMI (2008), Atkinson (1999), CII (2006), Wit (1988), Ling (2004), OGC (2005), Shenhar and Dvir (2007), Toor and Ogunlana (2010), White and Fortune (2002), Jiang and Klein (1999), Cooke-Davies (2002)	12	10
	Compliance with product/service requirements & specifications (scope)	PMI (2008), Raz, Shenhar, and Dvir (2002), Belassi and Tukel (1996), CII (2006), Wit (1988), Ellatar (2009), Gray (2001), Hatush and Skitmore (1997), Navarre and Schaan (1990), OGC (2005), Shenhar and Dvir (2007), Toor and Ogunlana (2010), White and Fortune (2002), Jiang and Klein (1999), Cooke-Davies (2002)	15	13
	Extent of use	Shenhar and Dvir (2007)	1	1
Impact on team SD3	Project team performance	Thamhain (2004), Thomas, Delisle, and Jugdev (2002)	2	2
	Team satisfaction and morale	CII (2006), Wit (1988), Ellatar (2009), Shenhar and Dvir (2007), Thamhain (2004)	5	4
	Team capabilities and skills development and growth	Atkinson (1999), CII (2006), Shenhar and Dvir (2007)	3	3
	Team member retention	Shenhar and Dvir (2007)	1	1
	No burnout	Shenhar and Dvir (2007)	1	1
	Project manager satisfaction	Wit (1988), Kumaraswamy and Thorpe (1996)	2	2
Present impact on business SD4	Market share	Shenhar and Dvir (2007), Thomas, Delisle, and Jugdev (2002)	2	2
	Project value for the organisation: sales, profits etc.	Wit (1988), Ellatar (2009), Shenhar and Dvir (2007), Thomas, Delisle, and Jugdev (2002), Jiang and Klein (1999), Lipovetsky et al. (1997), Berman (2007)	7	6
	Learning	Atkinson (1999)	1	1
	Strategic goals accomplishment	Atkinson (1999), White and Fortune (2002), Kenny (2003)	3	3
Future impact on business SD5	New technology	Shenhar and Dvir (2007), Kumaraswamy and Thorpe (1996)	2	2
	New market	Shenhar and Dvir (2007)	1	1
	New core competency	Shenhar and Dvir (2007)	1	1
	New organisational capability	Shenhar and Dvir (2007)	1	1

(*Continued*)

Table 2. (*Continued*)

Success dimension	Manifest variable (MV)	References	#	%
Impact on the customer SD6	Benefits for the customer (performance improvement)	Shenhar and Dvir (2007), OGC (2005)	2	2
	Customer satisfaction and loyalty	Pinto and Sleven (1983), Shenhar and Dvir (2007), Wit (1988), Kumaraswamy and Thorpe (1996), Lim and Mohamed (1999)	5	4
	Brand recognition	Shenhar and Dvir (2007)	1	1
Sustainability SD7	Respect for the environment	Atkinson (1999), Ellatar (2009), Kumaraswamy and Thorpe (1996)	6	5
	Respect for society	Atkinson (1999), Ellatar (2009), Kumaraswamy and Thorpe (1996)	3	3
	Legislation and standards compliance	Shenhar and Dvir (2007), Pocock et al. (1996), Ellatar (2009)	3	3
	Security	Ellatar (2009), Toor and Ogunlana (2010), CII (2006), Kometa, Olomolaiye, and Harris (1995), Lim and Mohamed (1999), Kumaraswamy and Thorpe (1996)	7	6
Total			118	100

such as product complexity and customer interface complexity, had already been considered significant by the authors of the product development area (Clark and Fujimoto 1991; Wheelwright and Clark 1992). Cooke-Davies (2002), Cleland and Ireland (2006), Schwalbe (2007), Crawford, Hobbs, and Turner (2004), Larson and Gobeli (1989), and White and Fortune (2002) also argue that the complexity of a project influences its performance. The Standish Group International (2009) also suggests that other characteristics related to the scale of the project may influence project success, including project size, allocated resources, number of staff members and project length.

Several risk management studies based on the contingency approach were identified (Dorofee et al. 1996; Patterson, Neailey, and Kewley 1999; Akintoye and Macleod 1997; Jiang and Klein 1999; Barki, Rivard, and Talbot 2001; Raz, Shenhar, and Dvir 2002; Sauer, Gemino, and Reich 2007; Bakker, Boonstra, and Wortmann 2010). Studies such as that of Barki, Rivard, and Talbot (2001) suggest that the success of a project depends on how it deals with uncertainties in the environment by making adjustments in the exposure to risk and in the project management profile. Other authors emphasise the contingent effect of industrial sectors (Dorofee et al. 1996; Akintoye and Macleod 1997; Patterson, Neailey, and Kewley 1999; Raz, Shenhar, and Dvir 2002). Some of them claim there is a need for risk-specific approaches based on the sector, such as software development projects (Dorofee et al. 1996; Patterson, Neailey, and Kewley 1999), the automotive industry (Akintoye and Macleod 1997) and the construction industry (Del Cano and Cruz 2011).

Based on the discussion of this topic, the following hypotheses are proposed:

- H3a: Project complexity interferes significantly with project success.
- H3b: The industrial sector interferes significantly with project success.

In addition to the direct effect of project complexity on project success (H3a), other hypotheses test its moderating effect on risk management, as follows:

- H3a′: Project complexity interferes significantly with the hard side of risk management and project success.
- H3a″: Project complexity interferes significantly with the soft side of risk management and project success.
- H3b′: The industry interferes significantly with the hard side of risk management and project success.
- H3b″: The industry interferes significantly with the soft side of risk management and project success.

The hypotheses are illustrated in Figure 1 as the hypothetical model tested in this study.

Because success is multi-dimensional, it can be evaluated by objective metrics (such as cost and time index) and metrics based on stakeholder perception. We propose a relationship between the perceptual measures and objective indicators of performance, as follows:

- H4: Cost interferes significantly with the perception of project success.
- H5: Schedule interferes significantly with the perception of project success.

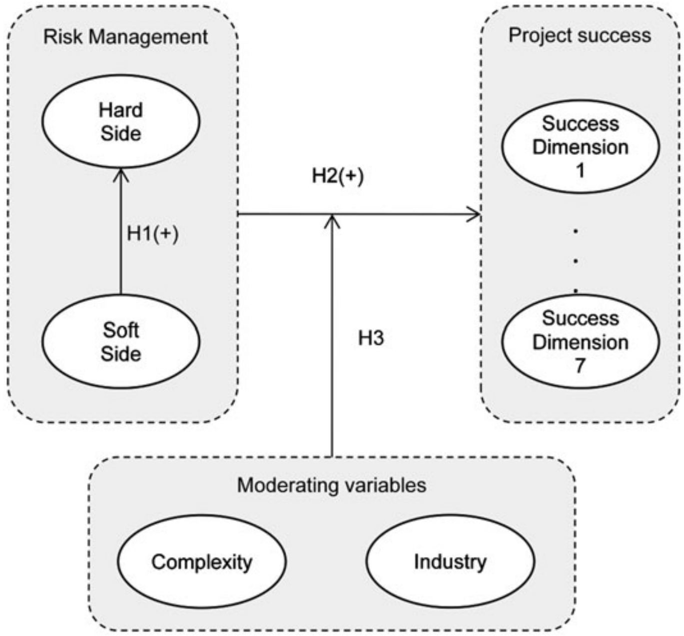


Figure 1. Conceptual model.
Note: The measurement model will be explained in Section 3. To simplify the understanding of the model, some arrows were not shown.

3. Research methods

This study on the relationship between project risk management and success is based on a multi-method combination of literature review and field research. Increasing interest has focused on applying multi-methodological research in operations management (Singhal and Singhal 2012a, 2012b).

In this study, several data collection methods were combined to achieve triangulation. The first phase of the research involved gathering data from the literature to design the research model and hypotheses. The first version of the research instrument was based on a systematic literature review of risk management, in which 3471 articles published in several scientific databases were identified. The references described in Section 2 proved particularly helpful for this study, providing important groundwork for the field research.

The second phase was a survey-based research involving 415 project management professionals, among whom 263 were willing to talk with the researchers and present data on project reports, which constitutes the third phase of the research. The fieldwork involved interviews with at least one individual on each of the 263 projects, and an analysis of internal company documents about the projects' performance.

3.1 *Definition of the research and data collection instruments*

Sampling units (projects) were chosen for ease of access to project data and respondents, as mentioned earlier. Although a non-probability sample was used, the requirements for calculating the minimum sample size were met for the multivariate analysis test applied using G*Power 3.0 software (Faul et al. 2007). Following the recommendation of Hair et al. (2005), a 5% level of statistical significance, which is the power level required for 95% confidence and an effect size of 15%, were considered to calculate the size of the sample, resulting in an expected sample of 119 respondents.

Of the initial survey sample (415 respondents), only 263 valid projects were left, for which requested project documentation, such as the project charter and project reports, were available; however, this is more than twice that was proposed by G*Power 3.0.

The first version of the research instrument based on the literature review was improved by content and face validation (Venkatraman and Grant 1986; Netemeyer, Bearden, and Sharma 2003). Three professors specialising in the area of PM were given a document detailing the research objectives, the theoretical model and the research instrument. These professors rated each of the items in the questionnaire in terms of clarity and representativeness to measure the construct

(Netemeyer, Bearden, and Sharma 2003). To evaluate the research instrument in terms of its adequacy from the respondents' standpoint, a pre-test was also conducted with 35 participants from an MBA course in project management in Brazil. After content and face validation, the questionnaire was revised and then administered in person by the researchers. The filled out questionnaires were then encoded, thus ensuring the confidentiality of the data. The interviews involved project managers or project members working in the area of project risk management.

The respondents' profile incorporates the following characteristics: training in project management, experience as a project manager, level of knowledge about risk management tools and techniques, level of knowledge about the business environment and professional certification in project management.

Several sources of evidence were used in the document analysis; however, the project reports were decisive for the objective performance measure. This document varies according to the organisation, but data on at least project scope, categorisation, budget and schedule should be gathered for each specific project. This is an ex-post facto study, since the project has already occurred. This approach was chosen because, as Shenhar and Dvir (2007) suggested, the dimensions of success vary over time (short and long term). However, albeit relevant, the project life-cycle phases were not analysed.

3.2 *Operationalisation of the variables*

3.2.1 *Dependent variable*

Project success was analysed based on objective measures extracted from project reports and on perceptual measures of performance.

Project success: Perceptual measures of performance were chosen, considering Venkatraman and Ramanujam's (1986) arguments about their greater effectiveness than that of traditional objective measures. To measure perception of project success, the research instrument used statements adapted from the seven dimensions of success described in Table 2. However, during the content and face validation phase, these seven dimensions were reduced to five by removing *preparation for the future* and *sustainability*, because they lack the information required to answer the questions properly. Therefore, the respondents were asked questions regarding the other five dimensions of success, which were scored on a Likert perception scale ranging from *total failure* to *total success* of their projects. The reflective measurement model was adopted for project success (Peng and Lai 2012), in which the direction of causality (represented by arrows) ranges from the construct or latent variable (LV) (project success) to its manifest variables (MVs) or indicators (five success dimensions). Changes in specific latent constructs lead to changes in all their indicators.

To avoid potential bias in perceptual measures of performance through document analysis of project performance reports, two indicators available for all the projects were analysed: *schedule* and *cost indices*, as indicated in Table 3.

3.2.2 *Independent variables*

The *soft side of risk management* was defined as multi-dimensional, comprising the MVs presented in Table 1. The *hard side of risk management* was likewise defined as multi-dimensional, comprising the MVs presented in Table 1. This procedure is used to ascertain if there is a strategy definition and revision system that involves the entire organisation, as well as long- and short-term objectives known by all the managers.

No major changes occurred during the content and face validation phase, maintaining the statements derived from the literature review of the independent variables. The reflective measurement model was adopted in both cases (Peng and Lai 2012).

Table 3. Project success measurement.

Manifest variable (MV)	Measurement
Y1 – Budget compliance	The cost performance index (CPI), measured by the total budgeted planned value (BPV) amount divided by the total cost incurred in the end of the project (Actual Cost), the project estimated budget. CPI= BPV/AC
Y2 – Schedule compliance	The schedule performance index, measured by the total scheduled planned duration (SPD) divided by the total duration incurred until the end of the project (TD). SPI = SPD/TD

3.2.3 *Moderating variables*

Both moderating variables are nominal, i.e. industry and complexity; hence, they were operationalised as dummy variables in the structural model, as proposed by Falk and Miller (1992). Therefore, a value equal to 1 was attributed to the projects that belonged to the same category and zero to all the other categories, as described in Tables 4 and 5.

Project complexity was evaluated through documented analysis, according to technological complexity, duration and team size (Wheelwright and Clark 1992; Shenhar and Dvir 1996; Shenhar 2001; Shenhar et al. 2002, 2005; The Standish Group International 2009). This led to four categories, A (low) through D (super high), as suggested by Shenhar and Dvir (1996, 2007) and indicated in Table 4. The industry was classified in 10 options, as indicated in Table 5.

3.3 *Data analysis*

The data were analysed according to their frequency distribution, descriptive statistics and bivariate analyses (cross-tables and correlations), and the full model was evaluated by partial least squares path modelling (PLS-PM), which was considered the most suitable method for this study. First, it is possible to incorporate nominal variables into the structural model, as was the case of the control variables – complexity and industry. Second, it is possible to incorporate variables measured by formative indicators, as was the case of the control variables. However, this does not depend on either the normality of the variables (as in the case of LISREL) or the normality of the residuals (as in the case of multiple linear regression), because the significance probabilities are estimated by bootstrapping (Falk and Miller 1992; Chin and Newsted 1999; Tenenhaus et al. 2005; Henseler, Ringle, and Sinkovics 2009).

The significances were estimated by bootstrapping directly on the SmartPLS software, using 1000 resamplings, which are consistent with Tenenhaus et al. (2005), who recommend a minimum of 200 resamplings.

The measures of model fit in component-based (PLS) SEM and covariance-based (LISREL and EQS) are different. According to Hsu, Chen, and Hsieh (2006), there is no overall goodness-of-fit measure applicable to both SEM techniques, because these techniques are based on essentially different assumptions. For PLS, goodness-of-fit statistics such as NFI or GFI produced for LISREL are meaningless because the purpose of PLS is not to minimise the difference between observed and reproduced covariance matrices (Hulland 1999).

4. Results

4.1 *Demographics*

The third phase resulted in 263 valid samples of projects distributed among eight industries (see Table 5). The Construction (17%) and IT industries (14%) account for more than one-third of the sample.

As for the variable of project complexity control, the sample comprises predominantly type B (131 projects – 50%) and type C (65 projects – 25%) projects, which account for 75% of the total. Therefore, the extremes – type A projects (59 projects) and type D projects (eight projects) – are the minority.

The sample comprised mostly project managers with more than five years of experience (84%). Most of the participants were male (70%), ranging in age from 35 to 45 (63%).

4.2 *Evaluation of the measuring model*

4.2.1 *Constructs measured with a single indicator*

Cost variation and schedule variation were measured with only one objective indicator. Thus, they cannot be interpreted as LVs, but must be considered as the indicator itself. Convergent validity and reliability were evaluated in the cases in which multiple reflective indicators were used; therefore, this analysis was not performed for these constructs.

4.2.2 *Constructs measured by multiple reflective indicators*

Project success, soft side risk management and hard side risk management were designed in a reflective way, as mentioned earlier. The reliability and validity of the measurement model were analysed using the composite reliability indicator (Henseler, Ringle, and Sinkovics 2009) and Cronbach's α coefficient (Cronbach and Meehl 1955), respectively, in which both must be equal to or greater than 0.7.

The criterion suggested by Fornell and Larcker (1981) was used for the analysis of convergent validity, which is based on the Average Variance Extracted (AVE) (Henseler, Ringle, and Sinkovics 2009). This criterion suggests an AVE of at least 0.5, which indicates sufficient convergent validity, i.e. the ability of a LV to explain more than half the variance of its MVs, on average (Henseler, Ringle, and Sinkovics 2009).

The AVE value and Cronbach's α coefficient were obtained directly from the SmartPLS 2.0 software, which was used to run both the measurement and the structural models (Ringle, Wende, and Will 2005).

The three reflective LVs showed significant loading factors ($p < 0.001$) higher than 0.6, resulting in a higher AVE than the minimum value of 0.5 recommended by Fornell and Larcker (1981). Cronbach's α and the composite reliability indicator were higher than the recommended minimum (0.7) (Chin and Newsted 1999; Tenenhaus et al. 2005; Henseler, Ringle, and Sinkovics 2009). This result indicates that there is convergent validity for these three reflective LVs with reflective indicators. Table 6 describes the results of the second SmartPLS run, in which all the reflective LVs showed a higher square root of the AVE than the correlation among them, confirming the discriminant validity (Tenenhaus et al. 2005; Henseler, Ringle, and Sinkovics 2009).

Discriminant validity was evaluated in two ways – at the indicator level and at the LV level. In the former case, Table 7 shows that the indicators have higher loading factors for their respective LV than in any other LV.

4.2.3 *Constructs measured by multiple formative indicators*

For the control variables (complexity and industry), each category was coded as a dummy variable, which was later modelled as a formative indicator (Falk and Miller 1992). In these cases – which differ from reflective cases – validity and reliability are not evaluated because the correlation between the formative indicators are unnecessary and undesirable.

For the control variables, content validity was considered adequate because all the relevant categories were represented in the model's estimation (see Tables 4 and 5).

4.3 *Evaluation of the structural model: hypothesis testing*

The structural model tested on the SmartPLS 2.0.M3 software contained all the relationships shown in Figure 1; however, the two control variables present no significant relation, as indicated in Table 8. Therefore, these control variables were removed to make the model easier to understand.

Table 4. Nominal variable complexity coded by dummy formative indicators.

Variable	Category	*n*	%
Complexity	A	59	22
	B*	131	50
	C	65	25
	D	8	3

*Any category might be used as a reference (Falk and Miller 1992), we chose the complexity B, because those are the categories with the highest numbers of projects. For this reason, the other dummies were only used as formative indicators.

Table 5. Nominal variable Industry coded by dummy formative indicators.

Industry category	*n*	%
Finances	16	6
Information technology (IT)	38	14
Construction	44	17
Manufacturing	25	10
Consulting	20	8
Health care	5	2
Oil and gas	18	7
Steel	24	9
Others*	73	28

*Any category might be used as a reference (Falk and Miller 1992), we chose the industry category Others, because those are the categories with the highest numbers of projects. For this reason, the other dummies were only used as formative indicators.

Table 6. Correlation matrix between the LVs.

	Project_success	RM hard skills	RM soft skills	AVE	Composite reliability	Cronbachs α
Project_success	0.7854*			0.6168	0.8885	0.8428
RM hard skills	0.2316	0.7531*		0.5672	0.8865	0.8482
RM soft skills	0.3145	0.5031	0.8445*	0.7132	0.8813	0.7979

*The diagonal contains the AVE square root; Note: The model was estimated by using SmartPLS 2.0.M3 software (Ringle, Wende, and Will 2005).

Table 7. Loading factor.

	LVs		
MVs	Project_success	RM hard side	RM soft side
RM_SS1	0.3000	0.2985	*0.7616*
RM_SS2	0.2864	0.3957	*0.8942*
RM_SS3	0.2238	0.5483	*0.8718*
RM_HS1	0.1503	*0.7178*	0.3925
RM_HS2	0.2556	*0.8010*	0.4560
RM_HS3	0.1268	*0.7395*	0.4884
RM_HS4	0.1393	*0.6378*	0.2096
RM_HS5	0.1824	*0.8265*	0.3489
RM_HS6	0.1740	*0.7807*	0.2800
SD1	*0.6659*	0.1159	0.1968
SD2	*0.7105*	0.1751	0.1614
SD3	*0.8472*	0.2290	0.2959
SD4	*0.8251*	0.1925	0.3092
SD5	*0.8586*	0.1887	0.2420

Note: The model was estimated by using SmartPLS 2.0.M3 software (Ringle, Wende, and Will 2005).

Table 8. Moderating variables hypotheses.

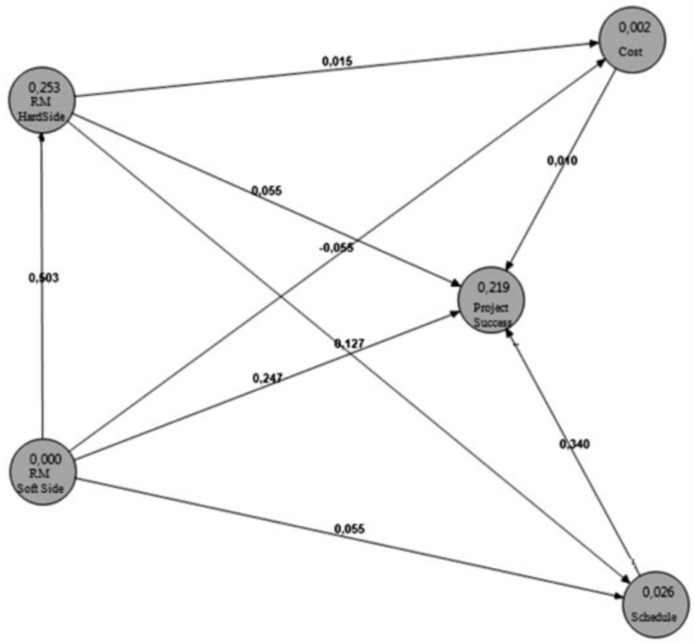
		Hypotheses	Standard error	*T* statistics	*P*-value
Complexity	Complexity ⇨ cost	H3a	0.072	0.9826	0.3260
	Complexity ⇨ project_success		0.0707	0.6359	0.5250
	Complexity ⇨ schedule		0.0821	1.369	0.1713
	RM hard side × complexity ⇨ cost	H3a′	0.1932	1.0697	0.2850
	RM hard side × complexity ⇨ project_success		0.1121	1.043	0.2972
	RM hard side × complexity ⇨ schedule		0.1334	0.9644	0.3351
	RM_soft side × complexity ⇨ cost		0.1551	1.0862	0.2777
	RM_soft side × complexity ⇨ project_success		0.1089	0.7995	0.4242
	RM_soft side × complexity ⇨ schedule		0.0913	0.1918	0.8479
Industry	Industry ⇨ cost	H3b	0.1134	0.7616	0.4465
	Industry ⇨ project_success		0.1332	0.862	0.3889
	Industry ⇨ schedule		0.1176	0.7221	0.4704
	RM hard side × industry ⇨ cost	H3b′	0.1714	1.4477	0.1480
	RM hard side × industry ⇨ project_success		0.1167	1.8404	0.0660
	RM hard side × industry ⇨ schedule		0.1834	0.7873	0.4313
	RM_soft side × industry ⇨ cost	H3b″	0.1308	0.6421	0.5210
	RM_soft side × industry ⇨ project_success		0.1414	1.0056	0.3149
	RM_soft side × industry ⇨ schedule		0.2181	0.854	0.3933

Because project success was operationalised as three complementary variables (project success, cost and time), the first based a reflective LV based on perceptual measures of performance, and two objective indicators, schedule and cost indices, two versions of the structural model were tested to evaluate the increase of R2 from the full model (Model 1) to the model without the objective indicators (Model 2). Tables 9 and 10 describe the results of the two structural models.

Table 9. Structural Model 1 results.

Dependent	Independent variable	Hypotheses	Standard error	*T* statistics	*P* value	R^2	R^2 adjusted
RM hard side	RM soft side	H1	0.0462	10.8956	*0.0000*	25.3%	25.3%
Project success	RM hard side	H2a	0.0691	0.7943	0.4272	21.9%	21.3%
	RM soft side	H2b	0.071	3.4815	*0.0005*		
	Cost	H4	0.0331	0.2929	0.7697		
	Schedule	H5	0.0587	5.7991	*0.0000*		
Cost	RM hard side	H2a′	0.0501	0298	0.7658	0.2%	−0.5%
	RM soft side	H2b′	0.0629	0.8788	0.3797		
Schedule	RM hard side	H2a″	0.0681	1.8622	0.0629	2.5%	1.8%
	RM soft side	H2b″	0.0815	0.6692	0.5035		

Path results



Bootstraping results

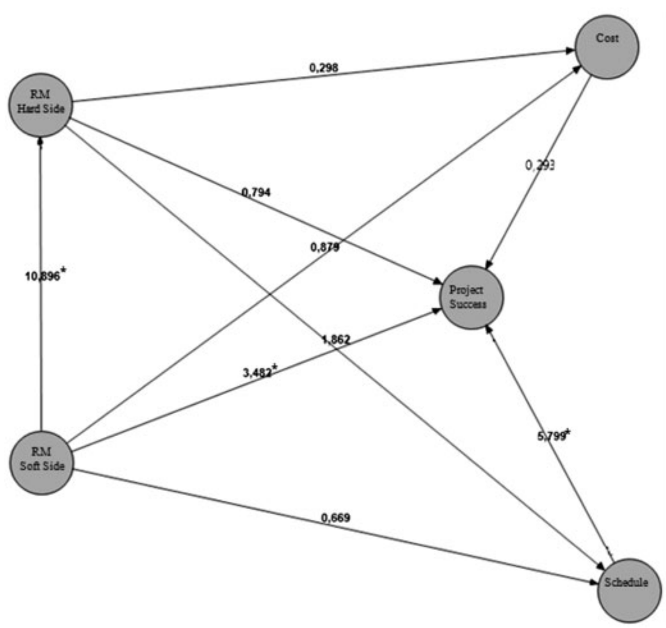
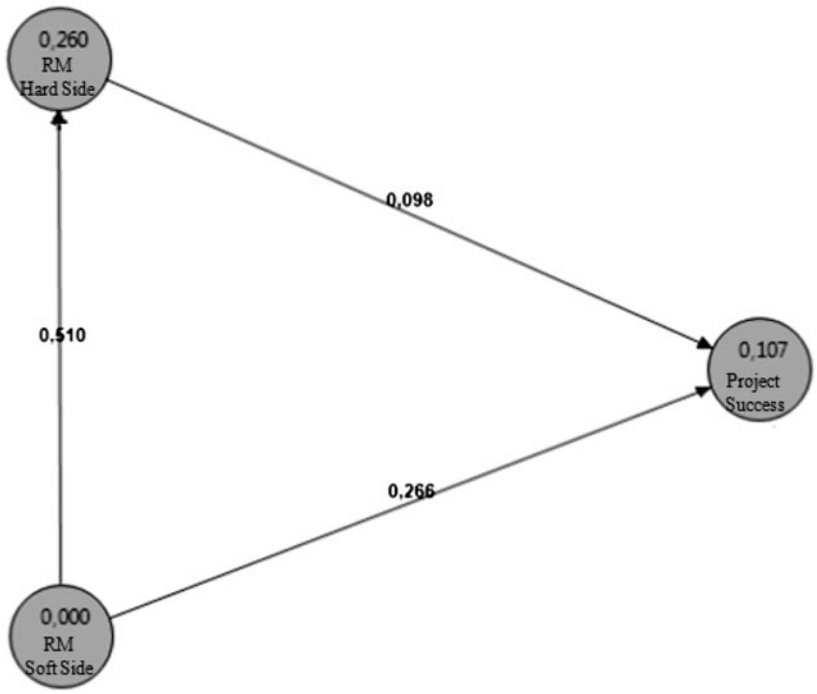


Table 10. Structural Model 2 results.

Dependent	Independent variable	Hypotheses	Standard error	*T* statistics	*P* value	R^2	R^2 adjusted
RM hard side	RM soft side	H1	0.0433	11.7603	*0.0000*	25.3%	25.3%
Project success	RM hard side	H2a	0076	1.2915	0.1968	10.7%	10.0%
	RM soft side	H2b	0.0724	3.6736	*0.0003*		

Path results



Bootstraping results

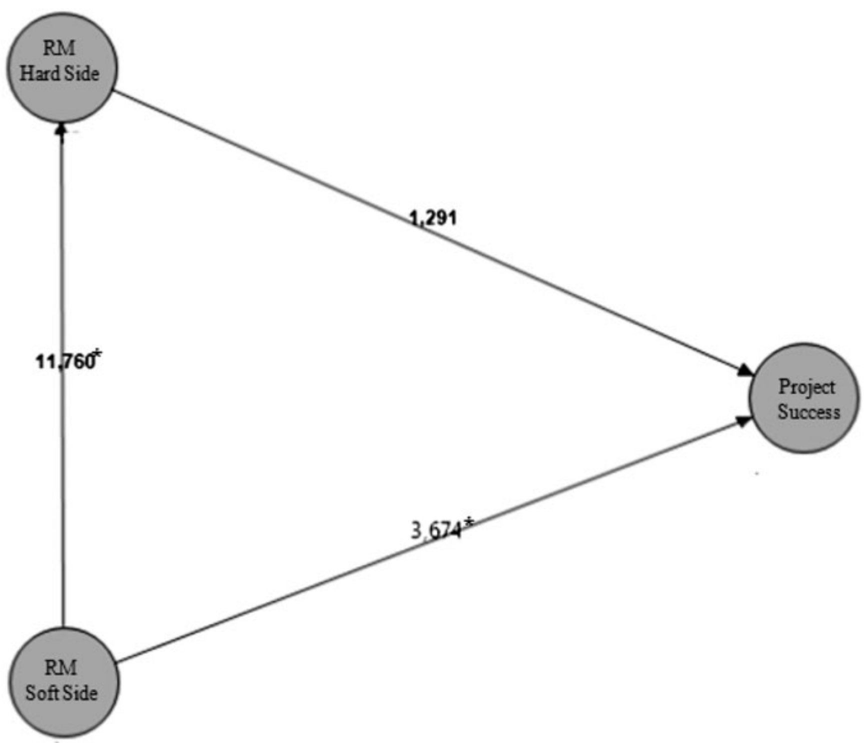


Table 9 shows that RM_soft side has a statistically significant coefficient with both RM_hard side and project success, which suggests that hypotheses H1 and H2b are valid. Moreover, schedule has a statistically significant coefficient with project success, thus validating H5. The RM_soft side LVs and schedule indicator explain most of the effects on project success (21.3%).

None of the hypotheses relating RM with Cost and Schedule indicators was confirmed (H2a′, H2b′, H2a″ and H2b″).

Table 10 shows that RM_soft side (H2b) explains 10.7% of the effect on project success. This effect is not negligible, since the systematic survey performed by the Standish Group Report every two years showed a project success rate of only 16.2% (1995). This value increased in the last decade, reaching 34% in 2009, thus indicating an increase of 18% in 14 years.

The decrease of R^2 from Model 1 to Model 2 indicates that Schedule (H5) explains 10.6% of the effect on project success. This is interesting and indicates that the perceptual measures (project success) are significantly influenced by Schedule but not by cost variation in the sample studied.

5. Discussion

Several studies have been performed in recent decades to gain an understanding of the impact of risk project management on project success, although most of them emphasise the hard side, recommending that organisations develop risk management processes, techniques and tools (Wideman 1992; DoD 5000.2-R 2006; Hillson 2002; Raz, Shenhar, and Dvir 2002; Keelling 2006; PMI 2013). This stream has been consolidated over time with much effort on the part of professional associations, companies and scholars through the BoKs. However, our study suggests that the impact of this effort is still weak, considering the hard side.

The hard side of risk management covers only part of the managerial aspects of project uncertainties. The hard side can help to manage foreseeable uncertainties and variability, as defined by Meyer, Loch, and Pich (2002). However, unforeseeable uncertainties need other types of skills related with the soft side. Given that most projects can present all these types of uncertainties, our study suggests the need to integrate the hard and soft sides, since the soft side has a significant positive impact not only on the hard side of risk management but also on project success.

Because most research has disregarded soft skills, as suggested by several studies (Grabher 2004; Gladwell 2006; Crawford et al. 2006; Sharma and Gupta 2012; Söderlund and Maylor 2012), the present study is expected to help fill this research gap.

5.1 *Implications for practice*

Many companies have spent significant amounts of resources on project management (PMI 2009) and executives seek evidence that their organisational efforts have borne fruit. An important managerial implication of this study is the finding that the adoption of a standard PM framework focusing on the hard side of risk management does not suffice for effective uncertainty management. Our study suggests that the soft side plays a key role and that firms should also consider soft skills, because their effect on project success is highly significant and positive.

This includes the need for internal and external stakeholders to be aware of project uncertainties, thus adjusting their expectations and estimates of project success. Moreover, an analysis of the soft side revealed the prominent position of project context and strategic standpoints. During the interviews, it became clear that the need for an understanding of competitive environmental issues appeared prominently. Accordingly, to satisfy this need for understanding, more strategic thinking about project risks, including mapping of the threats and opportunities and identification of key external stakeholders, partners and suppliers, is required. The last MV linked with the soft side in this study is the perspective of behaviour, including attitude and commitment.

When project stakeholders face unforeseeable uncertainties, they need to use their soft skills, such as intuition and judgement (Gladwell 2006; Söderlund and Maylor 2012) to provide fast responses and adapt to new risk environments, creating a balance between anticipation or preparedness and resilience (Bhamra, Dani, and Burnard 2011).

5.2 *Limitations and future research agenda*

Some aspects of the methodological approach could limit the generalisation of this study's findings. This research revealed the inherent limitations of the methodological choices adopted, taking into account a non-probability sample of selected projects. However, the sample size was selected for and represented effect, reliability and power.

The study was developed in Brazil, which means that there are some biases that make it difficult to generalise its conclusions. Nevertheless, it is the first large survey specific to the field of project risk management in Brazil, and as such, it offers important insights for further research in this area and creates a basis for comparison with other countries. Finally, Brazil has the largest community of practitioners in Latin America, according to the data of the Project Management Institute, suggesting that, despite the efforts to adopt international standards, the hard side of risk management is not sufficiently effective.

The inherent bias related to the perception measures of project success must be noted, although it is difficult to obtain data about more dimensions of strategic success. Nevertheless, we triangulated this data with cost and schedule objective indicators.

This study provides insights that indicate the soft side has a significant impact on project success. However, further research is needed to examine the mechanisms in greater depth and create managerial guidelines on how to develop and implement this approach in organisations.

Moreover, the literature on project risk management follows the logic of process groups throughout the life cycle (Wideman 1992; Fairley 1994; Williams 1995; Raz and Michael 2001; Raz, Shenhar, and Dvir 2002; Keelling 2006). Our study does not analyse the impact of the project phase on results, nor does it investigate in which project phase risk management could be most effective, or in which phase the soft and hard sides are most needed. This constitutes an important research issue yet to be explored.

Other moderating and control variables should be explored in future, in addition to the project complexity and industry variables investigated in this study, such as life cycle phases and company size.

6. Conclusions

The structural model presented herein provides a means for correlating the hard and soft sides of risk management with project success, understanding the moderating effect of project complexity. The model is coherent with the theoretical state of the art, tested through a broad range of industrial sectors and contexts.

The LV that stood out in both models was the soft side of risk management. This LV appears most prominently in project success and explains 10.7% of the effect on project success, which is not negligible. Moreover, the soft side supports the hard side, since we found a significant correlation that explains 25.3% of the effect on the hard side.

As for the hypothesis of the impact of the hard side of risk management, this study showed that it has a positive impact on only one aspect of project success – time – albeit with minor effects (1.8%). In addition, the absence of significance in the hypotheses related to cost and the other five perceptual indicators naturally leads to questions about the way risk management is being implemented in organisations.

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