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ABSTRACT

Purpose: We investigated how emotional intelligence (EI) affects the relationship between project managers' (PMgs) expertise and experience and project success for both the team and client.

Design/methodology/approach: This study collected 290 valid responses from IT project managers. The results were analyzed using an Ordinary Least Squares (OLS) regression, with Process v4.0 procedure and the Johnson-Neyman (JN) technique to assess the moderating effect of the level of EI.

Findings: Results showed that moderate levels of EI can enhance the impact of PMgs' experience on the project client, while higher levels of EI are necessary to positively impact the team. Moderate levels of EI can improve PMgs' expertise impact on the project team, increasing their effectiveness in interactions with clients and other stakeholders.

Practical implications: It is recommended to consider emotional intelligence alongside technical skills when selecting project managers to address emotional labor, stress, stakeholder management, and agility. Providing EI training and experiential learning opportunities internally can improve project managers' emotional intelligence.

Originality/Value: Our study contributes to the literature on emotional intelligence and project management, highlighting the relationship between technical skills and emotional intelligence levels of PMgs. Our research emphasizes the significance of experience and EI in project management, particularly in overseeing complex projects. Additionally, moderate levels of EI enhance PMgs' effectiveness in engaging with stakeholders closely involved in projects.

Keywords: Behavior in projects, Project manager skills, Emotional intelligence, Project success

Paper type: Research Paper

Introduction

Firms value significantly the technical skills of project managers (PMgs) (Ramazani & Jergeas, 2015) because they are essential for the successful delivery of projects within the specified time, budget, and quality (Baccarini, 1999; Jugdev & Müller, 2005). For example, the Project Management Salary Survey (PMI, 2021) reports that project-certified professionals earn 16% more on average. However, while the large majority of the extant research has focused on the PMgs' technical skills[1], those skills do not guarantee the success of projects (Ramazani & Jergeas, 2015), due to the increasing complexity and dynamism of projects. The project managers' cognitive abilities (Ispas & Borman, 2015) need to be taken into account as predictors of job performance (Ones et al., 2012; Van Iddekinge et al., 2018). That is, the PMgs' social interaction abilities are becoming crucial to build positive relationships with project teams and clients (e.g., Rezvani et al., 2018), and ultimately contribute to increase the likelihood of project success.

Recent studies have recognized a positive influence of emotional intelligence (EI) on PMgs and project teams (e.g., Clarke, 2010; Iliescu et al., 2012; Rezvani et al., 2016; Stephens & Carmeli, 2016). Collectively, these studies underscore the importance of emotional intelligence in project management, as it impacts various aspects of project success, including teamwork, conflict management, job satisfaction, trust, and knowledge creation. However, this extant research has mainly observed how EI influences directly project performance, and in some instances considering possible mediators that would influence project success, such as type of conflict (Khosravi et al., 2020), trust (Rezvani et al., 2016, 2018) and commitment (Zhu et al., 2021). Previous studies indicate that PMgs with developed EI can better understand and manage the emotions of others, manage conflicts more

[1] In the context of project management, technical skills refer to the abilities required to manage the technical aspects of a project, such as planning, budgeting, cost containment, and evaluating risk. (Gillard, 2009; Alvarenga et al. (2020). On the other hand, soft skills, also referred to as interpersonal skills, include abilities such as communication, negotiation, conflict management, and persuasion. (Gillard, 2009; Alvarenga et al., 2020).

effectively, adapt their approach to meet clients' unique needs and expectations, and build trustful relationships (Aguilar Velasco, & Wald, 2022; Sampaio, Wu, Cormican, & Varajão, 2022). Conversely, less developed EI may compromise project success (Rode et al., 2007; Lin et al., 2018).

The impact of technical skills on project success remains a topic of debate in the literature. While some studies suggest that project success is influenced by project managers, despite their limited discretion in determining project strategy (Meredith & Zwikael, 2020), others argue that project managers can still impact the time horizon of a project and affect its success, particularly in terms of the project team and client satisfaction (Shenhar & Dvir, 2007). To enhance their performance, project managers need to develop both technical and soft skills (Millhollan & Kaarst-Brown, 2016), such as emotional intelligence (EI). Nonetheless, our understanding is insufficient on the role of soft skills, such as EI, in improving the impact of technical skills on project success. Therefore, further research is needed to explore the relationship between technical skills, soft skills, and project success. This would help to provide a comprehensive understanding of the competencies required for project managers to achieve project success and guide the development of training programs for PMgs.

This study examines the moderating effect of PMgs' EI on the relationship between their training and experience and project success, specifically the success in terms of the impact on the team and the impact on the client. These human dimensions of project success have been suggested by Shenhar and Dvir (2007).

We argue that PMgs with higher levels of EI are better equipped to handle challenging projects by positively influencing the relationship between technical skills and the project success' dimensions. We test the hypotheses on a sample of 290 IT PMgs with data collected using a survey. Our findings seem to suggest that PMgs with high EI exhibit greater client

commitment, problem-solving abilities, and issue resolution skills, overcoming the challenges that project managers face while utilizing their technical skills. Our results also highlight that the positive outcomes of EI are more likely to occur when experienced PMgs have higher levels of EI, and hence it is neither a continuum nor we find an effect for lower levels of EI. In addition, moderate levels of EI could increase the effectiveness of PMgs, particularly when more clients become involved in projects, necessitating more effective communication and collaboration among team members.

Our study contributes to the stream of studies on project management behavioral theory and project success by investigating how EI, or the level of EI, of the PMgs influences the effect of the technical skills on project performance. Prior project management research has recognized the influence of EI on project performance, but a more complete understanding should distinguish the types of human interactions with at least those agents that are the primary stakeholders.

As a practical contribution, our study emphasizes the importance of PMgs developing cognitive abilities, and specifically their EI, as a manner to improve job performance, perhaps more remarkably in complex and dynamic project environments that require considerable emotional labor. While the technical skills and experience are typically valued when hiring PMgs - two facets valued in hiring PMgs are their specific experience as PMgs and formal training in project management (Ramazani & Jergeas, 2015) -, we suggest that EI should also be considered in the selection process. That is because PMgs with high levels of EI are better equipped to manage emotional labor requirements, deal with stress, stakeholders, and adapt to new situations.

Literature Review

Success in projects and project managers

The landscape of project management has witnessed significant advancements, especially with the introduction of comprehensive, dynamic, and integrated models that encapsulate the multidimensionality of project success (Pinto et al., 2021). However, a pressing concern that emerges is the extent to which the influence and contribution of project managers can be consistently effective across all these dimensions of project success.

When orchestrating a project, there is an expectation for the project manager to evaluate various facets of success. This evaluation not only includes immediate, short-term aspects like project management success (Atkinson, 1999) but also delves into long-term elements such as deliverables/outputs success (Jugdev et al., 2013; Ika & Donnelly, 2017), outcomes (Zwikael & Smyrk, 2009; Toor & Ogunlana, 2010), and the realization of benefits (Meredith & Zwikael, 2019; Ika et al., 2020).

Shenhar et al. (2001) have proposed a multidimensional approach to assess project success. Their model introduces a five-dimensional perspective, encompassing project efficiency, impact on client satisfaction, influence on the team, commercial success, and preparation for the future. Each of these dimensions demands a unique set of skills and expertise from project managers. For instance, while project efficiency is anchored in technical expertise, the impact on client satisfaction leans heavily on the project manager's adeptness at understanding and meeting client needs and expectations. The dimension focusing on the team underscores the project manager's leadership, motivational, and interpersonal skills.

However, a challenge arises: While project managers are anticipated to excel in all these dimensions, their influence and contribution may vary in effectiveness. The dimensions in which they are actively engaged might experience a more significant impact. They will hardly impact directly in dimensions that happens after the project is finished due to their role and position (Meredith & Zwikael, 2020).

Shenhar, Dvir, Levy, and Maltz (2001) have delved deep into this multidimensional perspective on project success. They posit that these dimensions manifest at different junctures of the project. The dimensions of project efficiency, impact on the team, and client impact are immediate, unfolding in the short term. In contrast, dimensions like commercial success evolve over a more extended period, typically post the product's launch or utilization. The fourth dimension, preparation for the future, is even more forward-looking, extending beyond immediate financial outcomes.

Shenhar et al. (2001) argue that while project managers should be evaluated based on performance across all dimensions, the reality is that their influence might be more palpable in the dimensions they are actively involved in. Meredith and Zwickael (2020) further contend that traditionally, project managers might not always be directly linked to the strategic level, which can further dilute their influence in certain dimensions.

Historically, the iron triangle approach was the primary method for assessing projects, but its appropriateness has been questioned by numerous researchers (e.g., Atkinson, 1999; Lim & Mohamed, 1999; Turner & Zolin, 2012; Drury-Grogan, 2014; Turner & Zolin, 2012; Serrador & Turner, 2015). While it provides an objective measure, it may not encompass the entirety of a project's success, particularly when factoring in the diverse impact of the project manager across various dimensions. The multidimensional approach proposed by Shenhar et al. (2001) presents a more comprehensive perspective, as it considers additional success criteria, including, for instance, the team's impact and the client's viewpoint (Lishner & Shtub, 2022).

Project managers' emotional intelligence and Project Success

Emotional intelligence involves the skill to precisely identify, evaluate, and convey emotions (Winter et al., 2006), sustain steady performance even in stressful situations, bounce back from negative or detrimental experiences (Dulewicz & Higgs, 2005), and regulate emotions in distinct circumstances. The concept of emotional intelligence (EI) has been a

topic of ongoing discussion among scholars, with some advocating for its conceptualization as a set of individual traits (Petrides & Furnham, 2001, 2003), while others, notably Mayer, Salovey, and Caruso (2008), argue that it is more accurately described as a set of abilities. This divergence in conceptualization has led to challenges in measuring EI (Conte, 2005). Two widely recognized measures of EI, the Bar-On Emotional Quotient Inventory (EQ-i) (Bar-On, 2000) and the Mayer-Salovey-Caruso Emotional Intelligence Test Version Two (MSCEIT V.2; Mayer, Caruso, & Saolovey, 2000), are based on differing models of EI and employ distinct methods of measurement. This has contributed to a lack of consensus within the EI construct (Muyia, 2009) and has led to confusion regarding what is actually being measured by EI assessments (Fiori & Antonakis, 2011, 2012; Fiori et al., 2014; Maul, 2012). Despite these challenges, there is a strong case to be made for the conceptualization of EI as a set of abilities, as proposed by Mayer, Salovey, and Caruso (2008). This perspective views EI as a function of an individual's cognitive abilities used to manage emotions, which is a more objective and measurable construct compared to the model of traits.

Wong and Law (2002) defined emotional intelligence as comprising four elements the ability to perceive, express, understand, and regulate emotions. That is, EI comprises the ability to recognize and identify emotions in oneself and in others, the capacity to express emotions effectively and appropriately in different situations, the ability to comprehend complex emotions and the relationships between them, and the ability to manage one's own emotions and responding appropriately to the emotions of others. These four elements of EI are critical for effective leadership and project management success (Ahsan et al., 2013; Zhang et al., 2013).

Emotional intelligence is an important attribute for PMgs, capable of influencing project success. EI provides PMgs with the ability to manage their teams, display an effective leadership (Pryke et al., 2015; Potter et al., 2018; Shao, 2018; Zuo et al., 2018), conflict

resolution ability and improved decision-making (Ahsan et al., 2013), communicate with multiple stakeholders (Henderson, 2008; Afzal et al., 2018) and achieve project goals.

Higher levels of EI also help build an effective leadership that is likely to help PMgs understand the strengths and weaknesses of their team members, motivate them towards a common goal, and delegate tasks and responsibilities (Ahsan et al., 2013). Moreover, PMgs with high EI are likely to be more effective in managing conflicts, finding solutions that are acceptable to all parties, and hence construct a harmonious working environment that contributes to better outcomes for the project (Ahsan et al., 2013; Zhang et al., 2013).

Emotional intelligence (EI) has increasingly been recognized as a pivotal factor in the realm of project management. This multidimensional concept encompasses the ability to understand and manage one's own emotions and those of others, which can significantly influence the outcome of a project (Podgórska and Pichlak, 2019). Such competencies are not just about personal introspection but extend to managing team dynamics and client relationships.

Project managers equipped with high levels of emotional intelligence often adopt open communication and progressive leadership styles, such as transformational leadership. These leadership styles, rooted in EI, foster an environment of trust, proactive behavior, and open communication. This not only ensures that teams function cohesively but also that projects are executed within their stipulated budget and time constraints (Afzal et al., 2018).

The significance of EI becomes even more pronounced when considering the personal competencies of project managers. Personal competence, reflecting how a project manager behaves during activities, is closely tied to their emotional intelligence. Such competencies, which include teamwork, attentiveness, and conflict management, are crucial in navigating the uncertainties and changes inherent in projects (Clarke, 2010). Leadership, especially when

rooted in emotional intelligence, plays a pivotal role in determining project success, influencing both team dynamics and client satisfaction (Ahsan et al., 2013).

In specific environments, like the Australian Public Service, the role of EI takes on added significance. Here, project managers operate in a context characterized by low accountability and considerable freedom for staff interpretation. In such scenarios, the need for high levels of behavioral competency or emotional intelligence becomes paramount. Project managers must navigate personal choices and biases to align with project objectives, often without the leverage of positional authority (Blixt and Kirytopoulos, 2017).

Drawing from the classification of Shenhar and Dvir (2007), it's evident that emotional intelligence impacts multiple dimensions of project success. On one hand, it ensures effective communication, trust-building, and conflict resolution within teams. On the other, it plays a crucial role in managing client relationships, ensuring that projects not only meet but exceed client expectations.

Emotional intelligence, with its multifaceted competencies, plays an important role in project success. It equips project managers with the tools needed to navigate the complexities of team dynamics and client relationships, ensuring successful project outcomes.

Hypotheses and Conceptual Model

In this work we consider the human relationship dimensions that could be affected by the PMg EI – impact on the team and impact on the client. The extant research indicates that project success goes beyond the perspective of project management efficiency, and has made some inroads into exploring other aspects (Jugdev & Müller, 2005). For example, the clients' perception of success (Pinto & Slevin, 1989) and the impact on teams (Shenhar & Dvir, 2007). These other perspectives require another set of soft skills to maximize the impact on the team (Millhollan & Kaarst-Brown, 2016).

The interactions with several stakeholders, and mainly with the team, and increasingly with the clients, are becoming more intense. EI provides PMgs with the ability to recognize theirs and the others' emotions, and to regulate emotions to improve the social interactions (O'Boyle et al., 2011). EI provides PMgs with better communication skills, allowing them to understand the needs and concerns of others, respond appropriately and lead to better collaboration and project outcomes (Henderson, 2008; Afzal et al., 2018).

The moderating effect of PMgs EI on PMgs expertise in project success

The PMgs expertise seems essential in ensuring a successful project outcome. The importance of expertise, or technical competences, for PMgs cannot be underestimated as to the impact on the efficiency of the projects, specifically the "iron triangle" of scope, cost, and deadline (Shenhar & Divir, 2007; PMI, 2021). Expertise[2] refers to knowledge of project management methodologies and tools (PMI, 2021), that are crucial to managing complex projects, identifying potential risks, and allocating resources efficiently (Millhollan & Kaarst-Brown, 2016). However, expertise alone may not guarantee performance in all dimensions of project success (PMI, 2021). Expertise skills are necessary but not sufficient to perform the job (Pollack, 2007; Azim et al., 2010; Massis, 2010).

In addition to expertise needed for carrying out the task, PMgs also require competence in team management, such as relationship coordination, conflict resolution, trust-building, creating engagement and commitment (Shenhar & Dvir, 2007; Rezvani et al., 2016, 2018; Khosravi et al., 2020; Zhu et al., 2021). Effective team management relies heavily on EI, the ability to perceive emotions throughout the job, and address concerns related to negative feelings (Wong & Law, 2002; Clarke, 2010; Farh et al., 2012; Zhang et al., 2013). For example, an expert PMg may struggle to motivate and engage team members, leading to low

[2] Expertise is special skill or knowledge that is acquired by training, study, or practice. (https://www.collinsdictionary.com/dictionary/english/expertise#google_vignette)

productivity and a lack of commitment. However, a PMg with high EI would be better equipped to build strong relationships with team members, understand their needs, and provide support and encouragement.

PMgs with high levels of EI are better equipped to manage differences in expectations and perceptions and lead and coordinate their teams more effectively (Khosravi et al., 2020; Zhu et al., 2021). To maximize the expertise of a PMg, they will leverage their EI to facilitate effective communication and collaboration within the project management team. A PMg with a strong EI skillset can communicate clearly, actively listen, and manage conflicts effectively, resulting in higher team engagement, enhanced productivity, and ultimately better project outcomes.

The expertise of a PMg can be optimally utilized when coupled with EI, which can aid in managing the emotions of the project team and foster a positive work environment (Zhu et al., 2021). During the course of a project, team members may encounter frustration, stress, or anxiety (Jugdev, Hartman, Thomas, 2000). A PMg with high EI can acknowledge these emotions and deal with them constructively. This can result in improved job satisfaction, enhanced team dynamics, and ultimately a more successful project outcome (Zhu et al., 2021). Thereby, we hypothesize,

Hypothesis 1a: The PMgs' EI strengthens the relationship between PMgs expertise and the project success - impact on the project team, such that the relationship is positive and stronger as the PMgs' EI increases.

The expertise of PMgs is critical for effectively managing project-related activities and processes, and ultimately delivering successful project outcomes (Ramazani & Jergeas, 2015). Expertise development programs have been developed to equip PMgs with the required knowledge and skills for successful project management, including project management methodologies and tools (Millhollan & Kaarst-Brown, 2016), as well as project management

education and certification (Carbone & Gholston, 2004). However, expertise is a threshold. If a Project Manager lacks EI, their expertise may have limited impact on the satisfaction of the clients.

Clients and users are increasingly active agents whose presence is essential for project success (Shenhar & Dvir, 2007; Sońta-Drączkowska & Mrożewski, 2020; Tam et al., 2020). A PMg with significant expertise may encounter challenges in understanding the clients' needs or communicating with them effectively, resulting in misunderstandings or miscommunications that could compromise the projects' success. However, a PMg with high EI would better understand and manage the client's emotions, establish rapport and trust, and ensure that the project aligns with the client's expectations.

PMgs with significant expertise may encounter challenges such as changing client requirements, competing stakeholder priorities, or unforeseen delays. In such situations, PMgs with high EI are better equipped to manage these challenges. By utilizing their understanding of emotions, the PMgs can manage conflicts constructively and resolve issues in a way that aligns with the clients' needs. Thereby, we hypothesize,

Hypothesis 1b: The PMgs' EI strengthens the relationship between PMgs expertise and the project success - impact on the client, such that the relationship is positive and stronger as the PMgs' EI increases.

EI moderation considering PMgs specific experience in project

The PMgs' EI may moderate the relationship between PMgs' experience and project success, particularly in relation to the impact on the project team. The extant research suggests that on-the-job experience is crucial for PMgs, including senior PMgs, to achieve successful project outcomes (Ramazani & Jergeas, 2015; Ika, 2015). However, technical skills alone may not be sufficient for successful project management, particularly with the increase in the complexity of projects. Therefore, it is important to recognize the value of

personal competencies, such as EI, to potentiate technical skills and enhance the PMgs' performance. SST proposes that individuals tend to develop emotions, motivations, and attitudes throughout their lifespan, with older professionals typically possessing more experience and maturity (Hur, Moon & Han, 2015). Moreover, the acquisition of professional experience may link to the level of EI (Vandewalle et al., 2019). PMgs need to deal with key project stakeholders, such as the project team and the client, which can be stressful. Experienced project managers may encounter challenges, from personality clashes to disagreements over priorities or strategies. To leverage their specific experience in project management, more experienced PMgs would need to complement them with personal competencies, such as higher levels of EI, which have been shown to affect the relationship between experience and measures of project success. Thereby, we hypothesize,

Hypothesis 2a: The PMgs' EI positively moderates the relationship between PMgs experience and the project success - impact on the project team, such that the relationship is positive and stronger as the PMgs' EI increases.

PMgs, in their daily tasks, use most of their time interacting with various stakeholders (Strohmeier, 1992; Carvalho, 2014). Although this has always been the case, more and more clients are participating in projects from the beginning (Sońta-Drączkowska & Mrożewski, 2020; Tam et al., 2020). The traditional challenges of dealing with stakeholders, including the need to lead and manage conflicts, are even more challenging by interacting with clients. Experienced project managers have a deep understanding of project management processes, techniques, and best practices, which enables them to identify and mitigate risks, manage resources effectively, and deliver projects on time and within budget. However, the impact of project manager experience on the project client's satisfaction may be limited if the project manager lacks emotional intelligence. A project manager with extensive experience may overlook the client's emotional needs, leading to misunderstandings or miscommunications

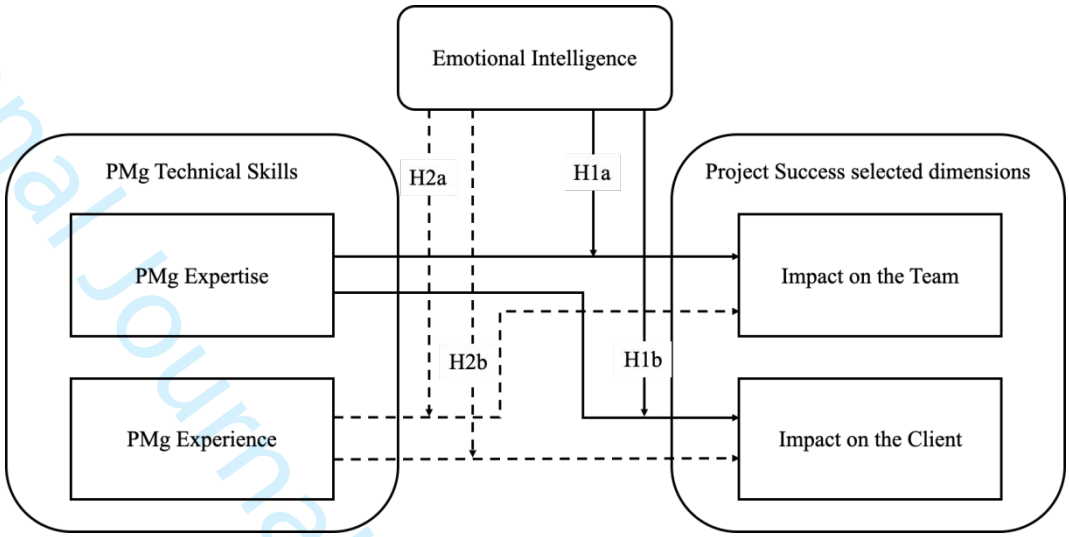
that could undermine the project's success. However, a project manager with high emotional intelligence would be better able to understand and manage the client's emotions, building rapport and trust, and ensuring that the project meets the client's expectations.

To make the most of their specific experience, PMgs need to learn from projects and from the interaction with clients how to be able to, throughout this interaction, be able to focus on their needs, and manage their expectations and emotional aspects of the relationship. Experienced project managers may encounter challenges such as changing client requirements, competing stakeholder priorities, or unexpected delays. A project manager with high emotional intelligence is better equipped to handle these challenges, using their understanding of emotions to manage conflict constructively and resolve issues in a way that meets the client's needs. PMgs with higher levels of EI should be better able to regulate their emotions and perceive and anticipate situations that could lead to conflict and impair the effective use of their specific project management experience (Akkermans et al., 2020; Li et al., 2020). Thereby, we hypothesize,

Hypothesis 2b: The PMgs' EI positively moderates the relationship between PMgs experience and the project success - impact on the client, such that the relationship is positive and stronger as the PMgs' EI increases.

Figure 1 presents the conceptual model with the hypotheses.

Figure 1. Conceptual model with hypotheses



Method

All the data employed to test the hypotheses was collected using an online survey sent to IT Project managers (IT PMgs) that were identified as such in the professional base LinkedIn. The survey included self-assessment scales and some questions to collect the demographics of the participants. Anonymity was assured, with the guarantee of non-disclosure and that the data would be used only in aggregate form and for statistical treatments. The use of self-assessment scales can generate common method variance, and we followed Podsakoff et al.'s (2003) recommendations to prevent possible hazards. We checked all the assertions to prevent potential misinterpretations, and we randomized the assertions (Fuller et al., 2016). The Harman test is a statistical technique used to detect common method bias by examining whether a single factor accounts for a large amount of the variance in a data set, with a threshold of 50% commonly used. The result of the single factor analysis was around 35% (Harman, 1960), providing some assurance that common method variance is not a hazard in our data.

Sample

A total of 453 responses were collected from Brazilian project managers, with 95.14% being valid responses, meaning 431 valid responses and 22 invalid ones. The 431 respondents

were PMgs, but we only considered the IT PMgs to avoid biases. The final sample comprised the responses of 290 IT PMgs that agreed to participate in the survey and were submitted complete.

A considerable portion of the sample comprised IT PMgs with substantial experience in project management: slightly over half of the respondents had more than ten years of specific experience in the role of PMgs, and about 84% more than five years. Similarly, a large number of IT PMgs had more than 250 hours of specific training in project management tools and techniques (55.3%), and almost 82% had more than 200 hours of specific training[3]. Specific training in project management includes the training on tools and techniques for managing the projects. Over 60% of our sample was over 40 years old, and the majority studied an MBA or master degree. There was a predominance of men in the sample, with approximately 75%. Finally, 194 participants (66,9%) hold a professional certification in project management. The detailed data is presented in Table 1.

Table 1. Respondents' characteristics

Experience					
	Average	**Standard deviation**	**Minimum**	**Maximum**	
Age	43,90	8,28	23	64	
Professional experience	22,85	8,18	5	44	
Professional experience as a PM	11,67	5,91	1	30	
Expertise					
PM training	**Up to 100 hours**	**From 101 to 200 hours**	**From 201 to 500 hours**	**From 501 to 1000 hours**	**Over 1000 hours**
Frequency	24	33	76	69	88
%	8,28	11,38	26,21	23,79	30,34

[3] Based on the PMBOK® Guide (PMI, 2021), traditional project management tools and technique include the Work Breakdown Structure (WBS) for scope division, the Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) for task interdependencies, and Gantt charts for visual timelines. Earned Value Management (EVM) measures project performance, while a Risk Register addresses uncertainties. The Responsibility Assignment Matrix (RAM) clarifies roles and tasks.

Schooling	High school	Undergrad	Specialization/MBA	Master's degree	Doctorate degree
Frequency	1	52	194	38	5
%	0,35	17,93	66,90	13,10	1,72

PM certification	Yes	No
Frequency	194	96
%	66,90	33,10

Gender	Masculine	Feminine	Not answered
Frequency	217	72	1
%	74,7	24,9	0,4

Measures

The dependent variable is *project success*. An often-used measure of project success is the five dimensions scale by Shenhar and Dvir (2007) (see, for instance Carvalho & Rabequini, 2017). However, given our focus and since the PMgs most frequent social interactions throughout the project is with the project team and increasingly with the client (Napier, Keil, & Tan, 2009), in this study we only used the measures of success that directly pertain to the impact on the project team and on the client.

The *project success - impact on the project team* assesses the project's impact on the team. The impact on the team dimension is important for evaluating project success as it involves the team's development and satisfaction. A successful project should provide opportunities for learning and professional growth, leading to motivated and engaged team members. The variable was measured with six items from the Shenhar and Dvir's (2007) scale, such as "The project team was highly satisfied and motivated", and "Team members experienced personal growth", with the responses provided in a Likert type scale anchored in 1 = strongly disagree and 5 = strongly agree.

The *project success - impact on the client* assesses whether the project's product has met the expectations of key project stakeholders. This variable was measured with five items,

such as "The client was satisfied", and "The project met the client's requirements", anchored in the same 5-point Likert type scale. We calculated the value of each variable using the mean value of the responses to the items.

Independent variables

The independent variables included *the PMg expertise*. We define expertise as a high level of knowledge and skill in a specific area, measured by specific training that contributes to the development of expertise. PMg expertise that captures the technical skills, or competences, of the IT PMgs essential to their job performance (Turner, 2022; Ramazani & Jergeas, 2015). This variable was measured with data collected in the survey, with the number of hours of training in project management tools and techniques. The responses were provided in intervals: up to 100h, 101 to 200h, 201 to 500h, 501 to 1000h, and more than 1000h of training.

The *PMgs' specific experience* refers to experience on the role, albeit not necessarily in the same company, and was assessed by their tenure as PMgs. That is, the PMgs specific experience captures the time (in years) working as project managers. The responses were provided in the following intervals: Up to 5 years, 6 to 10 years, 11 to 15 years, 16 to 20 years, 21 to 25 years, and 26 to 30 years.

Finally, *Emotional intelligence* (EI) refers to the ability to be aware of, to utilize, to understand, and to manage emotions in self and others (Mayer et al., 2004). In this study, EI is proposed to be a moderating variable that we measured using the Wong and Law Emotional Intelligence Scale (WLEIS) (Wong & Law, 2002). This scale is based on the original Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) scale (Mayer & Salovey, 1997) and it includes the original four dimensions of the MSCEIT scale: self-emotional appraisal (SEA), others emotional appraisal (OEA), regulation of emotion (ROE), and use of emotion (UOE). The advantage of using the WLEIS over the MSCEIT scale is that it is shorter, and it takes

less time to complete, thus reducing the possibility of wrong and incomplete responses. Due to its parsimoniousness and robustness, this scale has been used in other studies on the effects of EI in project management (e.g., Zhu et al., 2021; Khosravi et al., 2020).

Each of the four dimensions of the WLEIS scale was measured with four items, in a 5-point Likert type scale, anchored in 1 - strongly disagree, and 5 - strongly agree. For example, to measure SEA a sample item inquired "I have a pretty good sense of why I have certain feelings most of the time". A sample item for OEA was "I am a good observer of others' emotions". A sample item for ROE was "I am a self-motivated person". And a sample item for UOE was "I am able to control my emotions". (The complete survey may be accessed in Table 1 of the Supplementary materials). We computed the value of each variable using the mean value of the responses to the items.

Control variables

We included control variables at the level of the firm and of the participant PMgs to account for other effects on project success. At the firm level we controlled for the *firms' age*, which is an often-used measure associated with firms' learning, reliability and legitimacy considering internal and external stakeholders and success (Bakker & Josefy, 2018). Firms' age may have an effect on their performance (e.g., Bakker & Josefy, 2018). Firms' age was measured by the number of years since founding. We also controlled for *firms' size*, measured in the following two manners: by the *annual revenue* (1 - Up to 10 million R$, 2 - From 11 to 100 million R$, 3 - From 101 to 500 million, 4 - From 501 to 1 billion, and 5 - Above 1 billion R$), and by the *number of employees* of the firms (1 - Microenterprise (Up to 9 employees), 2 - Small business (from 10 to 49 employees), 3 - Medium company (from 50 to 99 employees), and 4 - Large company (over 100 employees). We used two measures of firm size, annual revenue and number of employees, to capture different aspects of a firm's size. Controlling for both measures allows us to better capture the overall size of the firm and its

potential influence on the outcome variable. Additionally, using both measures helps\ ensure that we capture the appropriate size of firms across different industries and contexts.

At the level of the project manager we controlled for the *PMg schooling* in a 5-points scale: 1- without higher education, 2 — complete bachelor, 3 – MBA, 4 – Master, and 5 – Ph.D. The *PMgs certification* was used as a prox for competence and was assessed asking the participants whether they had any professional certification (e.g., PMP or PRINCE2). This dichotomous variable took the value of 1 – PMg has certification, and 0 - otherwise. Data for all these variables was collected in the survey.

Data analysis

The hypotheses were tested using an OLS regression. We tested five models for each dimension of project success: impact on the team and impact on the client. We further used the Process v4.0 procedure and the Johnson-Neyman (JN) technique (Hayes et al., 2017) to assess the moderating effect of the level of emotional intelligence (EI). The JN technique identifies a spectrum of distinct values with no significant difference between the groups being evaluated. This region is called the region of non-significance (White, 2003). It also helps us visualize the levels at which the moderating effect of IE actually occurs.

Research Ethics and Data Handling

In the design and execution of this study, we considered ethical standards. Our primary dataset was derived from an online survey targeting IT Project Managers (IT PMgs) on LinkedIn. Throughout the data collection process, we prioritized the anonymity of our participants, ensuring that both their personal and professional details remained undisclosed. Every participant was given a firm assurance of non-disclosure, meaning that their individual responses would neither be disclosed nor used in ways that might jeopardize their anonymity. Instead, the collected data was exclusively used in its aggregated form for statistical analyses, ensuring that individual inputs remained indistinguishable.

Given the inherent challenges and biases associated with self-assessment scales, our methodology closely followed the guidelines proposed by Podsakoff et al. (2003). Each statement within the survey underwent rigorous scrutiny to eliminate any potential for misinterpretation. To further enhance the integrity of our data and reduce order bias, the survey statements were randomized, adhering to the best practices suggested by Fuller et al. (2016). To address potential concerns related to common method bias and to validate the integrity of our data, we employed the Harman test. This analytical tool aids in identifying if a singular factor might disproportionately influence the dataset's variance. The outcomes of this test fortified our confidence that common method variance did not pose a significant threat to our data. For researchers and interested parties, we'd like to note that the dataset used in this study is available upon request, ensuring transparency and fostering collaborative academic endeavors.

Results

Table 2 presents the descriptive statistics and the correlations between the variables. The correlations are not as high as to raise multicollinearity concerns and the Variance Inflation Factor (VIF) scores are between 1.18 and 2.79, well below the thresholds established for multicollinearity hazards.

Table 2. Descriptive statistics and correlations matrix

Variables	Mean	Std. Dev.	Median	Freq.	1	2	3	4	5	6	7	8	9	10
1. Impact on client			4.2	3.5-4 (104)	1.000									
2. Impact on the team			3.7	3.5-4 (88)	0.511***	1.000								
3. Firm age	44.74	41.68			0.096	0.115	1.000							
4. Firm size: n. employees			4.0	3.5-4 (214)	-0.073	-0.064	0.306***	1.000						
5. Firm size: annual revenue			4.0	4.5-5 (123)	-0.051	-0.046	0.397***	0.628***	1.000					
6. PMg professional certification			1.0	1 (194)	-0.040	0.094	-0.067	0.053	0.006	1.000				
7. PMg schooling			3.0	2.5-3 (194)	-0.034	0.059	0.052	0.052	-0.043	-0.164**	1.000			
8. PMg specific professional experience	11.67	5.91			-0.004	0.066	0.115	0.081	-0.044	-0.032	0.151	1.000		
9. PMg expertise			4.0	4.5-5 (88)	0.035	0.005	0.085	0.048	0.032	-0.229***	0.216***	0.186**	1.000	
10. PMg emotional intelligence			4.0	3.5-4 (129)	0.363***	0.345***	0.071	-0.001	-0.017	0.043	0.013	0.061	0.145	1.000

Note: * p<0.1, ** p<0.05, *** p<0.01. Continuous variables: mean and standard deviation. Ordinal and dichotomous variables: median and frequency.
We reported the mean and standard deviation for the continuous variables, and the median and frequency for the categorical variables.

Table 3 presents the results of the tests of the hypotheses. Models 1 to 5 test the effect on the project success - project team. Models 6 to 10 test the effects for impact on the project success - client. Models 1 and 6 include only the control variables. Models 5 and 10 are the full models.

Model 3 tested the moderation proposed in Hypothesis 1a that emotional intelligence strengthens a positive relationship between the PMgs expertise and the project performance - impact on the project team. The results were not significant (β=0.481, p=0.356), failing to confirm H1a. We also tested the moderating effect of EI applying the JN technique proposed by Hayes et al. (2017), but the test of the moderation between the PMgs expertise and the impact on the project team again failed to confirm the hypothesis. Hence, we fail to confirm the moderating effect for any range of values of EI.

Model 8 tested Hypothesis 1b, proposing that EI would positively moderate the relationship between the PMgs' expertise and the impact on the client. The results supported the hypothesis with a statistically significant and positive coefficient (β=1.621, p=0.002). We thus conclude that EI plays an important role in mitigating the impact that expertise may have in terms of impact on the clients. Stated differently, PMgs who possess emotional intelligence are better equipped to use their specific training in a way that positively impacts client outcomes.

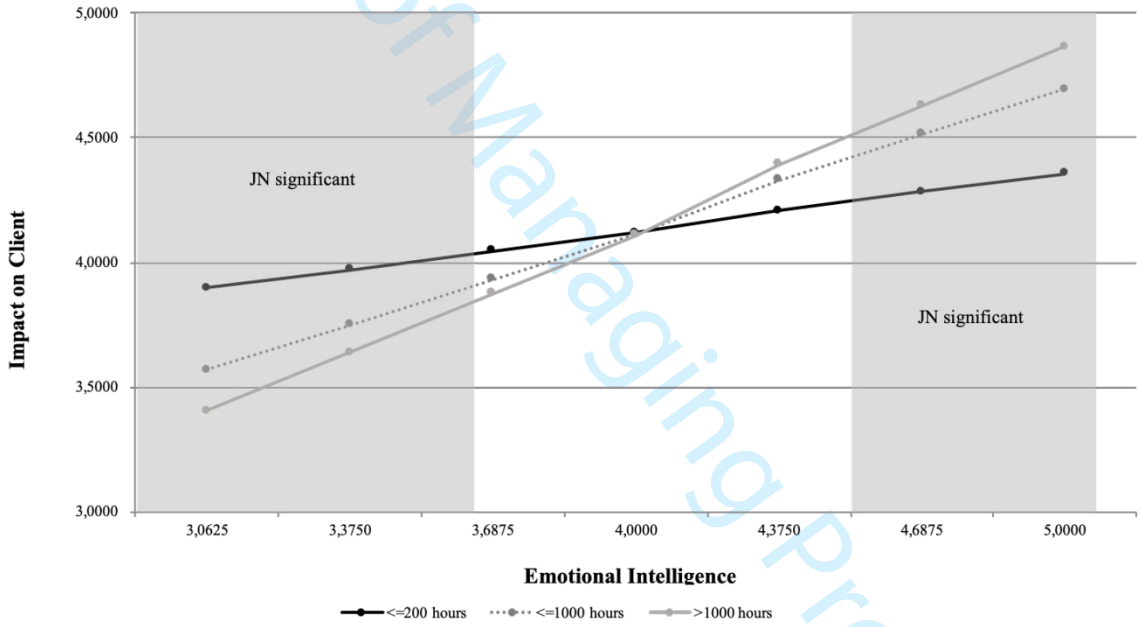
Table 3. Regression results

	Impact on the team										Impact on client									
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**		**Model 7**		**Model 8**		**Model 9**		**Model 10**	
	ß	p	ß	p	ß	p	ß	p	ß	p	ß	p	ß	p	ß	p	ß	p	ß	p
Intercept	-	0.000	-	0.000	-	0.035	-	0.000	-	0.008	-	0.000	-	0.000	-	0.000	-	0.000	-	0.000
Firm age	0.163	0.01	0.162	0.013	0.135	0.028	0.153	0.013	0.152	0.014	0.136	0.036	0.140	0.032	0.110	0.069	0.133	0.030	0.123	0.043
Firm size: employees	-0.097	0.203	-0.099	0.194	-0.010	0.168	-0.094	0.188	-0.095	0.186	-0.078	0.306	-0.070	0.365	-0.075	0.290	-0.064	0.370	-0.071	0.313
Firm size: annual revenue	-0.048	0.545	-0.044	0.575	-0.025	0.734	-0.039	0.598	-0.039	0.608	-0.058	0.468	-0.070	0.381	-0.046	0.529	-0.066	0.373	-0.057	0.443
PMg certification	0.121	0.042	0.123	0.044	0.094	0.105	0.093	0.103	0.093	0.106	-0.035	0.560	-0.027	0.652	-0.063	0.262	-0.059	0.298	-0.064	0.257
PMg schooling	0.069	0.244	0.066	0.278	0.071	0.218	0.063	0.272	0.063	0.272	-0.050	0.408	-0.050	0.415	-0.047	0.406	-0.054	0.340	-0.053	0.347
PMg expertise			0.005	0.930	-0.488	0.306	-0.051	0.387	-0.164	0.745			0.051	0.415	-1.480	0.002	-0.009	0.880	-1.226	0.014
PMg specific experience			0.026	0.742	0.040	0.601	-0.940	0.053	-0.901	0.081			0.107	0.187	-0.105	0.161	-1.262	0.009	-0.845	0.096
Emotional intelligence					0.195	0.231	0.105	0.403	0.078	0.655					-0.119	0.454	0.080	0.523	-0.212	0.217
EI x PMg expertise					0.481	0.356			0.124	0.822					1.621	0.002			1.341	0.014
EI x PMg specific experience							1.026	0.040	0.984	0.065							1.224	0.014	0.774	0.140
N	288		288		288		288		288		288		288		288		288		288	
F	2.261		1.702		5.182		5.583		5.063		1.433		1.333		6.404		5.935		6.046	
R2 (%)	4.58		4.62		15.66		16.67		16.69		2.94		3.66		18.67		17.54		19.30	
R2adj.(%)	2.55		1.91		12.64		13.69		13.39		0.89		0.91		15.75		14.59		16.11	

Note: β: Represents the slope of the regression line, indicating the change in the dependent variable per one-unit change in the independent variable; p: P-value measures the significance of an effect ($p<0.05$ was considered); N: Sample size or number of observations/data points in the study. F: Tests the overall significance of the model, determining if any predictor has a relationship with the dependent variable; R2 (%): Proportion of variance in the dependent variable explained by the independent variable(s). R2adj.(%)**:** Adjusted R2 accounts for the number of predictors.

We tested the moderating effect of EI proposed in Hypothesis 1b applying the JN techniques proposed by Hayes et al. (2017), and the result is shown in Figure 2. As shown by the grey area in the figure, the results of the JN test indicate that EI is significant for values below 3.635. The results also reveal that EI is significant for values above 4.48. That is, PMgs-specific training is relevant if associated with the increase of EI. In their relationships with the clients, the higher the level of EI can mean that PMgs will be able to show the client the knowledge of techniques and tools, but also the ability to influence, communicate and manage the personal relationship and intermediation with the team, enhancing the positive perception of the client about project management and impact on the client.

Figure 2. Moderation effect of EI on expertise and impact on client

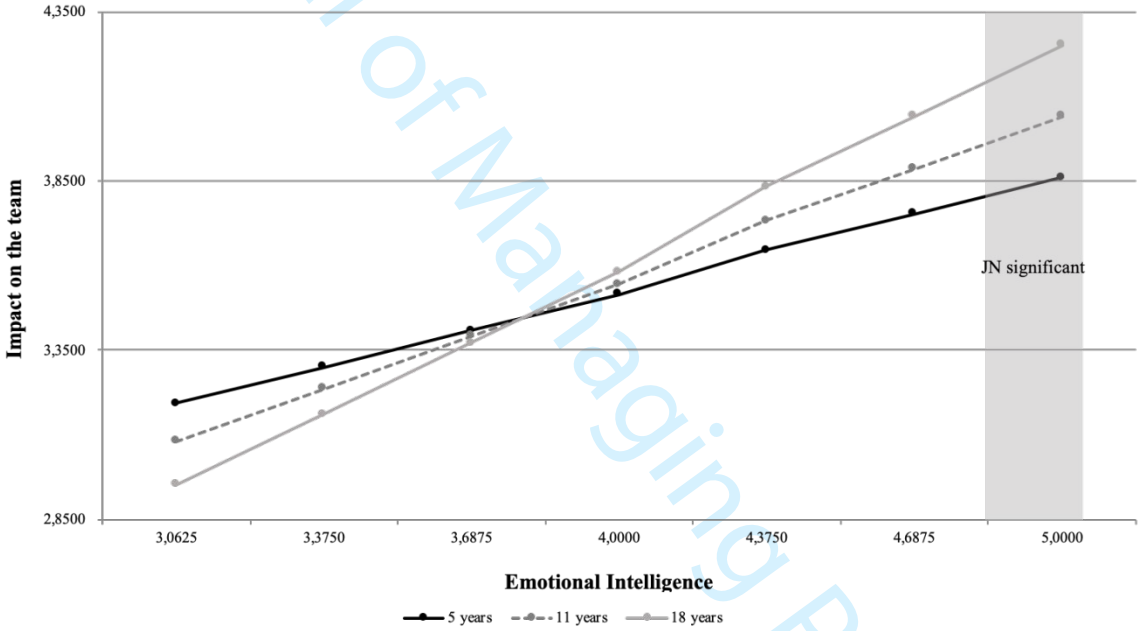


Model 4 tests the moderation proposed in Hypothesis 2a, that the PMgs' EI strengthens the effect between PMgs specific experience and the impact on the project team. The results indicate a positive and significant coefficient (β=1.026; p=0.040), thus confirming H2a.

However, greater detail is provided by the JN tests that suggest that the moderation only occurs at very high levels of EI (above 4.717). This indicates that although EI increases

with PMgs' specific experience, it will only have an impact on the team if the PMgs have a very high level of EI, thus confirming the effect proposed in the hypothesis 2a. Experienced project managers often face complex project requirements, tight timelines, and a diverse range of team members with varying personalities, backgrounds, and communication styles. To navigate these challenges effectively, experienced project managers need to possess a high level of EI, including self-awareness, social awareness, empathy, and relationship management.

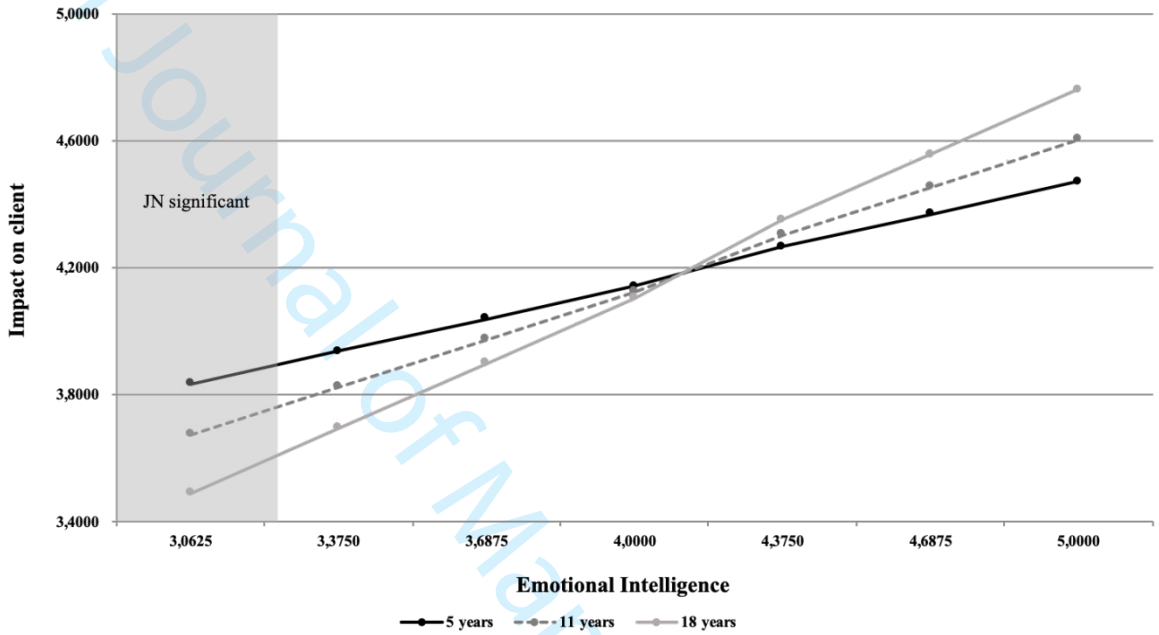
Figure 3. Moderation effect of EI on PMgs specific experience and impact on the project team



Hypothesis 2b was tested in Model 9, proposing that EI strengthens the relationship between PMgs experience and its impact on the client. The results confirm a positive moderating effect, with a positive and significant coefficient (β=1.224; p=0.014). We also tested the JN and found that the EI has an influence at intermediate values (as shown at the grey area in Figure 3). Although emotional intelligence (EI) grows with project managers' specific experience, moderate values of EI up to 3.288 will already have a positive impact. That is, experienced PMgs with a moderate level of EI would be able to positively impact the

project client. That is because experienced PMgs are better able to manage their emotions and to perceive the team emotions avoiding problems and conflicts, leading to a better team performance.

Figure 4. Moderation effect of EI on specific professional experience and impact on client



Discussion

In our study, we delved into the relationship between project managers' emotional intelligence and the success of their projects, particularly in the context of their technical skills such as expertise and experience. Previous research has hinted at the significance of soft skills, like emotional intelligence, in amplifying the impact of technical skills on project outcomes (Clarke, 2010; Iliescu et al., 2012; Rezvani et al., 2016; Stephens & Carmeli, 2016; Khosravi et al., 2020; Zhu et al., 2021; Aguilar Velasco, & Wald, 2022; Sampaio, Wu, Cormican, & Varajão, 2022; Rode et al., 2007; Lin et al., 2018). However, the comprehensive understanding of how these soft skills leverage technical expertise remains an area not fully explored (Meredith & Zwikael, 2020; Shenhar & Dvir, 2007; Millhollan & Kaarst-Brown, 2016). Unraveling this association can pave the way for more effective training programs, ensuring project managers are equipped with the right blend of skills for success.

Our study focused on project success and its relation to two core stakeholders: the team and the clients. We chose to focus on these two agents because they are the ones that project managers interact with the most (Shenhar & Dvir, 2007; Meredith & Zwikael, 2020; Afzal et al., 2018; Blixt and Kirytopoulos, 2017). While PMs are valued for their technical skills, including expertise in PM techniques and tools, as well as their experience in project management (Ahsan et al., 2013; Zhang et al., 2013), it is important to understand how they can improve project performance. The inconclusive findings of the direct impact of PMs' technical skills on project success (Millhollan & Kaarst-Brown, 2016; Shenhar & Dvir, 2007) suggest that project managers need other soft skills, such as emotional intelligence (EI), to maximize their performance (Clarke, 2010; Rezvani et al., 2016; Stephens & Carmeli, 2016; Khosravi et al., 2020; Zhu et al., 2021; Aguilar Velasco, & Wald, 2022; Sampaio, Wu, Cormican, & Varajão, 2022).

Our argument is that PMs with higher levels of EI are more likely to leverage their technical competencies to positively impact both the team and the client, ultimately leading to better project performance. While technical skills have often been regarded as the best predictors of task performance (Jugdev & Müller, 2005; Pinto & Slevin, 1989), we propose a more nuanced view of how these skills can be leveraged for better performance, especially in the context of interactions with stakeholders like the team and clients (Shenhar & Dvir, 2007; Millhollan & Kaarst-Brown, 2016). The increasing intensity of these interactions demands a higher level of emotional intelligence (EI) from PMs. EI equips PMs with the ability to recognize and regulate both their own and others' emotions, leading to improved social interactions (O'Boyle et al., 2011). This, in turn, enhances communication skills, allowing PMs to better understand the needs and concerns of others, respond appropriately, and foster better collaboration and project outcomes (Henderson, 2008; Afzal et al., 2018).

Our study found that EI positively influences the relationship between PMs' technical skills and project success, both relating to the team and the client. This aligns with extant research suggesting that on-the-job experience is crucial for PMgs to achieve successful project outcomes (Ramazani & Jergeas, 2015; Ika, 2015). However, our findings add nuance by suggesting that while moderate levels of EI can improve the impact of PMs' specific experience on the project client, higher levels of EI are necessary to positively impact the team. This is consistent with the notion that technical skills alone may not guarantee project success, especially given the increasing complexity of projects (Strohmeier, 1992; Carvalho, 2014). SST proposes that as professionals mature, they tend to develop emotions, motivations, and attitudes (Hur, Moon & Han, 2015). Our study further suggests that increasing EI positively influences the relationship between PMs' expertise and the impact on the project team, echoing Vandewalle et al.'s (2019) assertion that professional experience may link to the level of EI.

The daily tasks of PMgs involve extensive interactions with various stakeholders, and increasingly, clients are participating in projects from the onset (Sońta-Drączkowska & Mrożewski, 2020; Tam et al., 2020). While experienced project managers possess a deep understanding of project management processes, techniques, and best practices, our findings indicate that the impact of project manager experience on client satisfaction could be limited if the project manager lacks emotional intelligence. This resonates with the idea that a project manager with high emotional intelligence would be better equipped to understand and manage the client's emotions, building rapport and trust, and ensuring that the project aligns with the client’s expectations. To maximize their specific experience, PMgs need to learn from projects and interactions with clients, focusing on their needs and managing both expectations and the emotional aspects of the relationship. Our study supports the idea that PMgs with higher levels of EI should be better equipped to regulate their emotions and anticipate situations that could

lead to conflict, thereby enhancing the effective use of their specific project management experience (Akkermans et al., 2020; Li et al., 2020).

Our results suggest that EI can amplify the effect of PMs' technical skills in their interactions with both the project team and the client. Drawing from prior research, the influence of PMs' specific training and experience increases and positively impacts clients through the moderation of PMs with a very high level of EI (Hyväri, 2006; Rode et al., 2007; Lin et al., 2018; Song et al., 2018). This aligns with the broader understanding that while experience is invaluable, the combination of experience with high EI can lead to more effective project outcomes.

In conclusion, our findings show that PMs can benefit from their experience, particularly if they possess a higher level of EI. Experienced PMs are often chosen to oversee complex projects (Shenhar & Dvir, 2007; Meredith & Zwikael, 2020). However, our study emphasizes that the benefits of such experience are amplified when combined with a higher level of EI. Additionally, our results indicate that moderate levels of EI can potentialize PMs' expertise impact on the project team, increasing their effectiveness in interactions with clients and other stakeholders who are becoming more closely involved in projects.

Building upon the foundational work of Pinto et al. (2022), our study delves deeper into the relationship between project manager behavior and project success by examining the impact of emotional intelligence (EI) on project performance. Specifically, we explore how the level of EI of project managers affects the connection between technical skills and project success, drawing upon cognitive and socioemotional selective theory. While prior research has acknowledged the significance of EI on project management (Rezvani et al., 2018; Khosravi et al., 2020; Zhu et al., 2021), our study offers a more nuanced understanding of the types of human interactions between project managers and key stakeholders.

5.1. Contributions for practice

Considering our research findings, it becomes clear that the combination of a project manager's emotional intelligence (EI) and technical expertise is essential in the field of project management. The synergy of these competencies not only augments the efficiency of project execution but also strengthens team cohesion and stakeholder rapport.

When recruiting or promoting project managers, organizations should adopt a comprehensive evaluation approach. Beyond the traditional assessment of technical skills, it's important to measure a candidate's emotional intelligence proficiency. This perspective arises from the recognition that a project manager's role goes beyond technical oversight. It includes managing interpersonal dynamics, alleviating stress, resolving conflicts, and adapting swiftly to changing project scenarios.

To address this, we advocate for structured training programs that emphasize various facets of Emotional Intelligence (EI). These should include modules on self-awareness, self-regulation, motivation, empathy, and social skills, as these are the core components of EI as identified by Goleman (1995). Workshops that employ experiential learning, role-playing, and real-time feedback can be particularly effective, as they allow participants to practice and refine their EI skills in a controlled environment. Additionally, mindfulness and meditation sessions can be integrated, given their proven efficacy in enhancing emotional self-awareness and regulation (Davidson & Begley, 2012). Such training programs aren't mere supplements; they are pivotal in cultivating a holistic skill set for project managers. The tangible benefits of EI training are well-documented, with studies like Khosravi et al., 2020 and Zhu et al., 2021 underscoring its profound impact on project success.

In summary, a project manager with advanced EI can proactively spot potential team conflicts or issues with stakeholders. Their timely actions, driven by their emotional

intelligence, ensure smooth project operations, creating a workspace that promotes teamwork and achieves the best results.

5.2. Limitations and future research

Our study has some limitations that also offer opportunities for additional research. Our study sample comprises IT project managers, who primarily focus on technical requirements and techniques, limiting the generalization of our findings. This may affect the understanding of the impact of emotional intelligence in projects that involve less technical and more diverse teams and stakeholders. Therefore, future studies could explore different contexts and include project professionals who interact with a more diverse range of stakeholders to validate and expand our findings (Zhu et al., 2021).

In this study, we did not control for different types of project management methodologies. However, it is likely that the requirements, including those related to the extent of social interactions that are needed vary considerably (see, for instance, Tam et al., 2020; Sithambaram et al., 2021), as may occur in managing agile projects, for instance. Future studies could complement our study by evaluating the differences between the types of projects, including the psychological empowerment aspects of agile projects (Malik et al., 2021).

We assessed PMgs' self-perceptions in the survey but hazards relating to common method bias may emerge. To minimize this issue, we followed the recommendations of Podsakoff et al. (2003) by checking all assertions to prevent misinterpretation, randomizing the assertions (Fuller et al., 2016), and using the Harmman (1960) single-factor test. The results of the test were satisfactory, indicating that no single factor accounted for most of the covariance of the measurements. However, despite our precautions, measuring project success and the success of project managers remains a challenge, especially regarding obtaining

objective measures (Millhollan & Kaarst-Brown, 2016). This area warrants further research to develop better methods of measuring project success and PMgs' success.

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