ARTICLES

STAKEHOLDER MANAGEMENT AND PROJECT MANAGEMENT OFFICE: EFFECT ON PROJECT RESULTS

Gerenciamento de stakeholders e escritório de gerenciamento de projetos: efeito nos resultados

Gestión de stakeholders y oficina de gestión de proyectos: Efecto en los resultados

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ABSTRACT

Managing stakeholders is relevant for project management, as they affect project results. Likewise, the support of a Project Management Office (PMO) improves these results. This study analyzes the positive influence of stakeholder management on project results, specifically on the likelihood of concluding projects within the predicted time and cost, together with the moderating effect of PMOs. A conceptual model was validated through logistic regression, with data collected through a survey responded by 216 experienced professionals studying in graduate programs on project management. Findings indicate that stakeholder management improves project results in terms of time and cost and confirm that PMO enhances the influence of stakeholder management on these results. As its contribution, the study reinforces stakeholder management and PMO as key elements for successful project management. Sampling was sufficient for research replicability but restricted to professionals of project management living in Peru. Thus, future studies could target a broader population.

Keywords: *prescriptive stakeholder management, relational stakeholder management, project management office, project results.*

RESUMO

Uma vez que stakeholders de projetos afetam seus resultados, o gerenciamento desses atores deve ser considerado uma atividade relevante no gerenciamento de projetos. Somado a essa evidência, o presente estudo reconhece que os resultados de projetos podem ser incrementados quando há o apoio de um Escritório de Gerenciamento de Projetos (EGP). Assim, busca-se analisar a influência positiva do gerenciamento de stakeholders nos resultados dos projetos, especificamente na probabilidade de sua conclusão dentro de prazos e custos previstos, considerando o efeito moderador do apoio de EGPs. Para isso, o estudo apresenta um modelo conceitual validado por regressão logarítmica, usando dados coletados em pesquisa do tipo survey respondida por 216 profissionais experientes da área de gerenciamento de projetos e que estudam o tema em cursos de pós-graduação. Os resultados indicam que o gerenciamento de stakeholders melhora os resultados de projetos e confirmam que o EGP aprimora a influência desse tipo de gerenciamento nos resultados. Como contribuição, a pesquisa reforça o gerenciamento de stakeholders e o apoio de EGPs como elementos-chave para o sucesso no gerenciamento de projetos. A amostragem foi suficiente para a replicabilidade da pesquisa, contudo restringiu-se a profissionais que vivem no Peru. Portanto, estudos futuros podem buscar alcançar uma população mais ampla.

Palavras-chave: *gerenciamento prescritivo de stakeholders, gerenciamento relacional de stakeholders, escritório de gerenciamento de projetos, resultados de projetos.*

RESUMEN

La gestión de stakeholders es relevante para la gestión de proyectos, ya que afectan los resultados del proyecto. Asimismo, el apoyo de una Oficina de Gestión de Proyectos (PMO) también mejora estos resultados. Este estudio tiene como objetivo analizar la influencia positiva de la gestión de stakeholders en los resultados del proyecto, específicamente en la probabilidad de concluir los proyectos en tiempo y costo, junto con el efecto moderador de la PMO. Se validó un modelo conceptual mediante regresión logística, con 216 encuestados. Los hallazgos indican que la gestión de stakeholders mejora los resultados del proyecto, en términos de tiempo y costo, y confirman que la PMO mejora la influencia de la gestión de stakeholders en estos resultados. Como contribución, el estudio refuerza la gestión de stakeholders y PMO como elementos clave para una exitosa gestión de proyectos. Asimismo, el muestreo fue suficiente para la replicabilidad de la investigación, restringida a los profesionales del proyecto que viven en Perú. Por lo tanto, los estudios futuros podrían apuntar a una población más amplia.

Palabras clave: *gestión prescriptiva de stakeholders, gestión relacional de stakeholders, oficinas de gestión de proyectos, resultados del proyecto.*

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ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

INTRODUCTION

Practitioners and academics have given increased attention to project stakeholder management after its inclusion as an area of knowledge in the Project Management Book of Knowledge (PMBoK) in 2013 (Project Management Institute [PMI], 2017). Authors argue that stakeholder management contributes to project results (Littau, Jujagiri, & Adlbrecht, 2010; Maddaloni & Davis, 2017; Rose & Schlichter, 2013; Saad, Zahid, & Muhammad, 2020). Nevertheless, engaging stakeholders is not an easy task. Other factors contribute to project results, among them the support of Project Management Offices (PMOs), boosting project and business results (Aubry, 2015).

Stakeholders are individuals or organizations that affect or are affected by project outcomes (Aaltonen & Kujala, 2016; Freeman, 1984; Mitchell, Agle, & Wood, 1997). Some studies focused on who the stakeholders are and techniques to determine how to distribute project attention among them (Aaltonen & Kujala, 2016; Mitchell et al., 1997; Olander & Landin, 2005), whereas others investigated how understanding stakeholders' expectations facilitate their engagement (Chow & Leiringer, 2020; Maddaloni & Davis, 2018; Oliveira & Rabechini, 2019).

The prescriptive approach to stakeholder management identifies project stakeholders and assesses various attributes to gauge these actors' interests (Aladpoosh, Shaharoun, & Saman, 2012; Oliveira & Rabechini, 2019). Stakeholders are assessed to define engagement strategies (Yang & Shen, 2015). Classically, the salience model characterizes the relationship between stakeholder and organization in terms of their power to influence, the legitimacy of their relationship, and the urgency of their claims (Mitchell et al., 1997). A different perspective assesses stakeholders' influence based on their knowledge, social skills, financial resources, and external power (Aragonés-Beltrán, García-Melón, & Montesinos-Valera, 2017).

Complementary, the relational approach to stakeholder management debates how communication and relationships facilitate the alignment of goals (Aladpoosh et al., 2012; Oliveira & Rabechini, 2019). Authors argue that effective communication favors trust relationships (Chow & Leiringer, 2020; Ika & Donnelly, 2017). Besides, stakeholders' opinions on project objectives and decisions should be considered from the early stages (Brunet & Forgues, 2019; Maddaloni & Davis, 2017). Both approaches are relevant to successful stakeholder management, to understand and satisfy stakeholders' needs (Yang & Shen, 2015), and to improve project results (Bourne, 2015; Maddaloni & Davis, 2018), which could be measured in terms of project time and cost.

PMO research also discusses stakeholders. These offices facilitate stakeholders' interactions and relationships (Pemsel & Wiewiora, 2013; Sergeeva & Ali, 2020), influencing the results of projects (Müller et al., 2013) in terms of time and cost. Among the PMO's many activities (Dai & Wells, 2004; Müller, Glückler, & Aubry, 2013) are those related to stakeholder management – for example, assisting single projects with specialized activities (Müller et al., 2013) and knowledge transference management (Sergeeva & Ali, 2020).

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Despite the literature on stakeholder management establishing that it improves project results (Bourne, 2015; Davis, 2016; Eskerod & Vaagaasar, 2014; Karlsen, Græe, & Massaoud, 2008; Maddaloni & Davis, 2018), no studies have measured such influence (in terms of project time and cost, for example). Likewise, authors such as Pemsel and Wiewiora (2013) and Sergeeva and Ali (2020) argue that PMO supports stakeholder management, although no studies have measured the influence of PMO on the relationship between stakeholder management and project results. Hence, two research questions are formulated to address these research gaps.

RQ1: What is the influence of stakeholder management on the likelihood of concluding projects within the predicted time and cost?

RQ2: What is the PMO influence on the relationship between stakeholder management and the likelihood of concluding projects within the predicted time and cost?

This study used a quantitative approach to analyze the positive influence of stakeholder management on project results, specifically on the likelihood of concluding projects within the predicted time and cost, together with the moderating effect of PMO. As social science studies testing binary data gained relevance recently (Agresti, 2019), this research was based on a survey that asked experienced professionals studying in graduate programs on project management whether the projects they were last involved in were concluded on schedule and within the predicted cost in order to evaluate the project results.

Stakeholder management is known to influence more than project time and cost. For example, Vuorinen and Martinsuo (2019) understand that stakeholders influence four project dimensions: communication, complaints, decision-making authority, and supervision. This study focuses on the influence of stakeholder management on project results to verify the likelihood of concluding them on schedule and within the predicted cost.

This article presents a theoretical background connecting stakeholder management to project results, as well as PMO to stakeholder management. A conceptual model was built and further validated by logistic regression. The findings demonstrated that stakeholder management enhances project results, increasing the likelihood of concluding projects within the predicted time and cost. Besides, the study confirmed that PMO enhances the likelihood of concluding projects within the predicted time and cost.

This article is structured in five sections, including this introduction. The next section presents the theoretical background, which connects stakeholder management and the project results, and shows studies suggesting that PMO supports stakeholder management. The third section presents the methodology and describes data collection and analysis, followed by the fourth section with the research findings. The fifth and final section presents the discussion and conclusions, with suggestions for future studies, and implications for academics and practitioners.

THEORETICAL BACKGROUND

Stakeholder management and project results

The concept of "stakeholders" was coined by Freeman (1984), who proposed a strategic management framework considering "all of those groups and individuals that can affect, or are affected by, the accomplishment of organizational purpose" (Freeman, 1984, p. 25). He explained that these groups "have a stake" in the organization, hence "stakeholder."

Borrowing the concept from the organizational setting, Cleland (1985) established stakeholder management as a project management process. Since then, stakeholder management has been seen to influence projects and business results (Maddaloni & Davis, 2018; Saad et al., 2020; Sperry & Jetter, 2019). Stakeholders are identified and their attributes assessed - power, proximity, urgency, coalitions, influence, level of support - aiming to draw engagement strategies and continuously evaluate their satisfaction with project results (PMI, 2017; Yang & Shen, 2015).

The need to assess stakeholders and draw engagement strategies is consolidated in the project management literature (Aaltonen & Kujala, 2016; Mitchell et al., 1997; Olander & Landin, 2005; Saad et al., 2020). Besides, engagement strategies are revisited throughout the project lifecycle because stakeholder attributes and, consequently, their influence may change over time (Eskerod & Vaagaasar, 2014; Olander & Landin, 2005). Nevertheless, researchers still dwell on the best way to categorize stakeholders.

Mitchell et al. (1997) introduced the classic salience model for assessing stakeholders in terms of the urgency of their claims, power, and legitimacy, which was then simplified by the power and interest matrix (Olander & Landin, 2005). Another perspective applies the multicriteria decision to summarize in an index some parameters like stakeholder knowledge, social skills, financial resources, and external power (Aragonés-Beltrán et al., 2017). And another classifies stakeholders according to their potential to harm or help project goals (Eskerod & Vaagaasar, 2014). Despite assessing different attributes, these perspectives gauge the connection between stakeholders and the project.

Other studies adopt a perspective that explores the interactions among stakeholders constituting dynamic landscapes (Aaltonen & Kujala, 2016) or social networks (Mok, Shen, & Yang, 2015; Xue, Zhang, Su, Wu, & Yang, 2018). For example, Aaltonen and Kujala (2016) characterize stakeholder landscapes with four dimensions: complexity, uncertainty, dynamism, and institutional context. They claim the assessment of the stakeholder environment allows customization of engagement strategies.

These studies present techniques for prescriptive stakeholder management aimed at minimizing stakeholders' negative influence on projects (Aaltonen & Kujala, 2016; Aladpoosh et al., 2012; Aragonés-Beltrán et al., 2017; Mitchell et al., 1997; Mok et al., 2015; Oliveira & Rabechini, 2019). Hence, considering stakeholder management improves project results (Aladpoosh et al., 2012; Maddaloni & Davis, 2018; Saad et al., 2020; Xue et al., 2018), this study hypothesizes that prescriptive stakeholder management positively affects project results, increasing the likelihood of concluding projects within the predicted time and cost.

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

H1a: Prescriptive stakeholder management increases the likelihood of concluding projects on schedule.

H2a: Prescriptive stakeholder management increases the likelihood of concluding projects within the predicted cost.

Additionally, stakeholder management involves strengthening relationships with key actors, understanding their expectations to promote engagement and alignment with project goals (Basten, Stavrou, & Pankratz, 2016; Chow & Leiringer, 2020; Maddaloni & Davis, 2018; Oliveira & Rabechini, 2019). In this context, early, frequent, and effective communication is crucial to build strong relationships (Chow & Leiringer, 2020; Yang & Shen, 2015). Maddaloni and Davis (2017) corroborate this argument highlighting that good and bad aspects of the project must be communicated to stakeholders.

When stakeholders are involved in project decisions, specific concerns and different interpretations are voiced to be considered in collaborative solutions (Chow & Leiringer, 2020; Heravi, Coffey, & Trigunarsyah, 2015; Ika & Donnelly, 2017; McGibbon, Abdel-Wahab, & Sun, 2018; Xue et al., 2018). Thus, stakeholders are more likely to commit to project objectives, even if their individual interests are not fully attended (Ika & Donnelly, 2017; Lehtinen & Aaltonen, 2020; Walker & Rowlinson, 2019).

Information exchange and dialogue opportunities facilitate collaboration among stakeholders, improving the sense of community and trust (Lehtinen & Aaltonen, 2020). Trust is also cultivated when project management professionals care for stakeholders' needs, delivering what was promised and allowing empathy to emerge (Hartman, 2000; Oliveira & Rabechini, 2019; Pinto, Slevin, & English, 2009). Project management gears are greased in a trustful environment, improving tolerance towards difficulties (Eskerod & Vaagaasar, 2014; Hartman, 2000; Oliveira & Rabechini, 2019).

These studies discuss relational stakeholder management, which relies on communication and strong relationships to engage project stakeholders (Aladpoosh et al., 2012; Chow & Leiringer, 2020; Lehtinen & Aaltonen, 2020; Oliveira & Rabechini, 2019). Hence, considering stakeholder management improves project results (Aladpoosh et al., 2012; Maddaloni & Davis, 2018; Saad et al., 2020; Xue et al., 2018), this study hypothesizes that relational stakeholder management positively affects project results, increasing the likelihood of concluding projects on schedule and within the predicted cost.

H3a: Relational stakeholder management increases the likelihood of concluding projects on schedule.

H4a: Relational stakeholder management increases the likelihood of concluding projects within the predicted cost.

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

Prescriptive and relational stakeholder management are closely related and affect project results (Pinto et al., 2009; Saad et al., 2020). Thus, stakeholder identification and assessment are as important as strengthening relationships with them (Mok et al., 2015; Yang & Shen, 2015). As PMO might influence the relationship between stakeholder management and project results, literature supporting this claim is reviewed.

Project Management Office (PMO) and stakeholder management

PMOs are entities managing complementary and concurrent projects toward organizational goals (Dinsmore, 1999; Müller, Drouin, & Sankaran, 2019). They apply specialized methodologies and techniques to support project managers, teams, and executives on strategy implementation (Bredillet, Tywoniak, & Tootoonchy, 2018; Dinsmore, 1999). PMOs bridge temporary and permanent organizations (Pemsel & Wiewiora, 2013), facilitating interactions with project stakeholders (Pemsel & Wiewiora, 2013; Sergeeva & Ali, 2020). However, limited researches discuss PMO results (Dai & Wells, 2004).

There is consensus that PMOs are dynamic units, bearing various functions to realize organizations' needs (Bredillet et al., 2018; Müller et al., 2013; Pemsel & Wiewiora, 2013; PMI, 2017). According to The Project Management Institute (2017), the degree of influence and control PMOs exert on projects may classify them in three different roles: directive, controlling, and consultative.

When PMOs are responsible for project deliveries, having project managers reporting to them, they assume directive roles (PMI, 2017). Controlling PMOs have a more moderate commanding role, monitoring compliance to frameworks and project governance (PMI, 2017). Finally, consultative PMOs provide access to best practices and templates, with low control over project deliveries (PMI, 2017).

Specifically, studying the relationship between PMOs and project stakeholders, Müller et al. (2013) classify PMOs in three different roles related to project stakeholders: superordinate, subordinate, or coequal. Superordinate PMOs are similar to the directive PMOs (PMI, 2017), accountable for project results in terms of time, scope, and cost (Müller et al., 2013; PMI, 2017).

Subordinate PMOs extend the administrative capability of single projects in a servicing role (Müller et al., 2013). Finally, Coequal PMOs develop partnerships with stakeholders through exchanging expertise and collaboration with project management professionals (Müller et al., 2013). Comparison between these last two roles described by Müller et al. (2013) with the roles described by the PMI (2017) is not easy since PMI (2017) does not distinguish partnering and servicing roles from controlling and consultative PMOs.

Superordinate and subordinate PMOs focus on knowledge exploitation and organization effectiveness (Müller et al., 2013). They reinforce and develop project management methods supporting professionals with training and administrative support (Dai & Wells, 2004; Müller et al., 2013; PMI, 2017) and controlling project results (Müller et al., 2013; PMI, 2017). In analogy,

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

PMOs support and oversee the assessment of stakeholders as part of prescriptive stakeholder management.

Considering project management methods and project results are correlated (Dai & Wells, 2004), and PMOs' relationships with stakeholders affect project performance (Müller et al., 2013), this study hypothesizes that PMOs exert a moderating influence on the relationship between prescriptive stakeholder management and project results, in terms of concluding projects on schedule and within the predicted cost.

H1b: PMOs positively affect the relationship between prescriptive stakeholder management and the conclusion of projects on schedule.

H2b: PMOs positively affect the relationship between prescriptive stakeholder management and the conclusion of projects within the predicted cost.

On the other hand, coequal PMOs exchange good practices and explore new knowledge among partners (Müller et al., 2013). When acting as a partner, PMOs support soft skills development, promote knowledge transference, and strengthen relationships (Pemsel & Wiewiora, 2013). PMOs facilitate effective communication and build relationships as part of relational stakeholder management.

Considering PMOs strengthen relationships between the project and its stakeholders and the relationship between PMOs and stakeholders affects project performance (Müller et al., 2013), this study hypothesizes that PMOs exert influence on the relationship between relational stakeholder management and project results in terms of concluding projects on schedule and within the predicted cost.

H3b: PMOs positively affect the relationship between relational stakeholder management and the conclusion of projects on schedule.

H4b: PMOs positively affect the relationship between relational stakeholder management and the conclusion of projects within the predicted cost.

Considering that prescriptive and relational stakeholder management are complementary to improve project results (Pinto et al., 2009; Saad et al., 2020) and that PMOs support the achievement of organization goals (Bredillet et al., 2018; Müller et al., 2013; Pemsel & Wiewiora, 2013; PMI, 2017), this study analyzes the positive influence of stakeholder management on project results. The research observes specifically the likelihood of concluding projects on schedule and within the predicted cost and the moderating effect of PMOs.

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva
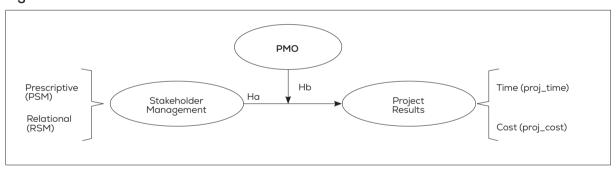
METHODOLOGY

Research design

A quantitative research approach was chosen (Creswell & Creswell, 2017) to analyze the positive influence of stakeholder management on project results, specifically on the likelihood of concluding projects within the predicted time and cost, together with the moderating effect of PMO. Supported by a theoretical background and an online survey, this research is non-experimental, cross-sectional, and causal.

It is non-experimental because it studies a sample to analyze trends in a population rather than measuring the impact of controlled interventions on a specific result (Creswell & Creswell, 2017). It is cross-sectional because it obtained the sample at a certain point in time (Creswell & Creswell, 2017). Finally, the research is causal since the logistic regression model confirms conducive effects between independent, moderating, and dichotomous dummy variables.

The theoretical background reviews key constructs and summarizes them in the proposed research model (Figure 1). Four main hypotheses (Ha) show the positive influence of prescriptive and relational stakeholder management on project results, assessed in terms of the project conclusion on schedule and within the predicted cost. Four complimentary hypotheses (Hb) establish the moderating effect of PMO, which influences each main relationship, correspondently.

Figure 1. Research Model

Data, instrument, and variables

Data was collected from project management professionals living in Peru and studying in graduate programs on project management. These professionals worked as project managers, project sponsors, or project team members. The online survey was sent to 500 professionals, and 223 responded (44.6%). The final sample comprised 216 professionals (43.2%) – seven participants (1.6%) did not complete the survey.

The study investigates stakeholder management as an independent variable, comprised of two dimensions, prescriptive stakeholder management (PSM) and relational stakeholder management (RSM) (Exhibit 1). A scale previously tested by Oliveira and Rabechini (2019) was adapted according to the research context. While PSM refers to identifying key stakeholders,

ARTICLES | Stakeholder management and project management office: Effect on project results

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

frequent communication, and assuring that project objectives satisfy their needs, RSM involves nurturing trust relationships with stakeholders and engaging them with project decisions (Oliveira & Rabechini, 2019).

Exhibit 1. Variable Definitions

Type/ Variable (Code)	Description	Measure
Independent		
Prescriptive stakeholder management (PSM)	Prescriptive stakeholder management with 6 items	Scale
	PSM1 – stakeholders were mapped by the level of urgency and legitimacy in the project.	
	PSM2 – stakeholders had their objectives translated into actions and activities.	
	PSM3 – during project execution, inclusions and/or changes in activities were planned to adapt to identified needs of stakeholders.	
	PSM4 – PMO established frequent communication with key project stakeholders.	
	PSM5 – there were actions to engage stakeholders throughout the project lifecycle.	
	PSM6- stakeholders have worked as a team, causing interaction with project members, which promoted project results.	
Relational stakeholder management (RSM)	Relational stakeholder management with 6 items	Scale
	RSM1 – project stakeholders, especially those with high power and influence, had their needs deployed unfolded in actions and activities throughout the project lifecycle.	
	RSM2 – the PMO was one of those responsible for the commitment of stakeholders to the project.	
	RSM3 – trust between team members favored project performance.	
	RSM4 – stakeholder engagement was relevant to project performance.	
	RSM5 – conflicts among stakeholders were resolved without external interference.	
	RSM6 – emotional intelligence improves decision-making and the development of effective relationships between stakeholders.	

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Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

Exhibit 1. Variable Definitions (Concludes)

Type/ Variable (Code)	Description	Measure
Moderating		
Project management office (PMO)	Project Management Office with 4 indicators	Scale
	PMO1 - the PMO, through its team, identifies the project stakeholders throughout the entire project lifecycle.	
	PMO2 - the PMO can distinguish the project's internal and external stakeholders.	
	PMO3 - stakeholders were ranked by their level of influence, power, and interest by PMO staff.	
	PMO4 - activities to strengthen relationships with stakeholders took place throughout the project lifecycle, with the PMO participation.	
Dependent		
Projects concluded on schedule (proj_time)	Project on schedule (0 = No = schedule overrun, 1 = Yes = on schedule)	Dummy
Projects concluded within predicted cost (proj_cost)	Project within predicted Cost (0 = No = cost overrun, 1 = Yes = within cost)	Dummy
Control		
Project budget (ln_budget)	Natural logarithm of project budget	Ratio
Firm size (ln_size)	Natural logarithm of the number of employees of the firms mentioned in the survey	Ratio
Age of professionals (ln_age)	Natural logarithm of the age of professionals/respondents	Ratio
Descriptive		
Proj_budget	Budget of the project mentioned in the survey	Ordinal
Firm employees	Number of employees of the firm mentioned in the survey	Ordinal
Age of professionals	Age of professionals/survey respondents	Ordinal

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

The positive influence of PMO on the relationship between stakeholder management and project results (projects concluded on schedule and within the predicted cost) was analyzed as a moderating variable, which is corroborated by authors such as Aubry (2015), Dai and Wells (2004), Müller et al. (2013), Pemsel and Wiewiora (2013) who understand that PMO supports project management. Hence, the scale for stakeholder management by Oliveira and Rabechini (2019) was adapted to consider PMO influence in four items (Exhibit 1).

Respondents answered each item of the survey based on a five-point Likert scale, ranging from totally disagree to totally agree. Project budget for the last project they completed, firm size, and age of professionals (respondents) were gathered as control variables. They were further converted to their natural logarithm to reduce the sensitivity of estimates to extreme or outlier observations and ensure normal distribution for the models.

For the dependent variables, project results were characterized by two dichotomous variables related to project constraints: project completed on schedule or not (proj_time) and project completed within the predicted cost or not (proj_cost). Respondents were asked whether the last project they worked on was completed on schedule and within the predicted cost.

Although recognizing the relevance of studies portraying project results in terms of multifactor constructs such as project success (Shenhar, Dvir, Levy, & Maltz, 2001; Wit, 1988), this study observes that social science research on binary outcomes has gained relevance in recent years (Agresti, 2019) and proposes to test a binary approach for project results. Thus, for statistical purposes, this approach considers project results in terms of project conclusion on schedule and within the predicted cost as two dependent dummy variables.

Analytical Procedure

Due to the adaptations made to the initial scale, exploratory factor analysis (EFA) was first performed to verify the validity of independent and moderating constructs (Hair Jr, Black, Babin, & Anderson, 2019). Adequate variances (PMO=0.769, PSM=0.659, RSM=0.673) were obtained by EFA (Table 1), which corroborated each stakeholder management dimension, prescriptive and relational, comprise six items, while PMO encompasses four items. In addition, EFA Cronbach's Alpha coefficient (α) confirmed high reliability for each construct (PMO=0.900, PSM=0.896, and RSM=0.902).

Table 1. Exploratory and Confirmatory Factor Analysis

Variable	EFA				CFA			
	F_1	F_2	F_3	Uniqueness	λ_1	λ_2	λ_3	$\delta = 1 - \lambda^2$
PMO_1	0.899			0.192	0.808			0.347
PMO_2	0.893			0.203	0.811			0.342

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ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

Table 1. Exploratory and Confirmatory Factor Analysis (Concludes)

Variable	EFA				CFA			
	F_1	F_2	F_3	Uniqueness	λ_1	λ_2	λ_3	$\delta = 1 - \lambda^2$
PMO_3	0.880			0.225	0.828			0.314
PMO_4	0.835			0.303	0.866			0.250
PSM_1		0.765		0.414		0.669		0.552
PSM_2		0.812		0.341		0.715		0.489
PSM_3		0.787		0.381		0.678		0.540
PSM_4		0.834		0.305		0.850		0.277
PSM_5		0.867		0.248		0.848		0.280
PSM_6		0.802		0.357		0.790		0.376
RSM_1			**0.784**	0.385			**0.746**	0.444
RSM_2			0.776	0.398			**0.817**	0.332
RSM_3			**0.889**	0.209			**0.842**	0.290
RSM_4			**0.866**	0.250			**0.808**	0.347
RSM_5			**0.797**	0.365			**0.696**	0.515
RSM_6			**0.802**	0.357			**0.729**	0.469
KMO	0.823	0.870	0.870					
Eigenvalue	3.077	3.953	4.035		EV	0.873	0.755	0.783
Var. Explained	0.769	0.659	0.673		AVE	0.687	0.581	0.600
Cronbach's α	0.900	0.896	0.902		CR	0.898	0.892	0.900

Exploratory Factor Analysis (EFA). Varimax Rotated Factor-Loading Matrix. F_1=PMO, F_2=SP, F_3=SR.
Kaiser-Meyer-Olkin. (KMO > 0.5). Cronbach's Alpha (α > 0.7)
Confirmatory Factor Analysis (CFA). λ_1=PMO, λ_2=SP, λ_3=SR. Explained Variance (EV > 0.7).
Average Variance Extracted (AVE > 0.5). Composite Reliability (CR > 0.7).

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

Further confirmatory factor analysis (CFA) authenticated construct validity with adequate average variance extracted (AVE): PMO=0.687, PSM=0.581, RSM=0.600. Moreover, CFA composite reliability (CR) coefficient attested high reliability for independent and moderating constructs (PMO=0.898, PSM=0.892, and RSM=0.900). These procedures ensured that the survey produced cohesive multifactor constructs adhering to normal distribution.

Next, descriptive analysis characterized the research sample, and t-tests evaluated differences in means (Hair Jr et al., 2019) for independent, moderating, and control variables related to the dichotomic variables. They examined whether PMO, prescriptive and relational stakeholder management, project budget, firm size, as well as the age of professionals were significantly different for projects concluded on schedule or not. Likewise, those variables were examined for projects finished within the predicted cost or not.

Correlation analysis verified the relationship between dependent and independent variables. And finally, eight logistic regression analyses (logit) were performed. Each model aimed to show the likelihood of prescriptive and relational stakeholder management exerting a positive influence on project results in terms of projects concluded on schedule and within the predicted cost (Hypotheses a). The study tested the moderating effect of PMO on each main relationship (Hypotheses b).

RESULTS

The last project concluded by respondents are the unit of analysis of this research. When described in terms of conclusion on schedule and within the predicted cost, nearly half of the respondets mentioned in the survey their project concluded on schedule (51.85%), while a little more than that reported their project concluded within the predicted cost (54.63%) (Table 2).

Table 2. Descriptive Analysis

Variable	Obs.	Mean	Std. Dev.	Min	Max
PSM	216	0.000	1.000	-2.661	1.568
RSM	216	0.000	1.000	-2.815	1.411
PMO	216	0.000	1.000	-2.365	1.333
proj_budget	216	20,700,000	62,700,000	5	395,000,000
ln_budget	216	13.865	2.666	8.517	19.794
employees	216	1,126	2,626,865	4	22,000
ln_size	216	5,364	1,938	1,386	9,999
age	216	32.981	7.509	22	65
ln_age	216	3.473	0.210	3.091	4.174

(Continue)

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Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

Table 2. Descriptive Analysis

(Concludes)

Variable	Obs.	Mean	Std. Dev.	Min	Max
proj_time	216	0.519	0.501	0	1
No	104 (48.15%)				
Yes	112 (51.85%)				
proj_cost	216	0.546	0.499	0	1
No	98 (45.37%)				
Yes	118 (54.63%)				

Table 2 characterizes the control variables. Hence, this study encompasses projects implemented from small to large firms (4 to 22,000 employees). Besides, the respondents had an average age of 32.9 years, and the allocated budget per project was 20,7 million US\$ on average.

Stakeholder management and PMO relationships with project results

The first t-test shows prescriptive and relational stakeholder management as well as PMOs are significantly different when compared between projects concluded on schedule (112 projects) or not (104 projects) (Table 3). Besides, it indicates a positive orientation connecting stakeholder management and PMO to projects concluded on schedule. Prescriptive stakeholder management is the most significant factor as to whether projects will be concluded on schedule.

Table 3. T-test for Stakeholder Management and PMO in Projects Concluded or Not on Schedule

Variable	Projects running over time (N=104)				Projects on schedule (N=112)				Diff. in means test (N=216)	
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max		
PSM	-0.204	1.006	-2.661	1.568	0.190	0.960	-2.417	1.568	**0.394*****	[0.134]
RSM	-0.199	0.980	-2.815	1.305	0.184	0.987	-2.699	1.411	**0.383*****	[0.134]
PMO	-0.176	1.025	-2.365	1.333	0.163	0.951	-2.214	1.333	**0.339****	[0.135]
ln_budget	14.089	2.666	8.517	19.679	13.657	2.662	8.517	19.794	-0.432	[0.363]
ln_size	5.309	1.820	1.386	9.999	5.415	2.048	1.609	9.826	0.106	[0.264]
ln_age	3.475	0.216	3.091	4.078	3.471	0.206	3.091	4.174	-0.005	[0.029]

Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$
Standard errors in brackets

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

As for control variables, project budget, firm size, and age of professionals (respondents) did not show significant differences in the conclusion of projects on schedule or not. However, it was possible to observe a weak trend connecting high-budget and older professionals to projects that did not end on schedule. On the other hand, larger firms presented a weak trend connecting to projects delivered on schedule.

The second t-test reveals that prescriptive and relational stakeholder management are significantly different in projects concluded within the predicted cost (118 projects) or not (98 projects) (Table 4). However, PMO, firm size, and the age of the project management professional did not show significant differences in projects concluded within the predicted cost or not. Thus, this result suggests that PMO might be indispensable in any project, concluded within or exceeding cost. On the other hand, the project budget shows significant negative orientation for projects concluded within the predicted cost, which denotes a higher likelihood of exceeding planned costs when the budget is higher.

Table 4. T-test for Stakeholder Management and PMO in Projects Concluded Within Cost or Not

Variable	Projects exceeding Cost (N=98)				Projects within Cost (N=118)				Diff. in means test	
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	(N=216)	
PSM	-0.150	0.989	-2.552	1.568	0.124	0.996	-2.661	1.568	**0.274****	[0.136]
RSM	-0.158	0.985	-2.815	1.411	0.131	0.997	-2.815	1.411	**0.288****	[0.136]
PMO	-0.057	0.933	-2.365	1.333	0.047	1.054	-2.365	1.333	0.104	[0.137]
ln_budget	14.253	2.764	9.210	19.679	13.542	2.549	8.517	19.794	**-0.711***	[0.362]
ln_size	5.223	1.935	1.386	9.999	5.481	1.941	1.609	9.826	0.258	[0.265]
ln_age	3.469	0.210	3.091	4.078	3.476	0.211	3.091	4.174	0.006	[0.029]

Significance levels: * p<0.05, ** p<0.01, *** p<0.001
Standard errors in brackets

These results support the decision to inspect the correlation between stakeholder management and project results regarding projects concluded on schedule and within the predicted cost. They also support the decision to measure the moderating effect of PMO, together with the effect of the control variables (Table 5). Thus, referring specifically to projects completed on schedule, a significant and positive coefficient correlates them to prescriptive stakeholder management (0.197), to relational stakeholder management (0.192), and to PMO (0.170).

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

Table 5. Correlation Analysis

	proj_time	proj_cost	PSM	RSM	PMO	ln_budget	ln_size	ln_age
proj_time	1.000							
proj_cost	0.369***	1.000						
SP	**0.197****	**0.137***	1.000					
SR	**0.192****	**0.144***	**0.885****	1.000				
PMO	**0.170***	0.052	**0.816****	**0.786****	1.000			
ln_budget	–0.081	–0.133	0.065	0.064	0.035	1.000		
ln_size	0.027	0.066	–0.014	–0.048	–0.003	0.024	1.000	
ln_age	–0.011	0.015	–0.107	–0.034	–0.069	0.116	–0.128	1.000

Significance levels * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

On the other hand, referring to projects completed within the predicted cost, a significant and positive coefficient correlates them to prescriptive stakeholder management (0.137) and relational stakeholder management (0.144). However, its correlation to PMO (0.052) is not significant, as found in the t-test. Finally, prescriptive and relational stakeholder management are correlated by a significant and positive coefficient (0.885), as well as to PMO (0.816 and 0.786), respectively.

As correlation analysis and t-tests produced adequate results, eight logistic regression models were tested considering projects concluded on schedule and within the predicted cost, respectively, as dummy dependent variables. Table 6 shows that prescriptive and relational stakeholder management exert a significant and positive effect on the likelihood of having projects concluded on schedule and within the predicted cost (Ha). PMO, as a moderating variable, enhances the positive influence of stakeholder management on the likelihood of concluding projects on schedule and within the predicted cost, in all four models (Hb).

Table 6. Logistic Regression (Logit)

	H1a	H2a	H3a	H4a	H1b	H2b	H3b	H4b
Control Variables:								
Project budget (ln)	–0.079	**–0.121****	–0.077	**–0.120****	**–0.089***	**–0.142****	**–0.095***	**–0.139****
	(–1.49)	(**–2.24**)	(–1.46)	(**–2.22**)	(**–1.65**)	(**–2.56**)	(**–1.74**)	(**–2.50**)
Firm size (ln)	0.040	0.088	0.045	0.093	0.050	0.108	0.066	0.121
	(0.55)	(1.18)	(0.63)	(1.26)	(0.67)	(1.39)	(0.88)	(1.61)
Age of the respondents (ln)	0.268	0.595	0.120	0.500	0.243	0.626	0.031	0.353
	(0.39)	(0.86)	(0.18)	(0.73)	(0.36)	(0.91)	(0.05)	(0.52)

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Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

Table 6. Logistic Regression (Logit) (Concludes)

	H1a	H2a	H3a	H4a	H1b	H2b	H3b	H4b
Independent Variables:								
Prescriptive stakeholder management (PSM)	0.438***	0.325**			0.513**	0.825***		
	(2.96)	(2.16)			(2.07)	(2.94)		
Relational stakeholder management (RSM)			0.424***	0.337**			0.583**	0.833***
			(2.86)	(2.22)			(2.36)	(3.03)
Moderating Variable:								
Project Management Office (PMO)					0.077	–0.372	0.131	–0.334
					(0.33)	(–1.39)	(0.60)	(–1.35)
Interactions:								
PSM x PMO					0.227*	0.299**		
					(1.80)	(2.18)		
RSM x PMO							0.360***	0.316**
							(2.73)	(2.22)
N	216	216	216	216	216	216	216	216
Log likelihood	–144.081	–143.543	–144.336	–143.338	–142.526	–139.500	–140.628	–139.322
df.	4	4	4	4	6	6	6	6
Wald χ^2	10.455	9.400	9.905	9.548	12.742	16.388	16.468	16.591
Wald χ^2 test (p-value)	0.033	0.052	0.042	0.049	0.047	0.012	0.011	0.011
Pseudo R^2	0.037	0.035	0.035	0.037	0.047	0.062	0.060	0.064

Logit Regressions with Robust Standard Errors. Marginal effects; t statistics in parentheses. Sig. * $p<0.1$, ** $p<0.05$, *** $p<0.01$
Dependent Variables: Project on schedule (d): (H1a, H3a, H1b, H3b) and project within predicted cost (d): (H2a, H4a, H2b, H4b).
(d) for discrete change of dummy variable from 0 to 1

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva
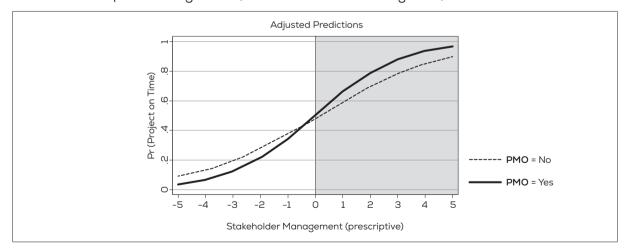
Referring to control variables, only the project budget showed a significant negative effect, which confirms the risk-logic related to larger project budgets, as they are less likely to conclude on schedule and within the predicted cost. On the other hand, neither firm size nor the age of professionals show a significant and positive influence on the likelihood of having projects concluded on schedule or within the predicted cost.

Stakeholder prescriptive management and its effect on project results

Prescriptive stakeholder management presents a significant and positive effect (0.438) on the likelihood of concluding projects within the predicted time. This result corroborates hypothesis H1a. When PMO moderates the relationship between prescriptive stakeholder management and projects concluding on schedule, logistic regression exhibits a positive and significant coefficient (0.227), which supports hypothesis H1b. Nevertheless, the direct relationship between PMO and projects concluding on schedule does not present a significant effect (0.077), indicating that when PMOs moderate the relationship between relational stakeholder management and projects concluded on schedule they are relevant, but not when they exert direct influence on dependent variable (projects concluded on schedule).
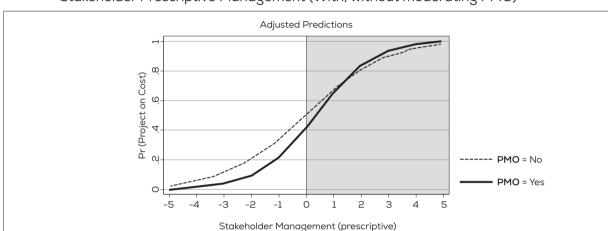
The graph of adjusted predictions indicates that prescriptive stakeholder management positively increases the likelihood of concluding projects on schedule (Graph 1). When PMO moderates the relationship between prescriptive stakeholder management and projects concluded on schedule, it shows an increase in the logit curve toward the likelihood of having more projects completed on schedule (Pr = 1).

Graph 1. Adjusted Predictions for the Conclusion of Projects on time and Stakeholder Prescriptive Management (With/without Moderating PMO)

Alike, prescriptive stakeholder management presents a significant and positive effect (0.325) on the likelihood of concluding projects within the predicted cost. This result supports hypothesis H2a. Besides, the influence of prescriptive stakeholder management on projects concluded on schedule (0.438) is higher than on projects concluded within the predicted cost (0.325).

ARTICLES | **Stakeholder management and project management office: Effect on project results**

Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

When PMO moderates the relationship between prescriptive stakeholder management and projects within cost, logistic regression exhibits a positive and significant coefficient (0.299), supporting hypothesis H2b. Despite the direct relationship between PMO and projects within the predicted cost presenting a non-significant and negative effect (-0.372), it indicates that PMO and stakeholder management should be combined when facing projects with larger budgets. This influence can be examined in Graph 2.

Graph 2. Adjusted Predictions for the Concluson of Projects within the Predicted Cost and Stakeholder Prescriptive Management (With/without moderating PMO)

The graph of adjusted predictions indicates that prescriptive stakeholder management increases the likelihood of concluding projects within the predicted cost. When PMO moderates the relationship between prescriptive stakeholder management and projects concluded within the predicted cost, the likelihood of concluding projects within the predicted cost is higher. However, this decreases when the influence of PMO is higher, and stakeholder management is lower in cases of projects with larger budgets.
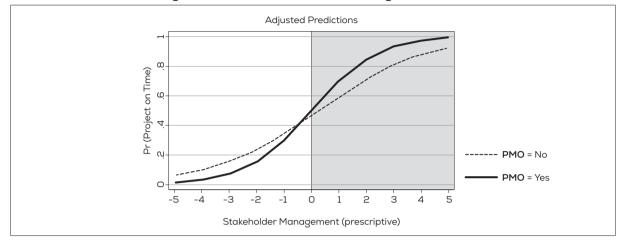
Relational stakeholder management and its effect on project results

Relational stakeholder management shows a significant and positive effect (0.424) on the likelihood of concluding projects on schedule. Therefore, hypothesis H3a is supported. When PMO moderates the relationship between stakeholder relational management and projects concluded on schedule, logistic regression exhibits a positive and significant coefficient (0.360), which supports hypotheses H3b. However, the direct relationship between PMO and projects concluded on schedule does not present a significant effect (0.131), which could again indicate that PMOs are amplifiers of the relationship between relational stakeholder management and projects completed on schedule or not, but do not affect project schedule directly.

The graph of adjusted predictions indicates that relational stakeholder management positively increases the likelihood of concluding projects on schedule (Graph 3). When PMO

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Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

moderates the relationship between relational stakeholder management and projects concluded on schedule, it enhances the likelihood of concluding projects with the predicted time.
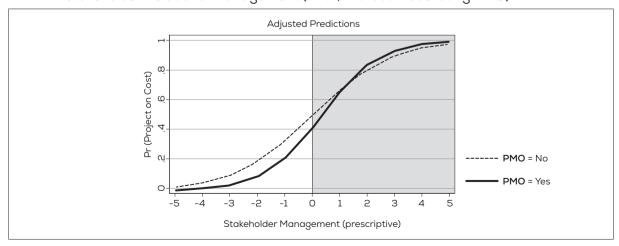
Graph 3. Adjusted Predictions for the Conclusion of Projects on time and Stakeholder Relational Management (With/without Moderating PMO)

Alike, relational stakeholder management shows a significant and positive effect (0.337) on the likelihood of concluding projects within the predicted cost, corroborating hypothesis H4a. Besides, the influence of relational stakeholder management on projects concluded within the predicted cost (0.337) is lower than the influence on projects concluded on schedule (0.424).

When PMO moderates the relationship between relational stakeholder management and projects within the predicted cost, logistic regression exhibits a positive and significant coefficient (0.316), supporting hypotheses H4b. However, the direct relationship between PMO and projects within the predicted cost presents a non-significant and negative effect (-0.334), indicating that PMO and stakeholder management should be combined when facing projects with larger budgets. This influence can be examined in Graph 4.

Graph 4. Adjusted Predictions for the Conclusion of Projects within the Predicted Cost and Stakeholder Relational Management (With/without Moderating PMO)

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Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

The graph of adjusted predictions indicates that relational stakeholder management increases the likelihood of concluding projects within the predicted cost. Moreover, when PMO moderates the relationship between relational stakeholder management and projects concluded within the predicted cost, it enhances the likelihood of concluding projects within the estimated costs. However, again, this decreases when the influence of PMO is high, and stakeholder management is low in case of projects with larger budgets.

DISCUSSION AND CONCLUSIONS

The study tested four hypotheses to analyze the influence of stakeholder management on the likelihood of concluding projects within the predicted time and cost, connecting prescriptive and relational stakeholder management to project results. They corroborated that stakeholder management significantly influences the likelihood of concluding projects on schedule and within the predicted cost.

As time and cost are relevant to project results, the survey asked project professionals whether the last project they were involved in concluded within the predicted time and cost. The intention was to test binary outcomes in the project management field, given that social science studies testing them have gained relevance in recent years (Agresti, 2019). Despite acknowledging scope as another relevant project result, the survey did not ask whether the project scope was delivered as planned. This element was intentionally left out, as different interpretations might have compromised dichotomous answers. Hence, time and cost were gathered as dichotomous dependent variables, and logistic regression models tested the empirical results.

The relevance of studies portraying project results in terms of multifactor constructs, like project success, is not disregarded. Nevertheless, the intention was to test an alternative framing, measuring the influence of stakeholder management on project predicted time and cost. As no studies have measured this influence, this research contributes to project management literature, filling a gap.

To analyze the influence of PMO on the relationship between stakeholder management and project results, the study tested four complementary hypotheses. They confirmed that PMO positively affects the relationship between prescriptive and relational stakeholder management with the likelihood of concluding projects within the predicted time and cost.

When stakeholder management and PMO were combined, the influence of stakeholder management on the conclusion of projects within the predicted time and cost increased. Nevertheless, the direct relationship between PMO and projects within time and cost did not present a significant effect. As no studies have measured the influence of PMO on the relationship between stakeholder management and project results, this study contributes to project management literature, filling another research gap.

As sufficient empirical data was collected from the survey respondents who live in Lima, Peru, the results may be replicable to other professionals in the area of project management

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Roque Rabechini Jr. | Eddy Alberto Morris Abarca | Nestor U. Salcedo | Cesar Jhonnatan P. Horna Saldaña | Danielle Cruz Paiva

working in other large cities in the world. Nevertheless, research sampling is a limitation, as a broader population could have been targeted. Another limitation is, as mentioned before, the choice not to collect information about the project scope, which would be another way of measuring the influence of stakeholder management and PMO on project results.

Further studies could amplify data collection to include professionals in the area of project management from different locations and then confirm the replicability of results. In addition, future studies could collect dichotomous data regarding project scope to measure the influence of stakeholder management and PMO on the iron triangle of project results. Likewise, future studies could measure the influence of stakeholder management on project success and verify whether stakeholder management also positively affects project success.

As this research main academic contribution, it confirmed that prescriptive and relational stakeholder management improve project results, as it increases the likelihood of concluding projects within the predicted time and cost. Also, it corroborated that PMO boosts this positive effect. Further, as a methodological contribution, the use of logistic regression models is highlighted to test the relationship between stakeholder management and dichotomous variables for project results. By reviewing the theoretical background on prescriptive and relational stakeholder management, the research also strengthened these concepts. Likewise, it reinforced that PMO is instrumental for stakeholder management.

As a contribution to practitioners, the research confirms that organizations should invest in developing PMOs and enhancing project stakeholder management. It highlights that identifying and assessing project stakeholders is as important as establishing trustful relationships with them, as these activities comprise two sides of the same coin regarding stakeholder management.

Conflict of interest

The authors have no conflict of interest.

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ARTICLES | **Stakeholder management and project management office: Effect on project results**

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AUTHOR'S CONTRIBUTION