THE PROJECT MANAGEMENT OFFICE AND ITS CONTRIBUTION TO PROJECT PORTFOLIO PERFORMANCE

ESCRITÓRIO DE PROJETOS E SUA CONTRIBUIÇÃO PARA O DESEMPENHO DO PORTFÓLIO DE PROJETOS

LA OFICINA DE GESTIÓN DE PROYECTOS Y SU CONTRIBUCIÓN PARA DESEMPEÑO DE LA CARTERA DE PROYECTOS

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ABSTRACT

This research describes how the PMO influences the performance of the project portfolio, using the Dynamic Capabilities approach to conduct a case study with a corporate PMO of a large financial group in Brazil, winner of national and international awards. Semi-structured interviews, document analysis, and a content analysis technique were used. This study shows that PMO influences the performance of projects and portfolios and supports the organizational units in their execution. In addition, it contributes to the project portfolio performance through the systemic and strategic vision of the portfolio; the integration between the various teams and sectors; and the training and the knowledge generated to the projects teams. These results show: a) how the PMOs impact the performance of project portfolios and b) that the PMO has dynamic capabilities and how these dynamic capabilities impact and enhance the results of the project portfolios.

Keywords: Project management office; Dynamic capability; Performance; Portfolio; Corporate project office.

RESUMO

Esta pesquisa descreve como o Escritíorio de Projetos (EP) influencia o desempenho do portfólio de projetos, utilizando a percectiva analíticas da capabilidade dinâmica para realizar um estudo de caso com um EP corporativo de um grande grupo financeiro no Brasil, vencedor de prêmios nacionais e internacionais. Foram realizadas entrevistas semiestruturadas e análise documental na coleta de dados, e a técnica de análise de conteúdo, para análise dos resultados. Este estudo mostra que o EP influencia o desempenho de projetos e portfolio e apoia as unidades organizacionais na execução dos projetos. Ademais, contribui para o desempenho do portfólio por meio da visão sistêmica e estratégica do portfólio; da integração entre as diversas equipes e setores; e do treinamento e do conhecimento gerado às equipes de projetos. Esses resultados mostraram como os EP impactam no desempenho dos portfólios de projetos e que o PMO possui capacidades dinâmicas e como essas capacidades dinâmicas impactam e potencializam os resultados dos portfólios de projetos.

Palavras-chave: Escritório de projetos; Capabilidades dinâmicas; Desempenho; Portfólio; Escritório de projetos corporativo.

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RESUMEN

Este estudio describe cómo la Oficina de Proyectos (OP) influye en el desempeño de la cartera de proyectos, utilizando la perspectiva analítica de la capacidad dinámica para realizar un estudio de caso con una OP corporativa de un gran grupo financiero en Brasil, ganadora de premios nacionales e internacionales. Fueron realizadas entrevistas semiestructuradas y análisis de documentos en la recolección de datos, para análisis de resultados, a técnica de análisis de contenido fue utilizada. Este estudio muestra que la OP influye en el desempeño del proyecto, en la cartera de proyectos y apoya a las unidades organizacionales en la ejecución de proyectos. Además, contribuye al desempeño de la cartera a través de la visión sistémica y estratégica de la cartera; la integración entre los diferentes equipos y sectores; y la formación y conocimiento generado para los equipos de proyectos. Estos resultados mostraron cómo las OP impactan el desempeño de las carteras de proyectos y que la PMO tiene capacidades dinámicas y cómo estas capacidades dinámicas impactan y mejoran los resultados de las carteras de proyectos.

Palabras clave: Oficina de gestión de proyectos; Capacidad dinámica; Actuación; Portafolio; Oficina de proyectos corporativos.

1 INTRODUCTION

Organizations increasingly create Project Management Offices (PMOs) to overcome the challenges of greater complexity and importance of projects and, thus, create value (Otra-Aho et. al., 2018). Despite this, the evidence for the PMO value creation and how it improves the project performance are still scarce (e.g., Hurt & Thomas, 2009).

PMOs are organizational entities assigned various roles in executing coordinated project management in their domain. Focusing on the PMO facilitates the empirical study of its contribution, in different forms, to organizational performance and the different perceptions of the value of those contributions (Aubry & Hobbs, 2011). In order words, PMO is a function created to facilitate and enhance project management through portfolio management and linking projects to the organization's strategy (Crawford, 2011). More broadly, PMO is an organizational entity, with various functions, executing and coordinating project management under its domain (Aubry, 2015, Hobbs & Aubry, 2007).

Some researchers evaluate whether the project management and the PMOs influence the performance of project portfolios and organizational performance. Their results show reduction in project time for projects that PMO managed, reducing the deadline and having *time-to-market* lower than the projects without the PMO implementation (Barbalho et al., 2014). The PMO impacts the project performance, business performance, and project management maturity, especially with the support role, showing the PMO's ability to act dynamically as an integrating entity (Aubry, 2015). Establishing standards and methods of project management and use of historical files have a significant correlation with the project's performance (Dai & Well, 2004)

However, their legitimacy and performance are questioned. In a survey of 500 PMOs, 42% had their relevance, or even existence questioned, meaning that almost half of existing PMOs is considered illegitimate by those responding to a survey. There are different views about PMOs and how they can contribute in different ways to organizational performance. Thus this contestation is a recurring problem (Aubry & Hobbs, 2007). The value of PMOs is inconclusive, as PMOs create sustainable value in some cases and fail to sustain their valuable contributions in others (Hurt & Thomas, 2009)

In this study we used the theoretical lens of Dynamic Capabilities, following the example of other studies (e.g. Biedenbach & Müller, 2012, Killen et al., 2012). The environmental dynamism of the organization analyzed (i.e., Brazilian financial sector), such as the accelerated pace of technological innovations, the fintechs, regulations quick and flexible responses to changing consumer preferences, digital money and unpredictability, justifies this research option. Furthermore, in environments with rapid change, organizations' capabilities to adapt quickly and repeatedly can generate strategic advantages (Teece et al, 1997).

In this context, Teece et al. (1997) conceptualize dynamic capabilities as the organization's ability to integrate, build and reconfigure internal and external competence in a dynamic environment. Therefore, this lens is suitable for research in a dynamic environment. The portfolio and project management capabilities can be analyzed as dynamic capabilities, and when developed and customized in an organizational environment, they are not easy to be copied (Killen et al., 2012). On the other hand, the PMO is an internal resource of the organization that contributed to the organizations to be able to perceive opportunities and threats (feel), seize opportunities (seize), and maintain competitive conditions for the continuous improvement of the business assets; in other words, as a resource that contributes to the operational capabilities to become dynamic capabilities (Lacruz et al., 2019).

Given the above, and although showed in the literature that the PMO contributes to the project's performance (Barbalho et al., 2014) and also of the organization (Aubry, 2015; Aubry et al., 2013), some questions remains open, for exemple, how this contribution occurs. Therefore, the questions that guide this research are: **(i) How does the PMO influence the performance of the project portfolio? (ii) Does the PMO act as a dynamic capability or operationalize dynamic capabilities? Thus, due to the need to understand the process that enables the PMO to impact the project performance, this study aims to describe how the PMO influences the performance of the project portfolio.**

In summary, therefore, having the objective and chosen techniques, this research gives a practical contribution for project management professionals, especially those who work directly with PMOs. Besides for scholars give contributions for better understand these existing organizational entities, boost project results, and improve the process of implementing new PMOs. As a theoretical contribution, this paper identifies whether PMO acts as a dynamic capability (Killen et al., 2012) or as a catalyst for dynamic capabilities (Lacruz et al., 2019), and help us to understand how dynamic capabilities enhance the results of project portfolios through the PMO.

2 DYNAMIC CAPABILITIES

The conceptual framework of the dynamic capabilities is a combination of the resource-based view (Barney 1986), transaction cost economics (Williamson 1985), neo-Schumpeterian theory of the firm (Nelson & Winter 1982), and innovation dynamics proposed by Schumpeter (1942) (Augier & Teece. 2008).

The concept of dynamic capabilities evolves, keeping relation between definitions but emphasizing specific aspects of dynamic capabilities. In general terms, definitions focus on the set of behaviors, skills, and capabilities (McKelvie & Davidsson 2009), processes (Teece 2007), and organizational learning mechanisms (Crossan et al., 1999).

Teece et al. (1997, p. 516) proposed the most widespread concept of dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments.". Since then, other references, such as Eisenhardt and Martin (2000), have emerged with a less economical and more processual approach of dynamic capabilities.

The word "dynamic" in "dynamic capabilities" refers to the ability to renew competencies to obtain concordance with the changing environment, i.e., it is necessary to have responses at critical moments. The "capability" refers to the role of strategic management in the adaptation, integration and reconfiguration, in order to facilitate the development of internal and external organizational theory and skills, resources, and functional competencies to meet the requirements of a dynamic environment thus (Teece et al., 1997).

The operational capabilities allow sustaining the technical capability of an organization and thus ensures daily operational efficiency. On the other hand, dynamic capabilities make it possible to maintain the organization's evolutionary capability by creating, extending, and modifying its resource base, thus achieving long-term competitive success (Teece, 2007).

The capabilities of an organization can be operational or dynamic, and they reflect the ability to perform a particular function or activity. However, the operational capabilities assist in performing basic functional activities, whereas the dynamic capabilities are the transformations and reconfigurations of operational capabilities (Protogerou et al., 2011).

Teece et al. (1997) present the dimensions that pertain to dynamic capability:

- Coordination/integration capacity - Managers' ability to coordinate and integrate the internal and external activities of the organization.

- Learning capacity - Learning allows tasks to be performed better and faster through repetition and experimentation and identifies new production opportunities.

- Reconfiguration capability - Ability to perceive the need to reconfigure the organization's asset structure and perform the necessary internal and external transformation in a rapidly changing environment. Subsequently, they present other dimensions of dynamic capabilities. They are the *sense* capabilities, which are capabilities to monitor and identify opportunities, *seize* which is to evaluate existing and emerging capabilities and possible investments, and *transforming,* which is the ability to create, extend and modify the resource base when the company grows and the market changes (Teece, 2007).

The sense capacity analyzes how managers identify opportunities and threats; achieve specific knowledge about the market and its users/customers; and learn to monitor the market. The seize capacity understands how managers seize opportunities; take creative actions and activities; and leverage specific knowledge. The transforming capability understands how managers implement new strategies for the organization; reconfigure resources from decisions; implement new management methods, create or modify strategy and marketing methods; create or modify markets and objectives; create or modify technological equipment, processes in service delivery, manufacturing; create or modify procedures and systems; launch new services, products, processes, structures. Organizations must develop sense skills, seize and transform simultaneously to create and maintain competitive advantage (Teece, 2007).

2.1 Dynamic Capabilities x Project and Portfolio Management x PMO

The project operational capabilities and the portfolio of dynamic capabilities measure the influence of the senior management involvement on the project and portfolio performance, respectively, i.e., the project operational capabilities and the portfolio of dynamic capabilities explain how the senior management involvement influences the project and portfolio performance. This happens through the routines, procedures, and workflow established by top management. The dynamic resources built by top-level managers allow the consolidation of project learning and its dissemination throughout the organization, avoiding repeating old mistakes and enabling successive project and portfolio performance goals. The micro-foundations of the project operational capabilities and the portfolio of dynamic capabilities are the routines and processes established by the senior managers and implemented by project managers, project team, and portfolio managers (Hermano & Martín-Cruz, 2016).

The absorptive, innovative and adaptive capabilities affect the performance of short and long-term projects and the portfolio. However, the absorptive and adaptive capabilities are the main contributors to the performance outcome, while the innovative capabilities contribute less (Biedenbach, and Müller, 2012). Portfolio management as a dynamic capability of the organization, and further propose that it is the composition of a collection of routines (Bredillet et al., 2017).

Some research has focused on dynamic capabilities from a top-down perspective, in which change is facilitated and applied at the organizational level. This view fails to capture whole forms of change that can occur in a project environment, as dynamic capabilities have a bottom-up element where change occurs within the project, often based on the improvisational nature of project team members, and these dynamic capabilities require more research attention (Clegg et al., 2018).

Maintaining strategic alignment under rapid evolution or uncertainty depends on agile or responsive management decision-making in identifying and prioritizing investment opportunities. Portfolio management enables this knowledge fusion but depends on capabilities to achieve agility and sustainability. The dynamic capabilities identified were: business objectives driving projects, multiple and dynamic prioritization criteria, dynamic balancing of risk and reward, canceling or reconfiguring projects. These authors suggest that the dynamic capability "business objectives" drive the projects and allow them to be implemented more efficiently than the other three dynamic capabilities identified (Daniel et al., 2014).

The relationship between dynamic and project capabilities are reciprocal, recursive and mutually reinforced. They indicate that project capabilities refer to the knowledge, structures and tasks required to manage different types of individual projects (project management) or a set of interrelated projects (program management) at the operational level. In contrast, the dynamic capabilities are required to select, sequence and manage a set of projects over time to achieve the long-term strategic objectives (portfolio management) (Davies & Brady, 2015).

Gardiner (2014) distinguishes project, program and portfolio management capabilities into three level—project management practices such as project resources, stakeholder knowledge and structuring as routines or level 0. The change in project, program and portfolio management activities and routines, like PMO practices that shape, modify and adapt project management practices, are first-order dynamic capabilities. Creating and modifying new

dynamic capabilities of project, program, and portfolio management, such as leadership, organization design, culture, stakeholder engagement, and knowledge management system, are second-order learning capabilities (Gardiner, 2014).

The knowledge produced by the projects and the gain in competitive advantages organizations obtains through the knowledge are transferred between projects. This long-term benefit is often not considered by the projects teams, which focus only on the projects' direct and short-term objectives and goals. The PMOs have a critical role in facilitating and supporting the flow of knowledge between the projects (Tshuma et al., 2018).

Sunder, Ganesh and Marathe (2019) conducted a study on the academic literature of dynamic capabilities, where they developed a multidimensional conceptual framework with five dimensions and 26 variables, which enabled a structured presentation of the conceptual foundations of dynamic capability. In the variable "technological and infrastructure resources," they verified the PMO as an infrastructure resource highlighted in the academic literature of dynamic capabilities.

Regardless of the bank's asset category, the PMO practices tend to manage the organization's capabilities in the project's delivery. The authors claim that the PMO practices significantly indirectly influence the performance through project portfolio management capabilities (Ichsan & Sadeli, 2020).

The dynamic capabilities theory is suitable for studying project portfolio management in dynamic environments and related organizational phenomena. Portfolio management is strategic capabilities that play a role in the organization's competitive advantage. In addition to the strategic emphasis, they also emphasize the importance of knowledge, learning, environmental dynamism, ability to leverage resources (Killen et al., 2012).

The project portfolio management capabilities encompass three main dimensions: processes, structure and people. One of the most notable aspects of project portfolio management capabilities across the six organizations was the level of change. The findings provide evidence of the continuous change and evolution of the capabilities (Killen & Hunt, 2013).

The PMO (responsible for portfolio management) can act as a driver in achieving a sustainable competitive advantage, given its ability to transform project management capabilities into dynamic capabilities, identify and create opportunities, and mitigate and eliminate critical threats, providing superior performance to the organization. Capabilities can become dynamic because the development and deployment of routines arise to select decision-making protocols and because dynamic capabilities are in various levels of the project to reconfigure existing project management capabilities. The PMO enable organizations to perceive opportunities and threats (sense), seize opportunities (seize) and maintain competitive conditions for continuous improvement of business assets (transforming and reconfiguring). The PMO does not constitute a dynamic capability, and neither its functions are dynamic capabilities, but the PMO can be understood as a resource being capable for providing the organization with dynamic capabilities (Lacruz et al., 2019).

In Table 1 we present a summary of the study review.

Table 1 - Summary of studies on dynamic capability

Author	Perspective/Dynamic Capability Analysis	Result
Hermano e Martín-Cruz (2016)	Using a dynamic capabilities approach, they sought to understand how top management involvement influences the project, portfolio and company performance.	They analyzed that it is through the routines, procedures and workflow established by senior management that the operational capabilities of the project and the dynamic capabilities of the portfolio mediate the influence of senior management involvement on the performance of the project and portfolio.
Biedenbach, e Müller (2012)	They sought to understand how capabilities decomposed into absorptive, innovative and adaptive capabilities in the initial phases of the project affect project and portfolio performance.	They identified the effects of absorptive, innovative and adaptive capabilities on the performance of short and long-term projects and the portfolio. It was seen that absorptive and adaptive capabilities are the main contributors to performance, while innovative capabilities contribute less.
Bredillet, Tywoniak e Tootoonchy (2017)	They used theories of change and process routines to investigate the co-evolution of PMO and portfolio management.	They defend portfolio management as a dynamic capability of the organization and also propose that it is the composition of a collection of routines.
Ichsan *et al*. (2017)	They address the ability to manage the project portfolio and its influence on the performance of organizations through the application of PMO practices.	Propose an integrated conceptual model of PPM capability, as a realization of dynamic capability influences the business performance perceived by the organization based on the application of PMO practices in the organization.
Clegg *et al*. (2018)	They encourage studies that employ a dynamic capabilities perspective to understand their role better. They also talk about the importance of research on topics such as the evolution of capabilities, flexibility, strategic change and the ability to adapt to dynamic environments.	In an agenda for future research, they highlight that much of the research already carried out has analyzed dynamic capabilities from a top-down perspective. The authors point out that this view fails to capture all the ways in which change can occur in a project environment, as dynamic capabilities have a bottom-up element.
Daniel *et al.* (2014)	They sought to understand what dynamic capabilities contribute to project portfolio management and how companies develop and adapt to the dynamic capabilities that constitute portfolio management in turbulent conditions.	They identified dynamic capabilities, such as: business objectives that drive projects, multiple and dynamic prioritization criteria, dynamic balancing of risk and reward, and cancellation or reconfiguration of projects. They also stated that business objectives drive projects and allow the other three identified dynamic capabilities to be implemented more efficiently.
Davies e Brady (2015)	They distinguish project capabilities at the operational level from dynamic capabilities at the strategic level.	They suggest that the relationship between dynamic capabilities and project capabilities is reciprocal and recursive and mutually reinforcing. Project capabilities refer to the knowledge, structures, and tasks required to manage projects or programs at the operational level. Dynamic capabilities are necessary to select, sequence and manage a set of projects for portfolio management.

Gardiner (2014)	They distinguish project, program and portfolio management capabilities into three levels.	Considers project management practices as routines or level 0. Modification of project, program and portfolio management activities and routines are considered first-order dynamic capabilities. The creation and modification of new dynamic project, program, and portfolio management capabilities are considered second-order learning capabilities.
Tshuma, Steyn, Van Waveren (2018)	They discuss the knowledge produced by projects and the competitive advantages that organizations obtain through the knowledge that is transferred between projects.	They point out that long-term competitive advantages are often not considered by project teams, who focus only on direct, short-term objectives and goals. They argue that PMOs play a significant role in facilitating and supporting the flow of knowledge between projects.
Sunder, Ganesh e Marathe (2019)	They developed a multidimensional conceptual structure with five dimensions and twenty-six variables, which enabled a structured presentation of the conceptual foundations of dynamic capability.	In the variable “technological and infrastructure resources”, they verified the PMO as an infrastructure resource highlighted in the academic literature on dynamic capabilities.
Ichsan e Sadeli (2020)	They explored how project portfolio management supports project delivery capabilities through the PMO to respond to environmental uncertainties, and how this affects bank performance (measured using Return on Asset - ROA).	They concluded that PMO practices tend to manage the organization's capabilities in project delivery and have a significant indirect influence on the company's performance through project portfolio management capabilities.
Killen et al. (2012)	The authors applied the sensing, seizing and reconfiguring/transforming framework to portfolios in dynamic environments.	They concluded that portfolio management is a strategic capability that plays a role in the organization's competitive advantage.
Killen e Hunt (2013)	They carried out a multiple case study in six organizations.	They verified that project portfolio management capabilities cover three main dimensions: processes, structure and people. One of the most notable aspects of project portfolio management capabilities across the six organizations was the level of change, evidence of continuous change and evolution of capabilities.
Lacruz et al. (2019)	They studied a PMO of a non-governmental organization using a dynamic capabilities approach.	They concluded that the PMO and its functions do not constitute a dynamic capability, but rather that the PMO can be understood as a resource capable of providing the organization with dynamic capabilities.

In the literature it is not, still, clear if the PMO acts as a dynamic capability or if it operationalizes the dynamic capabilities, besides it is not clear too how the capabilities enhance the projects' results through the PMO. Thus, one of the objectives of this research is to advance in this direction.

3 RESEARCH DESIGN

We conducted qualitative research and used as research strategy the case study (Yin, 2001). The PMO investigated is a reference for the work developed because of the awards it has received. Therefore, it is considered a rare case.

The object of the empirical investigation is a corporate PMO of a financial group in Brazil, winner of national and international awards, with global prominence. Given this, our premise is that this PMO impacts the project portfolio performance, so we investigate how this process happens.

In order to perform the data checking and verification, which enables a high-level quality and reliability in case study (Yin, 2001), we check documents and interviews from Internet as sources of evidence. This methodological procedure gave the conditions for using data triangulation in the analysis (Casey & Murphy, 2009). The documents analyzed was financial bank presentations and reports. We conducted semi-structured interviews with the PMO managers and project managers, following Spradley's instructions (1979). For data analysis, we used content analysis technique (Bardin, 2011).

Before starting the interviews, we show the research and project objectives in general. During the interviews we used descriptive, structural, and contrast questions. In total, we conducted 11 interviews, from July to October 2020, having 635.92 minutes, using the Microsoft *Teams* communication platform (Table 1).

Table 1 - Data from the interviews

Interviews	Interview duration (minutes)	Function	Time in position
1	57	Corporate PMO Manager	8 months
2	103	Corporate PMO Area Manager	1 year and half
3	81	Corporate PMO Area Manager	1 year
4	103	PMO Analyst	6 years
5	58	PMO Analyst	5 years
6	54	PMO Analyst	3 years
7	38	PMO Analyst	5 years and half
8	31	Project Manager / Product Manager	3 years
9	35	Project Manager / Accounting Manager	8 years
10	27	Project Manager / Credit Manager	4 years
11	49	Project manager / Product area departmental PMO manager	3 years

Source: Elaborated by the authors.

The research subjects are the PMO team: specifically, the managers, PMO analysts, and project managers. Managers are the leadership role facing the PMO and the service provided, the analysts are the PMO people, responsible for carrying out the activities and functions, and the project managers are "users" of the PMO service and they have straight contact with the PMO, that is because they are de interviewer subjects. The information coming from these three different participants, gave us conditions to see the phenomenon from different perspectives and that allows more accurate and convincing findings, reducing bias coming from the data collected in the interviews.

To minimize the risks of uncritical bias, we operationalized the *corpus* closure by theoretical saturation, i.e., when data collection no longer generated new insights or did not reveal new properties (Glaser & Strauss, 1967).

A semi-structured interview protocol was designed based on the document analysis, according to the proposal of by Spradley (1979) – i.e., involving introductory, descriptive, structural, contrasting, and exit questions. We validated the interview script with two experts in the field of project management and PMOs.

For data analysis, we did not start with categories defined a priori, therefore the first step for data treatment was to transcribe the interviews in full, which totaled in a text corpus of 124 pages. After material selection and floating reading, we explored all content through coding, where we cut the collected material, according to the relevance of excerpts and speeches of the interviewees, in record units.

Then we made the first phase of coding, defining, and establishing labels for these units. We navigated through the entire content of the text corpus to identify elements whose characteristics would allow for categorization (which we initially performed through a label). After establishing the labels, the content were grouped into common subcategories and finally into categories. Finally, we compared subcategories to look for differences and similarities that allowed for the inclusion in a subcategory or the creation of new subcategory.

Table 2 shows the result of the process of data treatment. For this study, we identified 41 labels, 13 subcategories, and 7 final categories.

Table 2 - Result of the coding process

Labels	Subcategories	Categories	Related Objective
Pillars of action	Pillars of action and functions	Functions and characteristics of the PMO	Describe how the PMO influences the performance of the project portfolio
PMO directive			
Project office structuring			
Collaborative PMO			
Project structuring			
PMO advisory			
Institutional development			
Dissemination of knowledge			
Exemption	Feature		
Organizational structure	Position in organizational structure	Position in organizational structure	
Exempted position	Exemption characteristic		
Training and knowledge	---	Contributions of the PMO to project performance	
Project structuring			
Self-evaluation			
Integration			
Maturity in project management			
Risk management			
Exemption			
Maximization of deliveries			
Strategic vision			
Cost evaluation	Objective metrics	Metrics and frequency of evaluation project performance	
Risk assessment			
Schedule Evaluation			

Executive milestone indicators			
Evaluation of agile projects (story point)	Agile project metrics		
Benefits management	Subjective metrics		
Evaluation according to the project	Frequency of the performance evaluation		
Biweekly / monthly evaluation			
Need to show the value	Adaptation to internal factors	Transformation and adaptation of the PMO	Analyze whether the PMO, as an infrastructure resource, acts as a dynamic capability or operationalizes dynamic capabilities
Be sustainable			
Constant adaptation			
Digital transformation	Adaptation to external factors		
Financial market			
Troubleshooting	---	Impacts of external factors on the portfolio and the role of the PMO	
Celerity			
Regulatory demands			
Management of impacts on the portfolio			
Change management			
Knowledge sharing	---	Consolidation of learning	
Promoting interaction			
Valuing learning			

Source: Research data.

4 RESULTS AND DISCUSSION

In this section we present the results of the two research objectives: (i) describe how the PMO influences the project portfolio performance and (ii) analyze whether the PMO acts as a dynamic capability or operationalizes dynamic capabilities.

4.1 How the PMO influences project portfolio performance

We describe how the PMO influences the project's portfolio presenting: (i) the categories that emerged from the coding process; (ii) the characteristics and functions performed by the PMO object of study and its contribution to the project portfolio performance; and (iii) the metrics used to measure the project portfolio performance.

4.1.1 Characteristics and functions of the PMO and the contribution to project portfolio performance

The PMO studied was created in 2009, for controlling a system architecture program. In the following years, its functions and services have expanded, which suggests the adaptability of the PMO. In this sense, Crawford (2011) points out that not all PMOs are created in the same way.

The department in which the PMO pertains reports to a specific organizational structure; however, the PMO reports to another organizational structure. This definition was set to give and maintain exemption in the way of acting of PMO concerning the department's projects.

Regarding the types of PMOs, there are several, and they vary according to the control and influence exercised in projects (Project Management Institute [PMI], 2017, Hobbs & Aubry, 2007). They can be PMOs of support, control, or directive.

Regarding to the characteristics and functions performed by the PMO, we found that the PMO has functions divided into three pillars of action: advisory, collaborative, and directive.

> So basically, the PMO is structured on three pillars, which has a range of services, then the directive PMO that we say that makes the monitoring, by the advisory that structures project offices in the department, precisely to foster and pollinate knowledge, in addition to doing structuring of new projects also, that are considered strategic for the bank. We also have the third pillar that is a pillar of knowledge right, which is the dissemination of knowledge is good (Interviewee 6).

On the directive front, functions make it possible to follow up and monitor the progress of projects, support the project manager, decision-makers and escalate decisive situations to higher management levels.

The PMO performs several consulting functions on the advisory front, such as diagnosis, structuring, planning projects, guidelines, and recommendations of methodologies for execution and monitoring. Also, on the advisory front, the implementation of sector PMO is performed, which are PMOs with a similar format to the corporate PMO, but focused on sector projects. The corporate PMO performs a diagnosis of the needs of the requesting department, performs the maturity measurement in project management, and performs the implementation of the EDPs, which are the local offices. In addition, the corporate PMO annually performs reassessments to monitor the evolution of maturity and institutional development.

On the collaborative front, functions perform for the dissemination of project management knowledge. The PMO prepares and provides training in the area, promotes content and updates, conducts lectures, meetings to share knowledge and lessons learned, seminars, and awards events.

The PMO functions are aligned with the most relevant functions of the job mix identified by Hobbs and Aubry (2007). The ten functions identified as most relevant are: report the status of the project to senior management; develop and implement standardized methodologies; monitor and control the project's performance; develop people skills, including training; implement and operate a project management information system; provide recommendations to senior management; coordination between projects; develop and maintain a project evaluation dashboard; promote project management within the organization; and monitor and control the PMO performance.

The task sets, responsibilities, and behavior patterns of each PMO determine how it acts concerning stakeholders and describes how the PMO achieves its goals (Otra-Aho et al., 2018).

The PMO functions that contribute most with the performance of projects are risk management, strategic vision, project structuring, integration of teams and sectors, and especially the training and knowledge generated by the PMO. The emphasis on the function of training and knowledge deserves such importance because it feeds back all the other functions performed by the PMO and impacts all those involved in projects.

These findings goes against the results of Hobbs and Aubry (2007), since the function of developing people's skills, including training, ranked fourth in importance, with 65% relevance in their study. The functions of risk management, strategic vision, project structuring, and team integration, on the other hand, are not among the ten most essential functions. We believe that this divergence arose because of the current context and sector analyzed. This organization pertain to financial sector, in a high dynamic reality, with many departments in its hierarchy. As a large company, there is difficulty for integrating their functional areas. In addition, some professionals assume functions like projects managers, but without having formal technical knowledge or experience. Finally, the financial sector has a high regulation index in Brazil.

> Moreover, I say that the greatest contribution is in this training, in this support that we give training, we have training in project management, we have training that is already coming out there for agile, so I enter the project, I leave the team trained, so when I left, my tiny seed was left there with structured training for them (interviewee 1).

> So the PMO arrives with the knowledge of project management. It organizes the work to be done, sets goals, sets deadlines, and transmits knowledge to people there about project management. [...] We even comment on this through the community, then we distribute knowledge, share knowledge, train people, and do this continuously, whether at the community level or the project level. I think this is how we end up contributing to the success of the portfolio (Interviewee 3)

In the study conducted by Aubry (2015), the author concluded that increasing the PMO support function improves project performance, business performance, and project management maturity.

4.1.2 Project portfolio performance metrics

We identify, mainly, objective metrics such as deadline and cost, but also subjective metrics such as the evaluation and the management of benefits after the project completion. There is, also, the monitoring of project performance through the agile methodology, this being recent, using Story Point, a metric that evaluates the planned *versus* accomplished, based on the amount of time used and remaining time.

In general, the PMO uses the same metrics from the literature, and one can cite the study of Aubry (2015), which considered budget compliance, compliance with deadlines, and scope delivery. Aubry (2015) also examined the business performance, analyzing the benefits that projects and programs generate for the organization. Barbalho et al. (2014) specifically considered the deadline performance. Otra-Aho et al. (2018) considered the metrics that the authors divided into efficiency and effectiveness of projects, where efficiency is related to time and cost and effectiveness are related to creating quality results and contributing to the business objectives. Lacruz et al. (2019) also considered the triple project constraint, scope, time, and cost.

> We have a scheduling metric, which is a traditional metric of schedule deviation, from planned and actual, cost deviation, budget versus actual. Furthermore, there are the metrics now that we are doing of benefits management, so what is the ROI of the project, what is the return on investment, what are the qualitative benefits [...] (interviewee 4).

Thus, according with results the metrics they use for portfolio performance metrics are those traditional metrics found in literature, that is mainly time, cost, budge. Therefore, it is fulfilled the first main objective of this study, to describe how the PMO influences the project's portfolio performance.

4.1.3 PMO acts as a dynamic capability or operationalizes dynamic capabilities

Analyzing the role of the PMO concerning to dynamic capability three categories arose: transformation and adaptation of the PMO, impacts of external factors on the portfolio and the role of the PMO, and consolidation of learning (cf. Table 2).

The transformation and adaptation theme proved to be relevant for the PMO, being recurrent in the PMO reality, having different sources, because of bank's digital transformation, the need to generate value for the organization and prove to be sustainable, or even the dynamic reality of the financial sector itself, the PMO is in constant transformation and adaptation.

This category is directly related to the concept of the term dynamic. Teece et al. (1997) define the term as the ability to renew competencies to obtain concordance with the changing environment. When taken to the level of dimensions of dynamic capabilities, it is related to reconfiguration capability since, according to Teece et al. (1997), the dimensions that pertain to dynamic capabilities are: coordination/integration capability, learning capability, and reconfiguration capability, whereby reconfiguration capability is related to the ability to perceive the need to reconfigure the organization's asset structure and to conduct the internal and external transformation required in a rapidly changing environment.

This reality of the PMO is observed in the excerpt:

> Considering the dynamics of the financial market in which you have, especially now with the big techs, you have new entrants, and you have startups, you have increased the use of digital channels; this leads us to have different project characteristics. Therefore, the PMO needs to be always at the forefront of methods, processes, technology and even observing what the executive expects from these projects for the PMO to act, so this very relevant issue of change that we live (Interviewee 3).

Teece (2007) subsequently presented other dimensions of dynamic capabilities. These are: a) the *sense* capabilities, which are capabilities to monitor and identify opportunities, b) *seize* which is to evaluate existing and emerging capabilities and possible investments, and c) *transforming*, which is the ability to create, extend and modify the resource base when the company grows and the market changes (Teece, 2007).

Once again, the category " transformation" is related to the dimension of *transforming* capability, which, as Teece (2007) clarifies, refers to the understanding of how managers implement new strategies for the organization; reconfigure resources as of decisions; implement new management methods, create or modify strategy and marketing methods; create or modify markets and objectives; create or modify technological equipment, processes in service delivery, manufacturing; create or modify procedures and systems; launch new services, products, processes, structures.

In the category "impacts of external factors on the portfolio and the role of the PMO", the factors that most impact the bank's project portfolio are the regulatory demands and the market demands. When the bank receives these demands, the PMO acts in this management to organize the existing demands, i.e., that are being executed, with the new demands, control and manage changes in scope, the impact they cause and giving the necessary speed.

> [...] take a project, for example, the one I am working on for instant payments; it is market demand, a regulatory demand that is, but it is also a market demand. BACEN [Brazilian Central Bank] identified this need to orchestrate a new payment system that is instant, like what happens in the market abroad, where you have your checking account, you scan a QRcode, and this is debited from your account, this ended up becoming a project and ended up in our portfolio and so, because it is a relevant project . . . the PMO ends up helping, either in observing the impact that that change is bringing or even in controlling to ensure that that change is made but does not generate impact on other issues already directed (Interviewee 3).

> It is essential because, in practice, the PMO, for orchestrating all these initiatives and making this correct assessment before effectively sequencing as a project, acts strongly in this management of demands (interviewee 11).

The way the PMO acts concerning external factors and their impacts is related to the dynamic capability dimension, identified by Teece et al. (1997) as the coordination/integration capability, which is the ability of managers to coordinate and integrate the internal and external activities of the organization. However, the PMO does not play any direct role or activity in market analysis and search for new opportunities; this role is played by each specific sectors and their people in the financial bank.

Learning consolidation was the third category identified and is regarding to the last research objective, and the main themes were knowledge sharing, promotion of interaction, and appreciation of learning. The interviewees were unanimous about the role and the importance of the PMO concerning learning, which is promoted both internally in the PMO, as well as externally, through meetings and lectures promoted for the exchange of experiences of managers and project teams and departmental PMOs, sharing of lessons learned and practices adopted in projects and interaction of teams. In addition, the PMO also conducts training for disseminate project management knowledge and leveling the knowledge of those people who are not trained. Another activity is the project management community inside the bank, which is the largest project management community in Brazil after PMI. Through this community, meetings, panels, and updates are held in general on various topics related to project management. The learning and knowledge theme has high importance, a pillar of the corporate PMO, the collaborative pillar, where all these actions are developed. In addition, there is exchange among the PMO team itself for the exchange of experience accumulated in the experience and management of all projects.

The category "consolidation of learning" give us the possibility of reflection taking the seminal study from Crossan et al. (1999), a complimentary reference of this study. These authors developed a structure for the process of organizational learning through four processes - intuition, interpretation, integration, and institutionalization - linked to the individual, group and organizational levels. The analysis of the dynamic nature of organizational learning is of utmost importance because even if individuals interpret relevant things and have perceptions, the learning needs to be integrated and institutionalized to realize its value then. The role of experience in the development of shared

knowledge reinforces that knowledge is interconnected with the actions and behaviors, that is, so that happens the consolidation and institutionalization, it is necessary the change of attitude and behavior with the acquired knowledge so that then, the institutionalized learning has a positive impact on organizational performance.

We identify that the knowledge transfer process that takes place daily of the PMO, through the experience accumulated in the management of various projects and the systemic view of the portfolio, enables the application of knowledge between projects.

> Through the community of practice, we promote events related to lessons learned, sometimes we even bring the manager of that project for a talk of about 20 minutes that he shares his experiences, demonstrates his delivery, in short, we share so . . . in the day to day of the project as well, so we take, for example, we are working on a project that requires, I do not know, a new technology, or suddenly some project that requires, that is related to some project, such as the GDPL [General Data Protection Law] project, the GDPL project is in our portfolio, so if we are in another project and we see that it touches the GDPL law, we will bring the GDPL team to this conversation, so we end up, by having this holistic view, by having an extensive portfolio, we end up supporting in this way too, and this ends up allowing the transfer of knowledge, yes (Interviewee 3)

In the following speech is possible to view of the actions developed by the PMO in order to provide and disseminate knowledge, summarized in project management training provided by the PMO, implementation of departmental PMOs, and the actions and events conducted by the PMO in order to integrate the internal community of project management.

> Today, the corporate PMO within the bank is responsible for producing the official training of the corporate project management methodology. They have a partnership with […] our corporate university, to produce educational content on the project management theme because it is understood that the area is the specialized area so that it can share relevant issues and methods about this science. [...] There is also the community of project managers, the PMO is responsible for orchestrating the community, where it brings together all the project managers at the corporate level in the bank, and every month we are invited to give a lecture, contribute with a subject, or an idea that was implemented and worked. So the community has a very vision character of engaging people in this sharing of ideas, best practices, including certifications. [...] So this dissemination occurs both by collaboration between people, between teams, as by the formal meeting, which is very much in the format of a Ted Talk, where all dependencies have this openness so that issues are guided, ideas are guided, and the community is the one who collaborates and shares with that theme that is being exposed, so this generates knowledge, generates learning (Interviewee 8).

The learning ability is one of the dimensions belonging to the dynamic capabilities. Learning enables that through repetition and experimentation, tasks are executed better and faster, in addition to identifying new production opportunities (Teece et al., 1997).

Winter (2003) differentiates routines, those considered a learned behavior, highly standardized, repetitive, or almost repetitive, from dynamic capabilities, which operate to extend, modify or create common capabilities or routines.

We confirm that this PMO can renew and reconfigure the organization's asset structure, in this case, processes and the way they act. That is a necessary capacity in a dynamic and changing environment like that. It has

the capacity for coordination and integration because it coordinates, integrates, and manages new demands and projects, which arise from regulatory requirements, market, customer demand, digital and technological transformation, as well as the impact of these new projects in the project portfolio. Moreover, it has the learning capacity, which contributes to the maturity in the organization's project management. It mainly allows a better work execution and direct contribution to the performance of the project portfolio due to its experience accumulated in project management and its ability to apply the acquired knowledge.

We confirm Tshuma et al. (2018) paper result, who argue that PMOs have a critical role as a facilitator of the knowledge flow between projects and generate competitive advantages for organizations. The PMO performs the coordination, develops and maintains a solid knowledge base, supports and cultivates project management standards to improve communication and knowledge transfer between projects, carried out through the infrastructure management and knowledge transfer processes.

The PMO has dynamic capabilities, and as an infrastructure resource responsible for coordinated project management functions under its domain (Aubry, 2015) influences the performance of projects and portfolios, the organizational units, and the organization. This result agrees with Ichsan et al. (2017) and Ichsan and Sadeli (2020).

As a complement, the PMO's dynamic capabilities, it is convergent with Killen and Hunt (2013). They found that the PMOs project portfolio management capabilities encompass three main dimensions: processes, structure, and people.

On the other hand, the study diverges from the result found by Lacruz et al. (2019) who is a study on a PMO of a third sector organization, pointed out the PMO as a driver in obtaining a sustainable competitive advantage (i.e., the authors argue that the PMO does not constitute a dynamic capability). Neither its functions are dynamic capabilities but a resource capable of providing the organization with dynamic capabilities.

The PMO indeed acts as a facilitator since it is not directly responsible for the execution of the project; however, it supports the organizational units in the execution and thus contributes to the performance and performance of projects and portfolios. Similarly, Aubry (2015) verified in the context of change and environment transformation the positive impact of the PMO in the project's performance, especially with the support role and with the role of integrating entity.

The PMO's contribution is through the operational capabilities of the PMO, which are the processes and routines, functions, structures, and people, which make the dynamic capabilities influence performance. Table 3 shows the synthesis and relationship of categories x objective x findings.

Table 3 - Synthesis and relationship of categories x objective x findings

Categories	Related Objective	Findings
Functions and characteristics of the PMO	Describe how the PMO influences the performance of the project portfolio	The most important function performed by the PMO is the training and knowledge function. The performance metrics used are the traditional metrics from the literature, that is, mainly time, cost, budget.
Position in organizational structure		
Contributions of the PMO to project performance		
Metrics and frequency of evaluation project performance		
Transformation and adaptation of the PMO	Analyze whether the PMO, as an infrastructure resource, acts as a dynamic capability or operationalizes dynamic capabilities	The PMO, as an infrastructure resource, has dynamic capabilities and influences the performance of projects and portfolios. The PMO can renew and reconfigure the organization's asset structure, coordination and integration capacity, and learning capacity.
Impacts of external factors on the portfolio and the role of the PMO		
Consolidation of learning		

5 CONCLUSIONS

In this study the PMO contributes to the performance of the project's portfolio. This is, notably, relevant when discussing the effectiveness of project's portfolio results – therefore is not possible, in this moment, to generalize this conclusion.

This PMO, as an infrastructure resource, possesses dynamic capabilities and influences the performance of projects and portfolios. This finding is consistent with Petit and Hobbs (2010), Biesenthal et al. (2012), Killen et al. (2012), Ichsan et al. (2017) and Ichsan and Sadeli (2020). Additionally, he PMO can renew and reconfigure the organization's asset structure, coordination and integration capability, and learning capability.

The results provide information and knowledge for practitioners about: a) how the PMOs impact the performance of project portfolios; b) how it functions as a differential and the metrics to analyze the performance of the project portfolio; and c) how to boost the projects´ results. These practical implications suggest that organizations managers should design their PMO to capture, store, develop, and share the knowledge coming from project management, because the dynamic capabilities can be appropriately leverage to a high level of portfolio performance. Therefore, professionals linked to PMOs should consider promoting learning skills, coordination and integration and transformation to improve the project portfolio performance, generating more value for their organizations.

We are taking caution in interpreting these results because cause-effect cannot be established in case studies methodology. Therefore, there is a contribution for future research considering that a relationship was found and can be used in future studies (see Table 2).

The theoretical contribution shows: a) the PMO has dynamic capabilities b) the PMO understands how these dynamic capabilities impact and c) the PMO enhance the project portfolios performance. Therefore, this study contributes to literature indicating the importance of a better understanding of dynamic capabilities in corporate PMO, since the PMO is an infrastructure resource, in the Brazilian financial sector.

The analytical structure proposed indicates that the PMO is an catalyst and a supporter for organizational units in the execution of projects. The PMO influences the projects portfolio performance through: a) the systemic and strategic vision of the portfolio of the financial institution, b) the integration between the various teams and sectors, c) the training and the knowledge generated to the projects teams, in both technical training and in the knowledge accumulated by the experience and performance in projects, and d) through processes of organizational learning. These results are convergent with the propositions of (Crossan, et al., 1999).

We suggest that future research go deeper into themes like the process of transformation and adaptation of the PMO. Besides, how this process is related to the PMO impact on the project's performance portfolio, also, the deepening on the importance of understanding the PMO performance by the other organizational units can reveal the reasons for the apparent contradiction between the PMO contributions to the organization's performance and the questioning about its legitimacy.

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