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The Dynamics of PMO in Construction Companies: A Systematic Literature Review

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ABSTRACT

The construction sector has seen Project Management Offices (PMOs) become essential, as they aligned project management practices with the strategic goals of the organization. As the complexities of construction projects increase, it is urgent to evaluate the functions, advantages, and challenges related to PMOs. This systematic review synthesizes current scholarly research to investigate how PMOs facilitate strategic alignment, operational effectiveness, and the incorporation of technology within construction enterprises. Through a thorough examination of existing literature, the research explores several factors of PMO execution, including strategic functions, operational efficiency, workforce dynamics, technological assimilation, and regulatory frameworks. The results demonstrate that PMOs considerably enhance project management effectiveness by aligning resources with corporate objectives and refining operational process through technological advancements. Nevertheless, challenges remain, such as organizational resistance, bureaucratic inertia, and the difficulties PMOs encounter in evidencing measurable value. These challenges highlight the necessity for flexible PMO frameworks that integrate Agile practices and utilize emerging technologies such as artificial intelligence and machine learning. Such innovations could enhance predictive capabilities and inform decision-making processes. To fully employ the potential of PMOs, forthcoming research should prioritize the establishment of comprehensive models for assessing PMO effectiveness and improving stakeholder engagement approaches. By proficiently articulating the value of PMOs and ensuring their alignment with organizational strategies, construction firms can evolve PMOs from mere administrative support roles into strategic collaborators that foster competitive advantage and sustainable development. This review offers a strategic guide for the effective utilization of PMOs, stressing the significance of aligning their organizational structure with corporate strategies and the dynamic demands of the industry. Through persistent innovation and strategic coherence, PMOs can play a crucial role in enhancing the success and sustainability of construction initiatives within the increasingly competitive global landscape.

KEYWORDS

Project Management Office, Construction Companies, PMO Roles, PMO Implementation

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1. INTRODUCTION

In an increasingly complex and swiftly changing business landscape, the Project Management Office (PMO) has emerged as an essential element in contemporary project management, vital for ensuring that projects are carried out effectively and successfully across diverse sectors, including construction. Projects are generally defined as temporary initiatives with specific objectives and durations (PMI, 2017), typically concluding in disbandment or transition upon the fulfillment of their aims (Jacobsson et al., 2013; Lundin & Söderholm, 1995). This temporary characteristic of projects prompts inquiries into the function and essence of PMOs, which are frequently instituted to oversee these initiatives. A PMO may be formed as a temporary entity to facilitate extensive projects with defined timelines or as a more enduring structure that aligns with the long-term strategic aspirations of an organization. Temporary PMOs may be disbanded post-project completion, potentially resulting in the erosion of vital project management expertise, as highlighted by Aubry (2011).

In contrast, more stable PMOs can adapt and progress in response to the evolving strategic imperatives of the organization, as illustrated by the descriptive framework of Hobbs and Aubry (2010), which outlines PMOs within the organizational context through their structural and functional characteristics. As the demand for PMOs escalates, numerous organizations acknowledge that this paradigm may efficiently address the complexities and delays inherent in project management processes (Artto et al., 2011; Martins & Martins, 2012; Singh et al., 2009). Andersen et al. (2007) assert that PMOs facilitate systematic coordination and integrated oversight of essential project activities, thereby augmenting project success within organizations.

Within the construction industry, among inherent complexities and uncertainties, the PMO assumes a crucial role as a strategic element of project management. The intrinsic unpredictability in all aspects of a project (Haghighi et al., 2019) necessitates thorough visibility and monitoring from initiation to conclusion. In this context, the PMO emerges as a vital entity, offering frameworks for efficient decision-making and risk management, thus becoming an indispensable component of project-oriented organizations. This systematic academic review aims to conduct a thorough examination and comprehensive synthesis of the extensive literature on Project Management Offices (PMOs), especially within the context of construction enterprises, which are frequently characterized by their unique operational challenges and intricacies. By examining the complex duties that PMOs assume, their critical input towards project accomplishments, the many hurdles they encounter, and the different methods they adopt, this paper seeks to shed light on and offer a more refined perspective on how PMOs can greatly boost the comprehensive abilities of project management while concurrently aligning with the broader aspirations and targets of the organization.

2. Utilization of the PMO in Construction Companies

To enhance the foundational understanding of the Project Management Office (PMO) introduced earlier, it is essential to conduct a comprehensive examination of the specific roles and practical applications of PMOs within construction firms, where they play a strategically crucial role in ensuring project execution aligns with overarching organizational goals and objectives.

The supportive role of a PMO is particularly noteworthy as it encompasses the provision of essential tools and resources such as expert consultation, standardized templates, and comprehensive training sessions, all of which collectively ensure that project managers are equipped with the requisite resources and pertinent information necessary to effectively carry out their responsibilities. This specific function not only enhances the execution of daily project tasks but also guarantees that best practices are consistently applied across all facets of the project lines, thereby fostering a culture of excellence and efficiency. On the other hand, the controlling role places significant emphasis on ensuring adherence to established policies, standards, and

procedures, which is crucial in the oversight of projects as it minimizes potential errors while simultaneously enhancing the consistency of outcomes achieved throughout the project lifecycle. Lastly, the directive role is characterized by its provision of centralized authority to guide projects, thereby facilitating a streamlined command structure that ensures that the achievement of project goals is executed with the highest levels of efficiency and effectiveness (PMI, 2021).

In addition to creating a defined methodological framework for project management, PMOs guarantee that all project activities are consistent and strategically linked with the organization's broader goals. Tulembayev et al. (2019) assert that strategic alterations in organizational structures, including the formation and incorporation of PMOs, significantly improve the execution of effective project management methodologies, which are deemed essential for mitigating the inherent uncertainties typically associated with construction projects (Abeywardana et al., 2023; Haghighi et al., 2019).

When it comes to construction, the establishment of a PMO provides notable benefits, since it aids in aligning project aims with company goals, fosters optimal resource management, creates uniform processes, boosts communication flow, and enhances risk management effectiveness. The positive ramifications of PMOs on critical aspects such as project scheduling, budget management, stakeholder engagement, and overall quality outcomes have been extensively documented and recognized within the industry. As observed by Umasekar (2024), in the context of advancing sustainable practices and fostering the adoption of innovative technologies, the PMO positions itself as a fundamental pillar of success in the realm of construction projects.

Moreover, PMOs play an integral role in addressing numerous challenges that are often encountered within the construction industry, including issues such as inadequate delivery of project outputs, cost overruns, and delays, as underscored by Alghaseb (2023). Studies suggest that following proven project management benchmarks, particularly in relation to the ten knowledge areas defined by the PMBOK, helps to bridge the gap between the application of these standards and the results produced, significantly boosting the probability of success in construction endeavors (Pirotti et al., 2022).

Within the expansive landscape of the construction industry, PMOs assume a multitude of functions, which include knowledge management, as they act as centralized hubs for the accumulation and dissemination of organizational learning resources (Arbabi et al., 2020; Lacruz & Cunha, 2018; Lucca et al., 2020), supportive roles that provide essential operational services and support mechanisms (Braun, 2018; Otra-Aho et al., 2019), as well as innovation drivers that propel projects towards excellence and foster long-term growth and sustainability (Ershadi et al., 2021; Sergeeva & Ali, 2020).

By significantly enhancing coordination and efficiency through systematic evaluations of company performance metrics and the standardization of processes (Carvalho et al., 2018; Fateev & Zaporozhets, 2020), PMOs effectively ensure the consistent implementation of governance controls. This oversight is essential as it leads projects while simultaneously providing robust support for the operational activities conducted within the company (Eriksson & Leiringer, 2015).

The roles played by Project Management Offices (PMOs) in the realms of strategic oversight and portfolio administration are profoundly impactful, contributing immensely to the enhancement of project value and the overall success of portfolio management endeavors, as evidenced by the research conducted by Bagherpour and Erjaee in 2017 and further supported by the findings of Ko and Kim in 2019. In executing these vital roles, PMOs ensure that the distinct targets of individual projects are adequately fulfilled while also serving a crucial function in facilitating the achievement of larger organizational strategic goals, harmonizing project outputs with the overall vision of the organization.

From an organizational standpoint, the presence of PMOs significantly elevates overall performance metrics by empowering various resources, thus facilitating the enhancement of work efficiency and subsequently increasing levels of customer satisfaction, as articulated by Desmond in 2015. The effective implementation of these multifaceted functions not only demonstrates the indispensable nature of PMOs but also underscores their role as essential instruments in surmounting operational complexities that frequently arise, while simultaneously bolstering the competitive edge of enterprises in the marketplace.

In the context of the dynamically evolving construction industry, PMOs have gone beyond their traditional administrative functions to emerge as strategic partners that contribute to sustainable success and growth trajectories within the sector. The increasing acknowledgment of PMOs' significance in enhancing the efficiency and effectiveness of project management practices illustrates their vital role in steering project portfolio management practices, standardizing operations, and fostering methodological developments that are critical for the successful completion of projects, as noted by Taylor in 2016.

As the discipline of project management undergoes rapid evolution, the responsibilities and the workload assigned to PMOs have also seen a considerable expansion and diversification. Acting as central hubs for synergy, PMOs support a more structured and repeatable application of project management tasks, thereby driving the expansion of their roles and responsibilities, which in turn presents tangible benefits for construction organizations engaged in complex project endeavors, as highlighted by PMSolutions in 2016.

PMOs provide companies with the capability to systematically visualize, plan, execute, complete, and document each project in a coherent manner, while also offering invaluable insights that are essential for prudent resource forecasting and budget management. By identifying optimal investment strategies for project activities, PMOs ensure that available funds are utilized efficiently, thereby avoiding any wasteful expenditures, as emphasized by PMSolutions in 2016. In addition to this, by providing essential infrastructure, such as managerial tools and specialized expertise, PMOs act as centralized hubs for the exchange of best practice information and offer critical advice to project managers who may encounter various challenges during project execution.

The essential value that PMOs deliver within the construction industry extends far beyond merely reducing the rates of project failures; they actively support a culture of continuous improvement, integrated oversight, and centralized allocation of resources, as noted by Parchami Jalal and colleagues in 2015. Empirical surveys conducted within the industry have consistently shown that PMOs enhance overall performance through the effective delivery of project deliverables, the establishment and reinforcement of solid project management cultures and practices, as well as the promotion of sustainable knowledge management practices, as indicated by Desta in 2006. The significance of PMOs becomes increasingly evident as the demands for greater efficiency and robust leadership roles within the constantly evolving landscape of project management continue to grow, as pointed out by Bredillet and colleagues in 2017.

The extent to which a PMO contributes to construction companies is fundamentally rooted in its ability to synergize and coordinate internal project management activities across various departments, as well as to engage externally with business partners in a cohesive manner. PMOs facilitate the building of consensus in problem-solving scenarios, whether these arise in the context of routine meetings or through direct communication with external business partners, as articulated by Philbin in 2016. Moreover, PMOs play a crucial role in centralizing project management governance, thereby offering essential support to senior management in decision-making processes grounded in the most recent and relevant project status information, as outlined by Ozguler and Yilmaz in 2017 and Tsaturyan et al. in 2015.

Moreover, PMOs serve as catalysts for transformation and innovation within businesses, enabling the implementation of novel techniques and technologies that markedly improve project productivity and operational efficiency. By facilitating organizational learning and knowledge dissemination, PMOs ensure that best practices are developed and broadly implemented, thereby enhancing the company's overall competitiveness in the market.

As essential facilitators of knowledge transfer within organizations, Project Management Offices (PMOs) evolve into pivotal hubs for the accumulation and dissemination of experiential learning across various projects, thereby enabling the continual and sustainable development of organizational capabilities, as evidenced by the scholarly works of Martinez Sanz and Ortiz-Marcos (2020) and Pemsel and Wiewiora (2013). In conclusion, through the diligent implementation of strategic risk management frameworks, PMOs play a crucial role in assisting construction companies to systematically identify, assess, and mitigate potential risks in a coordinated and proactive manner, which ensures that these companies remain aligned with their overarching strategic corporate objectives while simultaneously enhancing their overall performance metrics.

Table 1. Key Functions of PMO in Construction Companies

Key Functions of PMO	Explanation	Sources
Strategic Alignment	PMOs are vital in aligning project goals with the overall organizational strategy. This ensures resource optimization and efficient project execution.	Tulembayev et al., 2019; Abeywardana et al., 2023; Haghighi et al., 2019; Bagherpour and Erjaee in 2017; Ko and Kim in 2019
Operational Efficiency	PMOs streamline processes, improve communication, and enhance risk management, leading to increased efficiency and better project outcomes.	Braun, 2018; Otra-Aho et al., 2019; Carvalho et al., 2018; Fateev & Zaporozhets, 2020; Eriksson & Leiringer, 2015
Technological Integration	PMOs facilitate the adoption of innovative technologies (AI, machine learning) for improved predictability and decision-making.	Umasekar; 2024)
Knowledge Management	PMOs serve as central hubs for accumulating, sharing, and disseminating project-related knowledge, fostering a culture of continuous improvement.	Arbabi et al., 2020; Lacruz & Cunha, 2018; Lucca et al., 2020; Desta, 2006
Stakeholder Engagement	PMOs improve communication and collaboration among stakeholders (clients, contractors, etc.), leading to better project outcomes	Philbin in 2016; Ozguler and Yilmaz in 2017 and Tsaturyan and colleagues in 2015

In a dynamic business atmosphere defined by rapid changes and unpredictability, adaptability and the support provided by PMOs are essential for the effective management of construction projects, which frequently encounter complex challenges. The emergence of PMOs within corporate structures is closely associated with the increasing number and complexity of managed projects, necessitating a more centralized approach to project management practices, as articulated by Aubry and Lavoie-Tremblay (2018). In the context of large construction enterprises, particularly those operating across multiple national or international business units, PMOs are strategically employed to foster more agile management frameworks that effectively coordinate both strategic and operational levels in relation to the myriad changes, risks, and issues that demand prompt and decisive intervention.

In the construction enterprises, the implementation of PMOs has clearly demonstrated significant benefits, functioning not only as operational entities in large projects that require intricate coordination but also within units that manage projects focused on profitability and the realization

of benefits (Ershadi et al., 2023). PMOs provide guidance, assistance, and process standardization for project teams (Ayyagari et al., 2006; Philbin, 2016) facilitating the detection and escalation of potential risks to project leaders (Ershadi, 2021), thereby ensuring that each project is executed efficiently and in strict accordance with the strategic plans and goals established by the organization.

Through the execution of these multifaceted roles and functions, PMOs emerge as more than mere project overseers or controllers (Melda et al., 2013); they become indispensable components in aligning internal processes with external challenges, thus reinforcing their importance in sustainable business development strategies (Philbin, 2016). As the construction industry progresses and adjusts to fresh challenges and possibilities, the role of PMOs is being increasingly acknowledged as crucial partners that add considerable value to ongoing success and development, promoting an atmosphere that is favorable for continuous refinement and originality (Ershadi et al., 2022; Umasekar, 2024).

3. Challenges Encountered by Project Management Offices within Construction Enterprises

Despite the widespread incorporation of Project Management Offices (PMOs) in numerous construction firms, a significant debate regarding their operational effectiveness and overall performance continues. Many organizations critically assess the ability of PMOs to deliver substantial value to current projects, while various academic studies highlight the ongoing and often considerable changes in the organizational structures that oversee PMOs (Hoffman, 2003; O'Leary & Williams, 2008; A. Pinto et al., 2010). Gaining a comprehensive understanding of the distinctive functions performed by PMOs, particularly in the areas of infrastructure provision, consultancy services, and technical support, is crucial for ensuring their contributions effectively mitigate risks and consistently align with strategic objectives over time (Bassi et al., 2018; DeGuzman, 1999).

On the other hand, there are reasons suggesting that PMOs may not consistently contribute to improving project outcomes in the construction industry. Numerous firms face significant obstacles in the successful deployment of PMOs, often resulting in increased expenditures without evident and measurable advantages (Singh et al., 2009). Furthermore, the recognized norms of project management, such as the Project Management Body of Knowledge (PMBOK), may not uniformly match the distinct demands of some construction efforts, thus not guaranteeing better success outcomes (Johnson et al., 2002). Companies that have embraced the concept of PMOs often report that the presence of inflexible structures and processes can significantly hinder the agility and responsiveness that are crucial in an industry characterized by its dynamic nature (Otra-Aho et al., 2019). Research indicates that PMOs may unintentionally create excessive bureaucratic procedures, leading to prolonged decision-making cycles and a decrease in operational effectiveness (Kwak & Dai, 2000).

A comprehensive comprehension of the complex function of PMOs reveals that their efforts in risk mitigation and strategic alignment do not consistently result in observable positive outcomes, and in some cases, the negative consequences may outweigh any possible advantages (Ayyagari et al., 2006; Pellegrinelli & Garagna, 2009; Qi et al., 2014). Empirical research has indicated that PMOs frequently encounter significant obstacles and face considerable organizational resistance that limits their functional operations within construction firms (Singh et al., 2009). These significant challenges include a subordinate position within organizational hierarchies, shortcomings in effectively conveying value to diverse stakeholders, and deficits concerning their contributions to improving project delivery skills. Moreover, the reluctance of C-level executives to fully endorse PMOs, along with the subsequent rise in overhead costs stemming from possible overstaffing, constitutes additional challenges that impede the effectiveness of these offices.

The failure of PMOs to achieve established goals and implement beneficial changes in project governance frameworks is a principal reason for the inability to attain expected value (Schibi, 2013). Extensive surveys indicate that a concerning 75% of PMOs are either dissolved or restructured shortly after their inception, primarily due to their inability to effectively showcase the anticipated added value (Stanleigh, 2006).

Additional factors that contribute to the shortcomings of PMOs in project-based organizations include their failure to provide adequate assistance in the successful completion of projects (Gartner & Folkedal, 2018; Kendall & Rollins, 2003; Ko & Kim, 2019), a tendency for excessively authoritarian approaches, and compliance with unsuitable reporting frameworks (Szalay et al., 2017). The lack of strong management support, excessive micro-managing of project tasks, and the creation of ad hoc relationships in project management contribute to the failure of PMOs (Boonzaaier & Van Loggerenberg, 2006; Kendall & Rollins, 2003).

In the extensive and diverse landscape of the construction business, Project Management Offices (PMOs) commonly deal with numerous challenges that arise from several sources and angles. Resistance to changes in project management tools and methodologies often arises when PMOs seek to improve organizational maturity by implementing innovative systems and established standards. Employees or entire departments accustomed to traditional practices may view these modifications as cumbersome, creating obstacles to effective implementation (Lines et al., 2015). The negative attitudes held by key stakeholders regarding the efficacy of PMOs can obstruct their successful implementation. The common critique that PMOs create unnecessary bureaucracy without providing real advantages must be thoroughly countered by clearly showcasing their positive effects and contributions to the organization (Güngör & Gözlü, 2017). Furthermore, measuring and monitoring PMO performance poses a unique challenge due to the significant absence of a comprehensive framework intended to identify and assess all critical performance factors necessary for evaluating PMO efficacy (PMSolutions, 2016).

Nevertheless, amid these challenges, there exist substantial opportunities for PMOs to strategically align project initiatives with broader organizational objectives and goals. They can serve as innovative hubs that facilitate the advancement of more mature project management practices through fostering organizational learning and promoting knowledge exchange among various stakeholders (Martinez Sanz & Ortiz-Marcos, 2020; Pemsel & Wiewiora, 2013). Thus, remarkable advancements in operational productivity, expense trimming, and general project success may be accomplished, fostering a more effective building atmosphere.

To fully capitalize on these opportunities, PMOs operating within the construction sector can enhance their potential by actively contributing throughout the entire project lifecycle: this involves providing continuous support during the tendering process, making informed procurement and resource planning decisions subsequent to project award, and acting in the capacity of internal consultants during the execution phase to effectively manage dependencies, uncertainties, and communications among all related parties (Widfross & Rosqvist, 2015). Successful PMOs have the potential to evolve into sophisticated units that ensure the sustainability of long-term value through the consistent achievement of favorable outcomes and the ongoing internal development of capabilities (Kaul & Joslin, 2018).

Nonetheless, it is crucial to recognize that gaps frequently exist between the expectations of the business and the actual structure and functioning of PMOs. The divergence from the strategic path of the organization creates challenges in ensuring that projects are carried out in alignment with the fundamental organizational objectives and targets (Taylor et al., 2015). A balanced focus on both operational and strategic dimensions is essential for PMOs to deliver satisfactory outcomes that are aligned with the evolving needs of the organization. The failure to achieve this desired level of success can often lead to frequent reconfigurations of PMOs that ultimately do not fulfill the original expectations set forth by the organization (Bredillet et al., 2018).

Another prevalent challenge faced by PMOs is their position within the organizational hierarchy, which is often relatively low, thereby obscuring their critical role in driving the implementation of organizational strategies through various projects. PMOs may at times struggle to secure the necessary support and endorsement from C-level executives, which can significantly diminish their capacity to contribute effectively to project delivery capabilities (Singh et al., 2009). The inability to surmount these challenges can lead to the PMO failing to demonstrate the anticipated value that it was designed to provide, ultimately resulting in a diminished interest from sponsors in supporting similar initiatives in the future (Bourne, 2006; Wood & Ma, 2008).

Furthermore, the successful implementation of a Project Management Office (PMO) encounters considerable obstacles in its endeavor to secure the backing and confidence of essential stakeholders who play critical roles within the organization. Findings have revealed a notable inclination for top management to oppose alterations initiated by the PMO, especially when such alterations are believed to negatively influence the established organizational culture and potentially escalate overhead expenses, as underscored in the study by Wood et al. (2016). To effectively navigate and transcend these challenges, it is essential for PMOs to provide robust, empirical evidence that illustrates their advantageous impact on risk mitigation as well as improvements in efficiency related to various project endeavors.

In addition to this, the task of ensuring a uniform application of PMO methodologies and policies throughout the organization emerges as a formidable challenge that must be addressed. The presence of inconsistencies in the application of such frameworks can engender conflicts between PMOs and project managers, particularly in situations where the established standards are either not adhered to or are met with a lack of trust by the primary actors involved in the projects, as noted by Barbalho et al. (2009) and Lines et al. (2015). This reality necessitates that PMOs achieve a status in which they are recognized as authoritative entities that possess the requisite expertise and trustworthiness, thereby securing the unwavering support of all stakeholders and ensuring that the methodologies they advocate for are both adopted and rigorously enforced.

Table 2. PMO Challenges in Construction Companies

Key Functions of PMO	Explanation	Sources
Organizational Resistance	Resistance to change from within organizations can hinder the successful implementation of PMOs	Singh et al., 2009; Lines et al., 2015; Kwak and Dai, 2000; Gungor and Gozlu, 2017; Lines et al., 2015; Wood et al., 2016;
Bureaucratic Inertia	Inflexible structures and processes can stifle agility and responsiveness, hindering the PMO's ability to adapt to changing circumstances	Kwak & Dai, 2000; Wood et al., 2016
Difficulty Demonstrating Value	PMOs often face challenges in demonstrating their measurable value, leading to scepticism among stakeholders	Kendall & Rollins, 2003; Stanleigh, 2006; Singh et al. 2009; Schibi, 2013; Gartner & Folkedal, 2018; Ko & Kim, 2019; Alghaseb; 2023;
Lack of Standardized Frameworks	The absence of a universally accepted framework for evaluating PMO effectiveness makes it hard to assess their success	Salameh, 2014; PMSolutions, 2016; Szalay et al., 2017
Inadequate Stakeholder Engagement	Poor communication and collaboration with stakeholders can undermine the PMO's effectiveness	Bourne, 2006; Wood & Ma, 2008; Schibi, O. 2013; Kendall and Rollins, 2003; Schibi, O., 2013; Güngör & Gözlü, 2017;
High Implementation Costs	The establishment and maintenance of PMOs can be expensive, leading to concerns about their financial viability	Singh et al., 2009; Alghaseb; 2023

Conversely, it is crucial to acknowledge that PMOs functioning in the construction industry face a plethora of notable prospects that can be leveraged for the enhancement of their goals. As the construction industry continues to expand and evolve, PMOs have the potential to play an indispensable role in the alignment of project strategies with overarching business goals that drive organizational success. They can act as key centers of innovation, fostering the amalgamation of initiatives that encompass various projects and advancing the overall development of projects through the processes of organizational learning and knowledge sharing, as articulated by Martinez Sanz & Ortiz-Marcos (2020) and Pemsel & Wiewiora (2013).

Furthermore, academic research underscores the strength of PMOs in reinforcing the connection between the strategic and operational tiers within construction organizations, which is a vital aspect of project management. A PMO that operates successfully has the capability to fulfill the pressing requirement for swift responses and adaptability in the face of the abrupt changes that are frequently encountered in the construction industry, as indicated by Oliveira et al. (2017). By capitalizing on this potential, PMOs are well-positioned to transform challenges into opportunities that result in enhanced operational efficiency, significant cost reductions, and improved performance outcomes for projects.

In order to fully leverage these prospects, PMOs must prioritize a proactive method for managing the expectations of stakeholders and nurturing a trustworthy atmosphere among all participants. This comprehensive approach encompasses the demonstration of the tangible value that PMOs offer, not just in terms of traditional project success metrics, but also through the lens of long-term enhancements in systems and processes that underpin project management practices. The success of a PMO within the construction field is not solely contingent upon quantifiable outputs; rather, it is also determined by its capacity to cultivate environments that are conducive to positive transformations and innovations in project management methodologies, as discussed by Hobbs & Aubry (2007) and Letavec (2006).

In conclusion, while the establishment and implementation of PMOs within construction firms present exceptional opportunities for the enhancement of project management practices, it is imperative to remain cognizant of the challenges that must be addressed in this context. Effectively addressing cultural resistance, reinforcing the authority of the PMO, and establishing consistent frameworks throughout the organization are all essential elements in guaranteeing that PMOs operate as strategic tools that markedly enhance overall project success rates. Consequently, resilient PMOs must prioritize the alignment of their structural and strategic approaches with the evolving demands and dynamics of the construction industry, while simultaneously persisting in their efforts to innovate and strengthen their internal capabilities to adeptly confront the challenges that lie ahead.

4. PMO Implementation Strategies in Construction Companies

As the complexity and multi-dimensional characteristics inherent in construction projects continue to increase at a remarkable pace, it becomes increasingly evident that there exists a pressing necessity for the adoption of more flexible and responsive paradigms concerning Project Management Offices (PMOs). Considering this insight, a rising count of organizations working in the construction sector are starting extensive research initiatives geared towards merging Agile techniques into their project management models, which not only enhance dynamic teamwork among group members but also help them to swiftly and effectively meet the changing demands and expectations of their patrons, as noted in the scholarly work by Unger et al. (2012). This pioneering approach is not merely beneficial for enhancing stakeholder engagement but also plays a pivotal role in streamlining decision-making procedures, thereby mitigating the bureaucratic stagnation that is frequently associated with conventional PMO structures, as articulated by Reddal (2024). Furthermore, embracing advanced information technologies, especially in the realm of cloud-oriented project management tools, offers a notable edge by

providing stakeholders with real-time insight into the condition and advancement of multiple projects, which in turn cultivates an atmosphere of openness while enhancing responsibility among the team members engaged in these efforts, as detailed by Qi et al. (2014) and further examined by Van Der Linde & Steyn (2016).

In light of the unique and distinctive characteristics that characterize the construction industry, the effective establishment and implementation of PMOs within construction enterprises necessitate the development of specialized and context-specific strategies that are finely attuned to the particularities of this sector. The proficient functioning of a PMO is predicated upon the careful identification of capabilities that can significantly improve project management outcomes, not only at the level of individual projects but also across a spectrum of concurrent projects, as clearly articulated by Alvarez-Dionisi (2017). In their comprehensive analysis, Oliveira and colleagues (2018) emphasize several critical sectors, including operations, human resources, and strategic planning, each of which is fundamental to the overarching organizational project management framework, as substantiated by the research conducted by R. R. Oliveira & Martins (2018).

Stettina and Hörz (2015) assert that processes, human resources, organizational structures, and technology represent areas that have the potential to significantly influence project performance outcomes (Liu & Yetton, 2007)(Hobbs, 2007; Julian, 2008). This research highlights the critical significance of strategy, organization, operations, technology, and policy in influencing performance outcomes in project management settings. The critical identification of these domains ensures that all essential performance aspects are comprehensively addressed, thereby establishing a robust system of Critical Success Factors (CSFs) for PMOs. Within the context of contemporary construction companies, PMOs assume an increasingly strategic role and are viewed as crucial instruments for the implementation of business strategies through the adoption of project portfolio management methodologies (Bredillet et al., 2017, 2018). The capabilities of PMOs in overseeing project execution enable the alignment of resources with business objectives, through the prioritization of specific projects and the application of effective strategic control principles in project management (Van Der Linde & Steyn, 2016). Furthermore, PMOs make a substantial contribution to the overall success of construction firms, enhancing operational effectiveness and ensuring the realization of long-term strategies that are in harmony with the organizational competitive positioning in the global marketplace. Ershadi (2021) highlights in his study the essential areas that should be focused on when aiming to create effective PMOs in construction firms, specifically: strategic, organizational, people, operational, and technology dimensions.

4.1 Strategic Dimension

In today's construction enterprises, the significance of Project Management Offices (PMOs) has emerged as a critical strategic component, increasingly recognized for their essential role in aligning corporate strategies with effective project portfolio management practices. Bredillet et al. (2017, 2018) explain how PMOs facilitate the efficient implementation of corporate objectives by leveraging their inherent oversight capabilities to prioritize projects that align with organizational goals. This strategic alignment demands an adaptable PMO structure that integrates seamlessly with existing corporate frameworks, thus optimizing operational efficacy and minimizing conflicts within the organization, an assertion supported by extensive research from Andersen et al. (2007), Lavoie-Tremblay et al. (2018a), Phan (2015), and Wang & Liu (2010).

Moreover, PMOs are crucial in matching emerging tender opportunities with the organization’s capabilities, strategically positioning selected projects for maximum contribution to broader business strategies. This is achieved through rigorous pre-project evaluations, supported by contributions from Abbasianjahromi & Rajaie (2012) and Kaplanoglu & Arditi (2010), which highlight the importance of analyzing the potential value of each project. Furthermore, PMOs are tasked with the critical competency of project portfolio management, underscoring the need for

a strategic approach to selecting and managing projects to optimize risk and resource allocation—a point strongly emphasized by Abbasianjahromi & Rajaie (2012). In an era characterized by rapid technological advancements and dynamic market shifts, the agility of PMOs is paramount. Teece et al. (2016) argue that PMOs must be equipped to respond swiftly to changes, whether they involve technological innovations or structural adjustments.

Despite the acknowledged strategic benefits of PMOs, it is essential to critically assess the potential limitations and drawbacks associated with their integration into organizational frameworks. Some critics raise concerns that an overreliance on PMOs may foster bureaucratic inefficiencies, as articulated by Kwak & Dai (2000), potentially stifling innovation. Rather than being facilitators of strategic alignment, PMOs risk becoming overly focused on compliance and process adherence, thus detracting from the flexibility and creativity crucial for navigating the complexities of the construction landscape (Ayyagari et al., 2006; Desta et al., 2006). Moreover, while many studies acknowledge the importance of strategic alignment, there is a significant gap in exploring how misalignment may render PMOs vulnerable and impair their efficacy.

Another critical limitation of PMOs pertains to their capacity to adapt quickly to technological advancements and evolving business structures. The prevailing assumption that PMOs possess the necessary agility to manage these transformations is often misleading. In practice, many PMOs may become entrenched in traditional methodologies, which inhibit their ability to respond effectively to change. Although researchers such as Teece et al. (2016), Sohoni (2009), and Ershadi (2021) advocate for PMOs to maintain flexibility in their configurations and approaches, the persistence of conventional practices may hinder their responsiveness, resulting in missed opportunities to leverage new technologies or adapt to shifting market demands. Consequently, the potential for PMOs to enhance an organization's competitive edge may be jeopardized if they fail to embrace the necessary agility and innovation that today's fast-paced environment demands.

In summary, while PMOs play a pivotal role in aligning projects with corporate strategies in construction enterprises, a comprehensive evaluation of their limitations, particularly regarding bureaucratic tendencies and adaptability issues, is crucial. Addressing these gaps may not only enhance the effectiveness of PMOs but also fortify their contribution to the strategic objectives of the organization.

4.2 Organizational Dimension

The efficient and effective functioning of Project Management Offices (PMOs) within the diverse operational landscapes of organizations necessitates several critical components. These include robust decision-making authority, thorough performance evaluation systems, substantial administrative power, and established communication channels, all of which are pivotal for facilitating effective project governance. Kutsch et al. (2015) emphasize that such organizational structures enable PMOs to oversee multiple construction projects with centralized governance and systematic oversight. Essential to this governance approach is the establishment of clear baselines and the application of consistent, methodology-driven frameworks that delineate responsibilities and expectations across various control levels, as articulated by Dai and Wells (2004). The adoption of a centralized and systematic methodology empowers PMOs to enhance organizational capacity, ensuring that all project elements are aligned with overarching corporate strategic objectives. This alignment allows PMOs to adeptly manage the complexities inherent in the construction sector, making them indispensable for setting standards, coordinating project activities, and fostering ongoing innovation in project management practices. This role is further illustrated by the work of Parchami Jalal et al. (2015), who affirm the PMO's contribution to organizational excellence, and is corroborated by studies from Desouza & Evaristo (2006) and Liu & Yetton (2007).

However, despite the recognized importance of PMOs, there exists a notable gap in the literature regarding the impact of organizational resistance and cultural misalignment on their effectiveness. This oversight prompts the need for further research to investigate how these factors can undermine PMO operations and hinder strategic alignment.

Additionally, while the conventional view supports strong centralized authority and standardized methodologies as optimal for project governance, significant critiques challenge this perspective. Ayyagari et al. (2006) and Arumugam et al. (2013) argue that such an approach may not suit all organizations, particularly those operating within dynamic environments. Critics highlight that strong decision-making powers vested in PMOs can inadvertently lead to bureaucratic stagnation (Güngör & Gözlü, 2017), constraining the creativity and flexibility vital for success in fast-paced settings. Furthermore, the insistence on performance evaluation systems may foster a culture focused on metrics rather than innovation, resulting in employees prioritizing compliance over creative problem-solving. This shift could stifle the very essence of adaptability that projects require in response to ever-evolving market demands.

4.3 Policy Dimension

In the realm of Project Management Offices (PMOs), policy emerges as a critical element that significantly shapes the success of project management initiatives. Crawford (2011) asserts that a substantial proportion of project failures can be attributed not to intrinsic project challenges but rather to a marked deficiency in effective procedures, methodologies, and standards within project management practices. Without a robust and cohesive policy framework, project managers often encounter formidable obstacles in steering their projects toward successful completion. Thus, the development of explicit and well-targeted policies becomes essential for enhancing PMO efficacy. These implementation strategies encompass a broad range of domains, including procedural standardization, regulatory compliance, efficient change management, promotion of ethics and integrity, consideration of occupational health and safety, environmental sustainability, information security, and adherence to quality management standards, as noted by Meredith (2012), Patel (2012), and Raharjo (2018). The consistent application of standardized procedures across all organizational levels not only ensures uniform project management practices but also mitigates the risk of errors, fostering coherence and consistency, as emphasized by Patel (2012).

Despite recognition of the pivotal role that policy plays in the success of PMOs, it is imperative to critically evaluate the implications of an overemphasis on rigid policy frameworks. Critics such as Schibi (2013) argue that stringent adherence to formalized procedures and methodologies can inhibit creativity and adaptability, qualities that are increasingly vital in today's dynamic project environments. Although Crawford (2011) highlights inadequate procedures as a primary contributor to project failure, this viewpoint may inadvertently undermine the reality that projects are inherently complex and fluid, necessitating a level of flexibility and innovation that transcends strict compliance with guidelines.

Moreover, the presumption that standardized procedures will uniformly enhance project management effectiveness can be misleading. Each project possesses unique characteristics and contextual factors, making the application of a one-size-fits-all policy approach potentially problematic. Gungor and Gozlu (2017) contend that such rigid policies may foster bureaucratic inefficiencies, stifling responsiveness to the specific needs of diverse projects. Consequently, project managers may become ensnared in a web of compliance, diverting their focus from delivering tangible value and achieving project goals.

This review highlights a significant gap in the existing literature regarding the balance between structured policy implementation and the need for flexibility within PMOs. While comprehensive policies are undoubtedly necessary for establishing a baseline of best practices, the call for further research into how PMOs can adapt policies to be more responsive to project-specific contexts is

paramount. Such studies would be beneficial in identifying methods that allow PMOs to foster both compliance and innovative thinking, ultimately enhancing project success in an increasingly complex landscape. By addressing these limitations, PMOs can cultivate an environment that not only adheres to necessary standards but also promotes the agility required to navigate the complexities of modern project management.

4.4 People Dimension

The effective establishment and ongoing operation of Project Management Offices (PMOs) are profoundly influenced by human resource development programs and a supportive organizational culture. These two elements are vital and should not be overlooked, as they encompass essential perspectives on enhancing project management skills and nurturing supportive interpersonal relations within the organization. Research by Andersen et al. (2007), Hobbs & Aubry (2007), and Julian (2008) indicates that the competence development of PMOs is maximized when a team of skilled professionals, led by qualified leadership, collaborates effectively to meet project goals. Raharjo (2017) and Zhang et al. (2011) further emphasize that skilled leadership is crucial for guiding teams toward achieving success.

To enhance human resources within PMOs, it is imperative to strengthen team capabilities through various methods, including comprehensive training programs, mentorship opportunities, and active engagement in project management activities aimed at fostering skill development, as delineated by Barbalho & De Toledo (2013). Empowering human resources is particularly important for forward-thinking organizations that recognize their staff as integral to achieving successful performance outcomes. The implementation of effective project management tools and techniques not only aids in developing individual skills but also fosters collective capabilities crucial for generating added value for the organization.

Despite the clear significance of human resource development and supportive culture, critical analysis reveals gaps in the existing literature. Specifically, factors such as skill gaps, resistance to change, and inadequate training have not been thoroughly examined. Addressing these vulnerabilities is essential for strengthening the resilience of PMOs, suggesting an urgent necessity for future research to explore the interplay between human factors and PMO effectiveness more comprehensively.

Furthermore, while the establishment and operation of PMOs may be enhanced through a focus on human resources and culture, it is essential to recognize that these elements alone do not determine PMO success. Many organizations have thrived without extensive investment in these areas, indicating that alternative factors may hold equal or greater significance. For instance, the clarity of project objectives and the alignment of PMOs with strategic organizational goals—as highlighted by Ershadi (2021), Bredillet et al. (2018), Muhammad et al. (2024), and Aubry et al. (2010)—can often supersede the need for improved interpersonal relationships or skill enhancement programs.

Moreover, the assumption that robust project management skills alone can drive PMO effectiveness may be somewhat misleading. PMO success frequently hinges on their ability to adapt to evolving organizational dynamics and market conditions rather than solely relying on the technical proficiency of their teams, as noted by Raharjo et al. (2018) and Ershadi (2021). Consequently, while human resources are undeniably significant, they should not overshadow the necessity for flexibility, strategic alignment, and the capacity to pivot in response to emerging challenges.

4.5 Operational Dimension

Within the context of project management in the construction industry, the operational dimension encompasses the systematic management of project activities aimed at ensuring both efficiency and effectiveness in achieving project objectives. Project Management Offices (PMOs) take on a

critical role at this operational level, meticulously overseeing a diverse array of activities to ensure that various construction projects not only meet but exceed their established targets. As highlighted by Khattak and Mustafa (2019) and Trinh and Feng (2019), construction projects are particularly resource-intensive, utilizing a wide variety of resources throughout the project lifecycle. Consequently, it is essential for PMOs to provide significant support to project teams as they navigate and manage complex delivery challenges, particularly in the nuanced processes of resource allocation and optimization. These functions are vital for maintaining project timelines and budgetary constraints, as noted by Paton and Andrew (2019) and Santos and Varajão (2015).

Moreover, the scope of PMO responsibilities extends to effective schedule and budget management, administrative support, coordinated training opportunities, adept risk management, and the implementation of standardized documentation practices, as articulated by J.-K. Kim & Yoon (2011) and Philbin (2016). To facilitate these objectives, PMOs must cultivate an organizational environment that not only promotes interactive discussions among project teams but also encourages collaboration with subject matter experts, as proposed by Singh et al. (2009). This collaborative atmosphere is intended to enhance problem-solving capabilities and to ensure informed decision-making occurs promptly.

However, the operational dimension's role within PMOs has limitations and gaps that warrant critical examination. Notably, there exists limited research on operational inefficiencies and their impact on PMO performance, suggesting an untapped area that, if explored, could yield insights into optimizing PMO operations. Furthermore, the existing literature often overstates the significance of the operational dimension, leading to an overemphasis on systematic management that can stifle creativity and flexibility within project teams. Despite PMOs' involvement in overseeing project activities, their procedures can become bureaucratic (Kwak and Dai, 2000), hindering the necessary agility required to adapt to the ever-changing landscape of construction projects.

Critics contend that the rigid frameworks imposed by PMOs can impose unnecessary constraints on project teams, challenging their ability to innovate and respond effectively to unforeseen challenges. While PMOs are indeed tasked with supporting project initiatives across various dimensions, this support can inadvertently lead to a one-size-fits-all approach that overlooks the unique requirements of individual projects. The insistence on standardized documentation and risk management practices (Ershadi, 2021) may fail to account for the specific nuances and complexities inherent in diverse project environments, resulting in inadequate solutions that do not fully address project teams' needs.

Moreover, while fostering an environment for interactive discussions and collaboration is a commendable objective, it does not always lead to effective decision-making. The involvement of too many stakeholders can complicate the decision-making process, often resulting in analysis paralysis rather than timely resolutions. Instead of promoting collaboration, this may breed tension and misalignment among team members, undermining overall project objectives.

4.6 Technology Dimension

A successful Project Management Office (PMO) is fundamentally reliant on its ability to accurately assess and identify the technological needs of the organization. This assessment enables PMOs to provide project teams with essential resources, including historical project documentation, advanced analytics applications, and comprehensive information systems designed to collaboratively enhance and optimize project management practices. Scholars such as Ayyagari et al. (2006), Desouza and Evaristo (2006), and Qi et al. (2014) emphasize the importance of these technological resources in enabling PMOs to function effectively. The proficiency of PMOs in utilizing integrated management information systems allows them to optimize project management processes and consolidate performance data, thereby ensuring that decision-

makers have immediate access to crucial information necessary for strategic decision-making, as highlighted by Ko et al. (2015).

Furthermore, PMOs act as centralized repositories for the gathering, processing, and distribution of project performance data, transforming centralized project information into a vital asset for the organization. Establishing a comprehensive repository that encompasses all relevant project information significantly enhances decision-making processes within PMOs, a point underlined by Van Der Linde and Steyn (2016). The active involvement of PMOs in the development and implementation of advanced information technology solutions is essential in streamlining project management processes, making them more data-driven and ultimately improving overall efficiency. By equipping project teams with sophisticated technological tools, PMOs facilitate timely and effective data-driven decision-making, enhance the flow of information across the organization, and enable more accurate tracking of performance metrics.

Table 3. PMO Implementation Strategies in Construction Companies

Key Aspects	Explanation	Sources
Strategic	PMOs must be strategically aligned with organizational goals. This involves utilizing project portfolio management to select high-value projects, optimizing resource allocation, and ensuring adaptability to changing market conditions and technological advancements.	Van Andersen et al., 2007; Kaplanoglu & Arditi, 2010; Wang & Liu, 2010; Abbasianjahromi & Rajaie, 2012; Phan, 2015; Der Linde & Steyn, 2016; Teece et al., 2016; Bredillet et al., 2017, 2018; Lavoie-Tremblay et al., 2018a
Organizational	Effective PMOs require a robust organizational structure. This includes clear decision-making authority, comprehensive performance evaluation, sufficient administrative power, well-established communication channels, and centralized governance with defined roles and responsibilities. The PMO should also drive standardization, coordination, and continuous innovation within project management practices.	Dai & Wells, 2004; Desouza & Evaristo, 2006; Liu & Yetton, 2007; Kutsch et al., 2015; Parchami Jalal et al., 2015
Policy	A strong policy framework is crucial for PMO success. This framework should define procedures, methodologies, standards, and ensure compliance with regulations, promoting ethical conduct, health and safety, environmental sustainability, and information security.	Crawford, 2011; Meredith, 2012; Patel, 2012; Raharjo, 2018
People	PMO success hinges on skilled personnel, effective leadership, and a supportive organizational culture. This involves investing in training, mentorship, and creating an environment that fosters collaboration, empowerment, and a commitment to achieving project goals.	Andersen et al., 2007; Hobbs & Aubry, 2007; Julian, 2008; Zhang et al., 2011; Barbalho & De Toledo, 2013; Raharjo, 2017
Operational	PMOs must meticulously oversee project activities, ensuring projects meet or exceed objectives. This requires robust support for project teams, effective resource allocation and optimization, and a collaborative environment that facilitates efficient problem-solving.	Singh et al., 2009; Santos & Varajão, 2015; Khattak & Mustafa, 2019; Trinh & Feng, 2019; Paton & Andrew, 2019
Technology	Successful PMOs leverage technology to enhance efficiency and effectiveness. This includes utilizing integrated management information systems, data analytics, and cutting-edge technologies to streamline processes, improve decision-making, and ensure data-driven project management.	Ayyagari et al., 2006; Desouza & Evaristo, 2006; Qi et al., 2014; Ko et al., 2015; Van Der Linde & Steyn, 2016

However, despite these advantages, there are notable gaps in the existing literature pertaining to the technological vulnerabilities PMOs may encounter. Issues such as inadequate tools or systems and the impact of technological failures on PMO effectiveness have not been extensively studied. This oversight suggests a pressing need for future research to delve deeper into how technological advancements—or failures—can significantly influence the operational capacity and overall success of PMOs. Understanding these vulnerabilities could provide valuable insights into optimizing the technology strategies that PMOs employ and enhance their resilience in the face of technological challenges.

Moreover, the reliance on technology-vetted systems raises questions about the adaptability of PMOs in the context of rapid technological evolution. As industries increasingly adopt new technologies at a brisk pace, the challenge for PMOs will be to not only integrate these advancements but also to ensure that teams are adequately trained and prepared to use them effectively. This concern importantly alerts researchers and practitioners alike to the necessity of developing frameworks that accommodate continuous technological change while maintaining alignment with organizational objectives.

To successfully embed PMOs within construction organizations, a well-rounded methodology is imperative that adequately considers numerous significant elements, like strategic goals, organizational culture, human resource management, operational systems, technological innovations, and regulatory considerations. This holistic strategy ensures that PMOs remain aligned with the rapid and often unpredictable changes that characterize the construction industry while simultaneously functioning as effective instruments for the successful execution of business strategies. Through the promotion of innovation, the streamlining of processes, and the enhancement of project performance metrics, PMOs possess the inherent potential to contribute significantly to the overall competitiveness and enduring success of construction companies operating within the increasingly globalized market landscape.

5. Discussions

This discussion section provides a comprehensive literature review of Project Management Offices (PMOs) in the construction industry, synthesizing existing knowledge and identifying key trends, challenges, and future research directions.

5.1 Evolution and Development of PMOs in Construction

The evolution of PMOs in construction reflects a response to increasing project complexity. Initially, project management was often ad-hoc, lacking centralized coordination. The need for a more structured approach led to the emergence of PMOs, initially focused on basic administrative support functions such as resource allocation, tracking, and reporting. This aligns with the "supportive" PMO model frequently described in the literature (Braun, 2018; Otra-Aho et al., 2019).

Over time, PMOs transitioned beyond these basic administrative functions. They became more deeply integrated with organizational strategic objectives, evolving from support providers to strategic partners. This shift is reflected in the literature's emphasis on the expanding functions of PMOs, including directive and controlling roles, and their crucial role in strategic alignment and innovation (Bagherpour and Erjaee, 2017; Ko and Kim in 2019). The adoption of knowledge management practices further solidified this strategic role, transforming PMOs into centralized repositories of project-related knowledge and fostering continuous organizational learning (Martinez Sanz and Ortiz-Marcos, 2020; Pemsel and Wiewiora; 2013).

5.2 Key Success Factors and Challenges

The strategic significance of PMOs in construction is undeniable. Their ability to align project execution with overarching organizational strategies is crucial for effective resource management

and portfolio optimization (Umasekar, 2024; Bagherpour and Erjaee, 2017). This alignment is essential for organizations navigating the technological advancements and structural changes characterizing the industry Teece et al., 2016). Effective PMOs demonstrate flexibility, adapting to diverse project demands and evolving organizational structures (Oliveira et al., 2017).

PMOs also contribute significantly to operational and technological efficiency. Their central role in overseeing project delivery, optimizing resource utilization, and integrating advanced project management tools and sophisticated data systems enhances transparency and accountability (Reddal, 2024; Ershadi, 2021; Van Der Linde & Steyn; 2016). This data-driven approach is particularly crucial in the dynamic and unpredictable construction (Alvarez-Dionisi, 2017). Furthermore, a supportive organizational culture and skilled personnel are vital for PMO success (Andersen et al., 2007; Hobbs & Aubry, 2007; Julian, 2008; Zhang et al., 2011; Barbalho & De Toledo, 2013; Raharjo, 2017). Effective communication and clear decision-making authority within the PMO are equally crucial (Wood et al.; 2016; Kutsch et al. in 2015). Finally, standardized policies and procedures are essential for mitigating risks, streamlining processes, and ensuring consistent project execution across the organization (Crawford, 2011; Meredith, 2012; Patel, 2012; Raharjo, 2018).

5.3 Challenges and Future Research

Despite these advantages, PMOs face significant challenges. These include organizational resistance to change, difficulties in clearly demonstrating their value, a lack of standardized evaluation frameworks, and the complexities inherent in construction projects (Meredith, 2012; Patel, 2012; Raharjo, 2018). These issues often result in PMOs failing to meet expectations, leading to organizational restructuring or even closure in some instances (Stanleigh, 2006).

To address these challenges, future research should focus on developing more effective PMO models that successfully integrate traditional and agile methodologies (Reddal, 2024). This research should explore how innovative technologies such as AI and machine learning can be utilized to improve PMO predictive capabilities and decision-making. Additionally, a critical need exists for the development of robust performance metrics and improved stakeholder engagement strategies to enhance the clarity and persuasiveness of the PMO's value proposition Umasekar, 2024; Liu & Yetton, 2007; Hobbs, 2007; Julian, 2008). By addressing these crucial areas, future research can help optimize PMO models and practices, ensuring their continued contribution to the success and sustainability of the construction industry.

6. Conclusions

In summary, this comprehensive analysis highlights the essential and indispensable function function of Project Management Offices (PMOs) in aligning project execution with the overarching strategic goals of construction organizations. The evolution of PMOs from basic administrative support to strategic partners reflects a necessary adaptation to increasing project complexity and the dynamic nature of the sector. Effective PMOs demonstrably align project execution with organizational strategies, optimizing resource allocation and portfolio management (Umasekar, 2024; Bagherpour & Erjaee, 2017). This alignment is crucial for navigating industry changes and maintaining a competitive edge (Teece et al., 2016). Beyond strategic alignment, PMOs significantly enhance operational and technological efficiency by centralizing project oversight, optimizing resource utilization, and integrating advanced technologies for data-driven decision-making (Reddal, 2024; Ershadi, 2021; Van Der Linde & Steyn, 2016; Alvarez-Dionisi, 2017).

However, PMO success hinges on a supportive organizational culture, skilled personnel, clear communication, robust decision-making processes, and standardized policies and procedures (Andersen et al., 2007; Hobbs & Aubry, 2007; Julian, 2008; Zhang et al., 2011; Barbalho & De Toledo, 2013; Raharjo, 2017; Wood et al., 2016; Kutsch et al., 2015). Standardized policies and procedures are crucial for mitigating risks, streamlining processes, and ensuring consistent execution across projects (Crawford, 2011; Meredith, 2012; Patel, 2012; Raharjo, 2018). Despite

these significant advantages, PMOs face challenges such as organizational resistance, difficulties in demonstrating value, and a lack of standardized evaluation frameworks (Meredith, 2012; Patel, 2012; Raharjo, 2018). These challenges often lead to PMOs failing to meet expectations, resulting in restructuring or even closure (Stanleigh, 2006).

Addressing these challenges requires a multifaceted approach encompassing strategic, organizational, operational, people, technological, and policy aspects. Future research should prioritize developing adaptive PMO models that integrate traditional and Agile methodologies (Reddal, 2024), exploring the use of innovative technologies like AI and machine learning to improve PMO predictive capabilities and decision-making, and developing robust performance metrics to clearly demonstrate PMO value. Strengthening stakeholder engagement by effectively communicating the tangible and long-term benefits of PMOs is also crucial for bridging the gap between expectations and actual outcomes (Umasekar, 2024; Liu & Yetton, 2007; Hobbs, 2007; Julian, 2008). This will transform PMOs from mere support functions into strategic partners driving sustained competitive advantage.

This review provides a strategic roadmap for effective PMO implementation. Construction companies seeking to leverage PMOs must prioritize alignment with broader corporate strategies and industry demands, fostering an environment conducive to innovation and continuous improvement. Through these deliberate efforts, PMOs can significantly contribute to the success and sustainability of construction projects in today's competitive global marketplace.

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