



Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

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Abstract:

Software project teams (SPTs) are critical stakeholders. Their contribution in successful delivery of software projects is unquestionable. However, the empirical evidence of their importance seems to exist on paper only, as software project managers (SPMs) and scholars in the project management field ignore their individual needs, and as a result, SPTs remain the most neglected stakeholder group in the software industry. In endeavoring to address the neglect of SPTs by SPMs, the authors of this study developed a model aimed at assisting SPMs to pay due consideration to the needs of this important stakeholder group. At the heart of the model's functionality is the Project Management Office (PMO), which intends to enforce and standardize the gathering and addressing of software project team needs and interests by SPMs. The aim of the research study is to investigate how the functions of the PMO can be applied to operationalize the enforcement and standardization of the overall function of the model. Since the study is practical-oriented, the pragmatic interpretive approach was considered a suitable methodology. Through the interpretive methodology, several appropriate functions of the PMO, such as «Project management methodology, standards, and tooling», «Monitoring and controlling project performance», «Human resource management» and «Development of project management competencies» as established from project management literature were utilized to achieve the study's purpose. Even though the interpretation process was guided by literature, the inference was also influenced, to a certain extent, by the researcher opinion as «interested observer». Therefore, the approach presents a limitation to the study. Future studies should include the validation of the feasibility of the study's claim in a real-world project setup.

Keywords:

software project; project management office; project team; project manager; enforcement; standardization.

DOI: 10.12821/ijispm110301

Manuscript received: 25 March 2022

Manuscript accepted: 21 December 2022

1. Introduction

Software project teams (SPTs) are indispensable stakeholder groups in software development projects. The SPTs that are of interest in this study include software developers, software testers, system analysts, software architects, and database designers which are directly involved with software development activities. SPTs are fundamental to software development projects [1], [2] and the success of software projects is almost entirely dependent on SPTs [3], [4], thus without them there would be no projects to speak of in the software industry. The assertion made by Cooke-Davies [5] that *'it is people who deliver projects, not processes and systems'* probably holds true for the software development industry than any other industry. The view of software development being more human dependent is also supported by Lu et al. [2], who claim that the development of software is a more human effort than a technological one. However, project teams (SPTs included, because Bourne [6] solely used software project case studies in her cited work here) are often not considered important project stakeholders by management [6]. Furthermore, the neglect of some of the software project stakeholders, SPTs included, has led to project failures in the industry [7]. SPTs are the most neglected stakeholder group by many software project managers (SPMs) [8], project stakeholder management researchers [9] as well as other researchers on project success and project team management [10]. Despite the benefits of considering project team member input in key project decisions [11], Hans [8] established that the views and interests of SPT members are often not given due consideration by SPMs. One plausible reason for the neglect of this important stakeholder group is that they are perceived as possessing little economic power, as alluded to by Eskerod et al. [12] as well as Hans and Mnkanla [13]. However, Eskerod et al. [14] bemoan the side-lining of certain project stakeholders based on their economic power or any other attributes, advocating instead for equitable treatment of all stakeholders, irrespective of economic power or other attributes.

In attempting to address the poor treatment of SPTs by software project managers, the authors of this research study developed a model (in a separate study, see [8] for a detailed discussion of the model, which will henceforth be referred to as the original study). The purpose of the model is to assist SPMs to pay due attention to the needs and interests of SPTs, and thus treat them as key project stakeholders. One of the important findings of the original study was the varying attention allocated to software project team needs by SPMs, with some attending to team needs while others ignoring them. The same study also found that the processes for soliciting views and concerns of SPTs were undocumented, and therefore open to various interpretations and inconsistent implementation by SPMs. Central to the model's function is the use of the project management office (PMO) (see Fig. 1 in Section 2) to enforce and standardize the collection of SPT member project interests [8] by SPMs, so that the practice is sustained and embedded in organizational culture. Furthermore, the inclusion of the PMO in the model ensures standardized, consistent, and uniform attendance to SPT needs by SPMs in an organization. The use of the PMO for standardization of this project management practice, namely, the collection and addressing of SPT views and needs, is in accordance with Silvius's [15] assertion that the PMO is best suitable for such a function. The importance of standardization of project management practices has been deemed a significant issue in the information and communication sector by Fernandes and Araújo [16]. Moreover, enforced standards (standardized processes in the context of this study) offer various benefits in an information technology environment [17].

There is general consensus that a project management office is crucial for successful and efficient delivery of projects [18]. Dai and Wells [19] agree with this claim by stating that a PMO enables project management effectiveness through lessons learned which emanate from project success or project failure perspectives. A PMO is tasked with overseeing the implementation, standardization, and enforcement of project management practices within an organization [20], [21]. A study by Hobbs further established that a PMO's second most important function is the development and implementation of standardized project management practices [22]. Project management practices enable organizations to achieve strategic objectives and improve project value [23], while through standardized project management practices, organizations realize synergies and best practices [24]. Over and above the aforementioned functions, a PMO supports and controls project activities [25]. One such project activity is team management [24], which includes addressing project concerns and needs.

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

The preceding discussion outlined various expectations of a PMO to promote and instill best project management practices within an organization. Leveraging on these possibilities, this study intends to explore how the PMO may be utilized to operationalize the enforcement, standardization, or institutionalization of the implementation of the model's overall function, which is to assist SPMs to solicit and address SPT views and concerns. The research questions (RQs) the study aims to address are as follows:

RQ 1: *How can the PMO be used to enforce the overall function of the model?*

RQ 2: *How can the PMO be used to standardize the overall function of the model?*

The remainder of the paper is structured as follows. The next section presents the background of this study, including a brief description of the model. The research approach used by this paper is presented in Section 3, while Section 4 discusses the functions and roles of the PMO to achieve this study's objective, namely, to enforce and standardize the model's implementation within an organization. Lastly, Section 5 presents the conclusions, limitations, and possible future work.

2. Background

This section discusses software project stakeholders, which include software project teams (SPTs). It highlights the neglect of SPTs despite recognition as key project stakeholders. The needs of SPTs and the importance of considering these needs are presented alongside an explanation of the historic neglect of software project teams and previous attempts to address this neglect, including the model developed by the authors of this study for intervention. This section also discusses various broad PMO functions which are meant to facilitate the implementation, enforcement and standardization of project management practices in an organization.

2.1 Software project stakeholders

As with projects in other industries, software projects require collaboration of various stakeholder groups, including project clients, project sponsors, and software teams. A common and generic acceptable definition of *project stakeholder* is 'an individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio' [21, p723]. As this definition confirms, project stakeholders may affect (positively or negatively) project outcome. It is on this basis, amongst other factors, that stakeholders are recognized as important and their management by project managers is crucial for project success. Freeman et al. [27] concur, expressing that business managers (SPMs in our context) should pay requisite attention to (project) stakeholders.

Beside the fact that project stakeholders may *affect* a project, they may also *be affected* by the project or project outcome, and therefore they have certain expectations and needs that should be met through the project or project activities [28]. The idea of 'benefiting' between a project and its stakeholders should be reciprocal and mutual. The needs of SPTs include recognition, training, career advancement opportunities, a conducive work environment, and participation in SPM decision-making processes [29], [30]. Software project teams expect SPMs to be aware and address these needs and expectations, because SPT members feel valued when their needs are attended to [31]. In particular, a team leader who encourages participative decision-making within a team empowers the team members; this, in return, enhances team performance [32]. Furthermore, better managed knowledgeable workers, such as (software) project teams, increase an organization's competitiveness in its industry [33]. Even so, Laplante [34] concedes, proper management of software teams has proven to be an Achilles' heel of SPMs.

2.2 Software project teams as neglected key stakeholders

The discussion in the previous section highlighted the necessity for SPMs to pay undivided attention to key project stakeholders. Amongst the key software project stakeholder groups that need special attention are software project teams. The reason for SPMs to pay particular attention to SPTs is because software projects are virtually and totally dependent on SPTs for success, as alluded to by André et al. [35] and McLeod et al. [28]. Without software project

teams, successful delivery of projects is nearly impossible [36]. SPTs are the foundational units through which software project tasks are accomplished and delivered [32].

With the plethora of empirical evidence of the key role played by SPTs in projects, their neglect at the hands of certain project managers is not only unfortunate but has impaired organizations and hindered projects. Some negative results that emanate from the neglect are discussed by Hans and Mnkandla [37], Mainardes et al. [38], and Pee et al. [39]. A recent study by Hans [8] confirmed that the views and interests of SPTs do not receive due attention from some software project managers. Another recent study by Tanveer [40] argues for more empirical research on software engineers' needs (research on how the needs and interests of software team members can be addressed). These research studies by Hans [8] and Tanveer [40] confirm the neglect of SPTs by both SPMs and researchers in the software development field respectively. The findings by Hans [8] do not come as a surprise based on the findings of a study by Paradise [41] that managers, in general, are not capacitated to deal with employee needs. Furthermore, the inability of managers, SPMs included, to engage with their teams directly contradicts what the twenty-first century employee requires: continuous engagement with a line manager, as claimed by Lee et al. [42].

2.2.1 Related work: models and tools aimed at addressing needs of project stakeholders

Several stakeholder management models aimed at assisting project managers to better manage project stakeholders and give the necessary attention to project team interests have been proposed and developed by various researchers. The Stakeholder Circle methodology [43], [44] and the Social Network Analysis (SNA) approach [45] are two notable stakeholder management models popular in the project management field.

The aim of the Stakeholder Circle methodology was to provide project teams with capabilities to identify, prioritize stakeholders, develop and manage relationships with key stakeholders. Despite the model's contribution to improving stakeholder management, the tool has the following limitations: (i) The tool was not tested/evaluated on full project life cycles on any of the five projects used for its evaluation – its effectiveness is based on one phase of each project [43]. Therefore, the effectiveness of the model across different project phases is unknown; (ii) The Stakeholder Circle methodology classifies project stakeholders based on their attributes, namely, power (influence), urgency (determination for immediate attention) and legitimacy (right/claim/authority) [45]. The classification of stakeholders using this approach may lead to marginalization of certain project stakeholders (while '*selling the project to the most important stakeholders*' [46]) and/or misclassification of influential project stakeholders as having less project influence and legitimacy, for example. Moreover, the attributes possessed by project teams should not be a determinant of the treatment or non-treatment of their needs by project managers [47] – the needs of all stakeholders should receive attention of project managers.

The purpose of the SNA model was to enable project managers to examine the whole structure of project stakeholders (rather than individual stakeholders) together with impacts of stakeholders, with the aim of better understanding the existence of inter-relationships between the network of stakeholders, an organization and projects. The SNA model '*enhances understanding of the project environment as a network of relationships within and around the project organisation*' [43]. The model allows a project manager to use 'known' stakeholders to identify other 'unknown/hidden' stakeholders. Even so, the SNA model presents the following major limitations: practical and ethical difficulties become an issue during the process of collecting information from stakeholders about other stakeholders (i.e. using the snowballing process) in terms of the confidentiality of the required data [45].

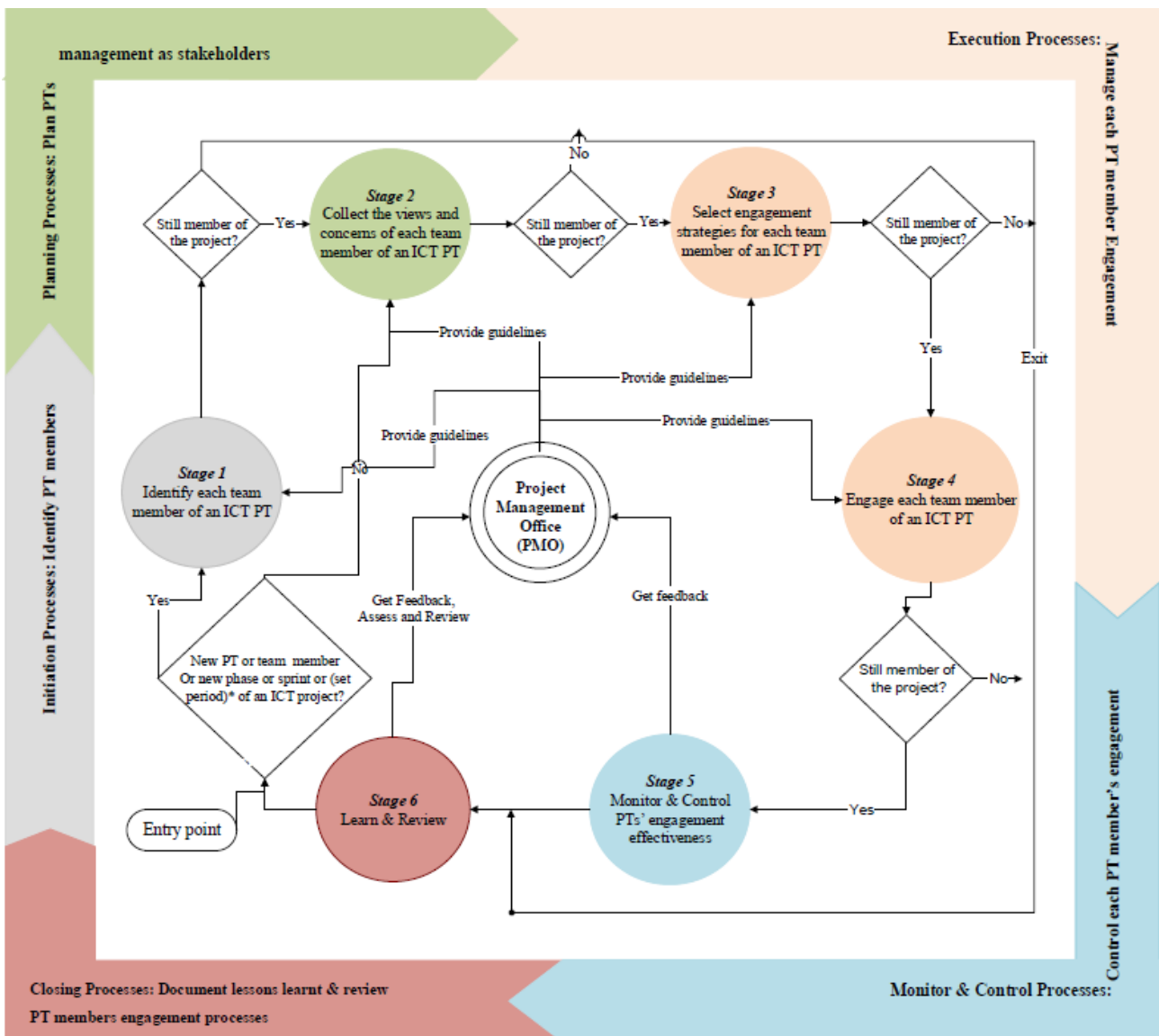
The abovementioned models have not yielded the desired results in terms of addressing the neglect of software project teams by project managers [8]. This led to the authors of this study to propose and develop a model aimed at addressing this neglect, see Fig. 1. Besides the shortcoming of the aforementioned models and frameworks to address the neglect of SPTs by SPMs as mentioned in the preceding paragraph, another major weakness of these models is the failure to enforce and standardize their implementation within projects and across an organization. The model in Fig. 1 uses a PMO to address and overcome this weakness. This study contributes to the body of knowledge by demonstrating how the PMO can be used to enforce and standardize a stakeholder management model. The next section provides an overview of this model.

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

This study is not the only one to have applied the functions of the PMO to achieve certain organizational or project management related objectives. A recent study by Silvius [15] also used the PMO to outlined how this office may enhance the sustainability of projects and project management.

2.3 Brief overview of the model

Fig. 1 depicts the model whose implementation this study seeks to enforce and standardize through the use of PMO functions. The following discussion summarizes the six important phases of the model for SPMs to follow. The stage designated as entry point is where the model’s processes begin, typically at the start of a project or at the beginning of a new project phase or sprint. Once this step has been ascertained, Stage 1 of the model would follow.



Set period* - is any iterative period set by the PMO in conjunction with a project manager / scrum-master to start / continue the process of the model.

Fig. 1. A model for assisting SPMs to treat SPTs as key stakeholders (Adapted from Hans [8])

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

Stage 1: Identify each member of the information and communication technology software project team – At this stage every software project team member who is a stakeholder at the current project phase or sprint is identified by an SPM or Scrum master. The identification process of SPT members requires that the needs and interests of each identified individual team member be established.

Stage 2: Select engagement strategies for each identified team member – During this stage, an SPM or Scrum master is expected to identify and select suitable engagement strategies for each identified individual team member. Since team members are unique (with differing personalities and preferred communication methods), it is important that an SPM or Scrum master personalize engagement strategies to improve communication between the SPM or Scrum master and the concerned SPT member. The need to personalize engagement strategies according to individual team members is in line with Laplante's [34] postulation of treating software team members as unique individuals because their needs and personalities are different.

Stage 3: Collect the views and concerns of each team member – This stage requires that views and concerns pertaining to the project are solicited from each software project team member using the engagement strategies identified in Stage 2.

Stage 4: Engage each team member of the project on the collected views and concerns – Once the views and concerns of each SPT member have been gathered and analyzed, an SPM needs to engage individual team members on their needs with the specific aim of addressing these needs.

Stage 5: Monitor and control the project manager-project team engagement process – During this stage, the PMO of the organization gathers and assesses feedback from SPMs and their SPT members on the effectiveness of the SPM-SPT engagement process, with the aim of improving the SPM-SPT engagement process where necessary.

Stage 6: Learn and review – During this step, the PMO evaluates the input of SPMs and their SPT members, as indicated in Stage 5, to identify lessons learned and review the process and guidelines regarding the effectiveness of the SPM-SPT engagement process. The lessons learned are to be documented for future use and reference purposes.

2.4 Standardization and enforcement of project management practices

Many organizations from different sectors use projects to remain competitive and achieve their goals [25]. This typically results in the operation of many interdependent projects within an organization at any given time. Likewise, organizations rely on project management for efficient running of projects [48] and to increase productivity [49]. The interdependency among projects within an organization and the intention to smoothen such synergies has led organizations to seek ways to standardize their project management practices. In this paper, *standardized project management practice* refers to the level of uniformity or consistency applied in carrying out project management processes, as defined by Milosevic and Patanakul [50]. Standardization of project management processes improves operations, reduces process errors, and promotes expert knowledge sharing [51]. On the other hand, non-standardization of project management of project management practices may result in inconsistent project outcomes [52]. Standardized project management practices constitute what Beck [53] refers to as 'foundation practices', the organization's project management pillars. The information and technology sector values the standardization of project management processes, tools, and techniques as more important than other sectors do [16] and use standardized project management practices as strategic tools for managing projects [50]. Moreover, standardization of project management practices has brought many positive outcomes (e.g., simplified project management and assessment [53]) and has provided organizations with high performing value-adding project management systems. Aligned or interrelated projects can be managed seamlessly as a portfolio of investment [25] and thereby improve their return on investment and reduce project costs [54] through standardized project management practices. This assertion is supported by Mueller et al. [55], who explain that standardization of information technology processes reduces complexity and costs related to information technology, while the absence of well-documented standardized processes results in confusion and uncertainty [17].

Standardization of project management practice is necessary but not sufficient – an organization needs to enforce the foundation practices to achieve the desired results [56]. Steinfeld et al. [57] corroborate this by reaffirming: '*process*

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

standards are necessary, but not sufficient. Successful implementation of standardized project management practices may only be realized in an organization when practices are enforced by top management through a PMO [58]. However, Mueller et al. [55] warn that enforcement of standardized practices without employee buy-in for these practices is unlikely to be successful.

Organizations seem to lack mechanisms for characterizing and governing their process standards [17] and this supports similar claims by Bolles and Hubbard [59] that organizations have found it challenging to apply the same project management practices consistently and uniformly across their business units. The Project Management Institute (PMI) also confirms that several organizations have no consistent procedures to govern projects [60]. Kezner [61], though, reiterates the centrality of PMOs to the standardization of project management operations and practices: a PMO enables the realization of common and organization-wide project management practices. Furthermore, according to Hobbs and Aubry [62], a PMO assists in providing the oversight function of monitoring and controlling project management practices. Silvius [15] likewise confirms that a PMO has several responsibilities, some of which are listed in Table 1. The functions range from simple supportive functions (e.g., functions under *Project support and archiving responsibility*) to enforcing compliance (e.g., *develop and implement a standard methodology*). Project managers are expected to run projects in accordance with the organization's (project management) practices and procedures [21], typically made possible by use of the PMO. A recent study by Hans and Mnkandla [20] suggests that it is almost impossible to standardize project management practices and processes within an organization without making use of a PMO. A word of caution however: in as much as organizations should strive for standardization of project management practices, they must avoid over-standardizing as one size does not fit all in project management [63].

Table 1. PMO responsibilities (Adapted from Hobbs and Aubry [62] as well as Silvius [15])

Responsibility	Possible task
Project management methodology, standards, and tooling	Develop or select a methodology for project management processes and methods Provide a set of PM tools
Monitoring and controlling project performance	Monitor and control project performance Develop and maintain a project scoreboard
Benefits realization management	Benefits management Conduct post-project reviews
Human resource management	Human resource and staffing assistance Recruit, select, evaluate, and determine salaries for project managers
Development of project management competencies	Provide mentoring for project managers Provide trainings and/or certifications for project managers Provide trainings and/or certifications for other project personnel
Project support and archiving	Manage archives of project documentation Provide a set of tools without an effort to standardize
Promote project management within organization	Project management consulting Promotion of project management practices within the organization
Organizational learning	Conduct project audits Implement and manage a database of lessons learned

3. Research methodology

Since the study's aim is to establish *how* the PMO can be utilized to enforce and standardize the implementation of the model, then the research methodology followed in this paper is a pragmatic and interpretive one. Interpretive research methodology is suitable for research studies, which intend to answer *how* questions [64]. Mackenzie and Knipe [65] as well as Walsham [66] also confirm the suitability of an interpretivism approach for Information Systems (IS) research. Several researchers such as Boland and Day [67], Curtis et al. [63], and Schneiderman and Carrol [69], for example, have used the interpretive approach in the IS field. Furthermore, Silva et al. [70] assert that pragmatism is a research approach which considers data from a practical perspective and thus is appropriate for IS research too. Again, since the study is practical-oriented, a pragmatic interpretive approach was deemed suitable [15], [71]. As pragmatism is oriented towards solving real world practical problems [72], then it was used to derive the necessary knowledge on how the PMO can be used to enforce and standardize the implementation of the model.

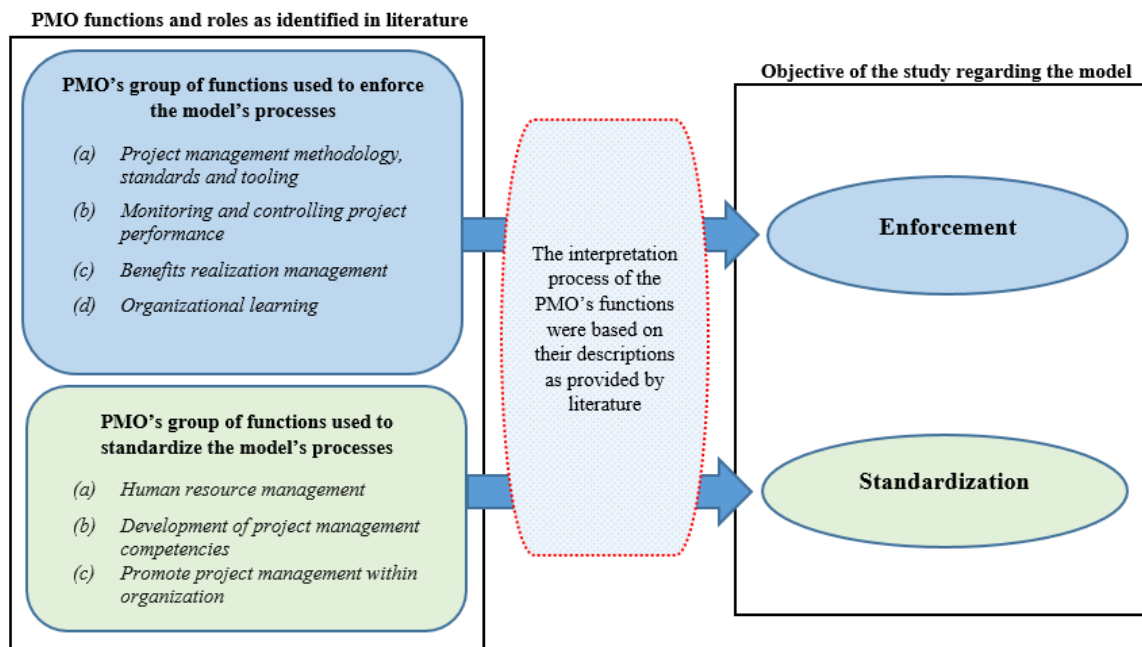


Fig. 2. Interpretive process followed in achieving the aim of the study

Interpretive approach was judiciously and creatively utilized (as interpretivism promotes creativity [70]) on several suitable functions of the PMO as found in project management literature to indicate how PMO roles may be applied to achieve the objectives of this research. Fig. 2 provides a high-level view of the interpretive process followed by this study and which PMO functions or roles were used for the enforcement and standardization of the model's implementation. The study employed the interpretive description to outline how relevant PMO functions may be used to enforce and standardize the adoption of the model across an organization. In achieving this objective, the researchers based their interpretation on human sense guided by meanings/definitions/description [73] of the PMO functions as informed by relevant literature. For example, *Monitoring and controlling project performance* is one of the PMO group of functions identified in literature (see Table 1) that this study used to enforce the model's processes. One of the associated tasks that define this function is monitoring and control of project performance, which includes assessing compliance and adherence and taking corrective actions, where necessary, regarding stakeholder engagement (SPMs-SPTs engagement in the context of this paper) as a project management practice and process [74]. Since the study's

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

model requires SPMs to constantly and consistently engage with their SPTs in order to address their project needs and expectations, the use of *Monitoring and controlling project performance* function of the PMO (based on the functions' description/definition) to achieve this purpose is therefore a logical interpretation. Monitoring, controlling, and evaluation of adherence to the established SPM-SPT engagement processes will assist in enforcing this important practice within and across projects in the organization. The description/definition of the function further assisted in determining whether the function should be used for enforcement or standardization purposes of the model's implementation. For example, the monitoring and control task is meant for assessing progress against stated project objectives, with the aim of ensuring that responsible people are held accountable for their performance and where necessary effect improvement on related activities and practices [75]. The need for accountability requires that project stakeholders comply with the set project objectives, practices and processes. Therefore, the function's elaborate description given here fits the enforcement need of the model's implementation.

4. Enforcement and standardization of the model's implementation using the PMO

The discussion presented in this section concerns how the functions and roles of the PMO as identified in literature were applied in achieving the intended enforcement and standardization of the model. On issues of project management practices, this study considers the PMO as an agent of change, as proclaimed by Yornu and Ackah [76]. The need for the enforcement of the model's functionality emanates from the original study's findings, which revealed the following [36]:

- Some organizations had not established processes to assist SPMs in eliciting project-related views and concerns of their team members;
- In organizations with processes, implementation and observation depended on the will of SPMs, with some following the processes while others not. In other words, there were no uniform or consistent adherence to processes aimed at collecting SPT views and concerns, a situation potentially linked to the lack of documented and standardized processes [20].

The aim of the model was to assist SPMs to gather views and concerns of project team members effectively and efficiently. The inclusion of the PMO as part of the model is intended to address the inconsistent implementation of the model in an organization. Table 1 shows various functions associated with the project management office. The discussion in the following sections on PMO group of functions presents an argument on how these functions may be used to enforce and standardize the processes of the model.

4.1 Enforcement of the model's processes

Subsections 4.1.1, 4.1.2, 4.1.3 and 4.1.4 discuss how '*Project management methodology, standards, and tooling*,' '*Monitoring and controlling project performance*,' '*Benefits realization management*' and '*Organizational learning*' functions may be used to institute and enforce the model's function.

4.1.1 Project management methodology, standards, and tooling

One of the key roles of the PMO is the creation and enactment of standardized project management methods, processes, and other practices [62]. The lack of processes or undocumented or non-standardized processes to elicit SPT views and concerns may contribute to the poor attention of SPMs to team member concerns and needs, as alluded to by Hans and Mnkandla [20]. Moreover, an absence of documented processes breeds uncertainty among employees (SPMs), as they may not know why a particular process exists or how to apply it [17]. But SPMs cannot be held accountable for failure to solicit their teams' views and concerns when there are no processes in place for assisting them to do so. This is so because project management processes, tools, and methodologies serve as a bedrock for other functions and roles of a PMO [77]. The PMO is an overseer of project management practices, and thus perfectly positioned for a mandate to institute, implement, foster, and proclaim the necessary processes to be adhered to by software project managers. The discussion on the model in Subsection 2.3 indicated the need for the PMO to decide – in conjunction with SPMs – the

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

model's entry point as well as the opportune time to execute the different phases of the model. Furthermore, the PMO should establish necessary templates to be used by SPMs and SPTs for input and comments to the PMO about their consultative activities. At the end, the PMO is expected to produce well-documented processes and guidelines to which SPMs and SPTs are expected to adhere in the application of the model.

4.1.2 *Monitoring and controlling project performance*

Hobbs and Aubry [62] consider the monitoring and controlling function of the PMO as the most significant of all PMO functions because it directly supports project governance and enables control of project activities [78]. However, it is impossible to keep tabs on something that cannot be measured [79]. For the PMO to foster and control the adherence of SPMs to the established engagement processes, the effectiveness of these processes and the overall contentment of the affected parties should be ascertained and evaluated. The purpose of process evaluation is to determine the efficacy of the selected engagement strategies with the intention of improving them if need be. The monitoring, controlling, and evaluation of adherence to the established SPM-SPT engagement processes will be a signal that organization management values such processes. Measuring project processes demonstrates the value of such processes and promotes project visibility [80]. Rewarding the SPMs for their observance of the established processes will not only signal the importance of adhering to such, but will simultaneously promote and encourage the intended behavior and compliance [81], [82] of following the processes. A PMO should use its vested powers to persuade all SPMs to consider standardized or institutionalized project management practices, to pay due attention to SPTs interests and needs.

4.1.3 *Benefits realization management*

The PMI [83] defines *benefits realization* as an approach undertaken to derive benefits from the execution of tasks or projects. The overall purpose of the model designed by the authors of this study is to assist SPMs to focus on the needs and interests of software project team members. In reciprocity, SPT members will be loyal to the organization [84] and contribute to the success of the organization's projects [85]. Therefore, mutual benefits are realized in the implementation and enforcement of the model's function. It follows logically that the implementation and enforcement of the model's processes for the realization of its accrued benefits be carried out by the PMO through its benefits management function.

Conducting post-project reviews is another responsibility that falls under the benefits realization management function of the PMO, as indicated in Table 1. There are two types of project reviews, namely, the project performance measurement related review carried out during the project life span [5], and the project success measurement review (post-project review) undertaken at the completion of a project. The former review type is the one that is of interest to this study because the PMO's reviews of individual SPM adherence to SPM-SPT engagement processes as well as their compliance to the processes of the model happen during project execution. Knodel [54], however, contends that in certain organizations accountability for results is a foreign notion. Therefore, conducting project reviews is vital for holding accountable those responsible for project outcome and enabling an organization to learn from such project reviews, thereby improving project management practices. In the context of this paper, the review of SPM compliance to SPM-SPT engagement processes and the review of the individual SPM's level of observance to the model will enable the PMO to determine the level of compliance to the model's overall function by SPMs. Project review feedback will better direct the PMO in taking appropriate corrective actions, if necessary.

4.1.4 *Organizational learning*

Organizational learning is about preserving behaviors, values, mental models/maps and culture that define and characterize the organization [86]. In a bigger organization, projects are considered to be temporary organizations and sub-organizations [87], [88], and they are related to organizational culture [74]. It therefore follows that the behaviors, values and culture of the organization would be entrenched in its projects. After all, it is the aim of every organization to have all these (behaviors, values, mental models and culture) shared (assuming that its culture and values are good), perpetuated and entrenched into all its employees (including new employees) and its projects.

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

Therefore, through this group of functions the PMO as a custodian of project management practices and methodology is well positioned to disseminate project-related behaviors and values that should be shared across projects. Based on the preceding discussion, this study proposes the use of this group of functions to establish and promulgate the implementation of the model company-wide.

4.2 Standardization of the model's processes

The argument offered in Subsection 4.1.1 is equally relevant to this section on standardization of the model's processes, as presented in Fig. 1. This section discusses the use of '*Human resource management*', '*Development of project management competencies*' and '*Promote project management within organization*' functions of the PMO for the standardization of model's processes, which include the gathering of the views and interests of SPTs that the model intends to operationalize organization-wide.

4.2.1 Human resource management

For an organization to apply a successfully proven common project delivery road map [74] and share best project management practices across the organization, the standardization of the project management practices and processes and efficient management of project teams is imperative. Attendance to SPT member project needs (a practice the model seeks to promote) is a human resource management practice that should be institutionalized and practiced by all SPMs in the organization. Project human resource management practices may not only be enforceable by the PMO, but may be standardized too [8] using the PMO human resource management function. The standardization would bring a desired outcome: consistent and common attendance to individual project team member needs and interests [50]. The positive side effect of the effective implementation of this PMO function is the reduction of key staff turnover or turnover intentions [84], [89], which is a desire of every organization.

4.2.2 Development of project management competencies

Organizations which regularly deliver successful projects have realized the importance of training, mentoring and developing new project leaders after their best project leaders [74]. The practice of growing project leaders has several advantages, including the instilling of common good project organizational culture into 'home-grown' project leaders that bolster the delivery of successful projects. Implementation of standardized mentoring and coaching programs for project managers ensures uniform training of mentees on project management practices, including consistent and unvarying attendance to SPT interests by SPMs. The PMO, as a guardian of good project management practices, has a unique opportunity to standardize such programs through its human resource training function.

4.2.3 Promote project management within organization

The PMO's functions may be classified as either operational (support to individual projects), tactical (managing coordination across multiple projects and promoting adoption of organizational project management practices) and strategic (prioritizing projects based on business objectives and strategy) [78]. At operational and tactical levels, the PMO may use functions under *Promote project management within organization* to support projects and ensuring that preferred project management practices and processes are adopted and applied. This approach could be used for standardizing and uniform adoption the desired project management practices across the organization. In the context of this study, the PMO can use these group of functions for company-wide implementation and standardization of the model. At a strategic level, on the other hand, the PMO may apply this group of functions to implement the model so as to address the needs and expectations of SPTs, resulting in a satisfied, committed, loyal and productive workforce, that is easy to retain [84]. Therefore, the use of these functions to promote the implementation of the model could result in multiple strategic benefits for an organization.

The preceding discussion in this section outlined how the PMO, through its various roles and functions, can be utilized to standardize and enforce the model's function in an organization. The ultimate goal is to engender a company-wide project team management culture which encourages SPM-SPT engagement that addresses SPT needs by SPMs to treat

Using the PMO to enforce and standardize the attention of software project managers to needs of software project teams

project teams as valued stakeholders. An organization can only attain true standardization when project management processes and practices are adhered to by all project managers [50].

5. Conclusions, limitations, and future studies

5.1 Conclusions

Software projects cannot run without software project teams; soft skills provided by team members are more critical in the software industry than ‘hard’ skills [90]. Yet the poor treatment of software project team members does not suggest that this empirical evidence has been heeded with seriousness. The inability of SPMs to attend to the needs of project stakeholders, SPTs included, frequently contributes to project failure.

As a contribution in arresting the neglect of SPTs, the authors of this study developed a model to assist SPMs in paying attention to the needs of these key stakeholders. One of the critical aspects of the model is the inclusion of the PMO to foster and standardize the implementation of the model in an organization, and thereby ensuring consistent and uniform approach in addressing the needs of SPTs within an organization. The lack of enforcing and standardizing of project management practices meant for addressing the needs of stakeholders (SPTs in the context of this paper) by existing stakeholder management tools was highlighted as one of their major limitations in Subsection 2.2.1. The inclusion of the PMO in the model designed by the authors of this study was intended to address this limitation. The use of the PMO for this purpose is in accordance with the claim by PMI [26] and Dai and Wells [19] that the enforcement and standardization of good project management practices in organizations are best handled by a PMO. The risks of lack of enforcement and non-standardization of project management practices and processes have far-reaching implications, including non-compliance by internal stakeholders (e.g., SPMs) in following the practices, challenges in enforcing compliance, and the inability to hold non-complying parties accountable.

The purpose of the study was to establish how to operationalize the enforcement and standardization of the model’s overall function using the PMO roles and functions as outlined in literature. Two research questions were posed in this study to guide the research process in achieving the objective: **RQ 1:** *How can the PMO be used to enforce the overall function of the model?* and **RQ 2:** *How can the PMO be used to standardize the overall function of the model?* The following discussion indicates how the two research questions were answered by this study.

Subsections 4.1.1, 4.1.2, 4.1.3 and 4.1.4 outlined in detail how different PMO functions could be applied in enforcing the overall function of the model. Hence, the arguments presented in these subsections answered the first research question of this study. Similarly, the arguments presented in Subsections 4.2.1, 4.2.2 and 4.2.3 indicated how relevant functions of the PMO could assist in standardizing the overall function of the model, thereby answering the second research question.

5.2 Limitations and future studies

The interpretivism research approach involves attributing subjective meaning to that which is being interpreted, while concurrently the interpreter (researcher) may infer meaning from a personal point of reference [91] because an interpretive researcher is not a ‘*detached and disinterested observer*’ [71]. This research approach, therefore, poses a limitation to this study. However, the use of the literature to guide the researchers’ interpretations of the functions of the PMO moderated any potential bias in the interpretation. The researchers propose future studies to validate the practicality of this study’s claim of the use of the PMO to foster and standardize the model’s overall function, more so because the impact of functions and roles of PMOs are not yet fully understood [76].

Acknowledgments

The authors would like to thank our university for its financial support enabling the achievement of the study’s objectives.

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