


## Article

# Exploring Project Management Office Models for Public Construction Projects in Hail, Saudi Arabia

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**Abstract:** The Saudi Vision 2030 initiative is critical to boosting national development, particularly in the construction industry. The construction industry is getting a lot of attention in a variety of ways, the most visible of which is the promotion of best practices, including project management office (PMO) applications. Hail province, like others, is experiencing project delivery issues. Thus, the purpose of this research is to explore the most suitable PMO model for Hail public construction projects. A literature review included an examination of the driving factors for establishing PMOs in construction firms, as well as PMO models and typologies that describe their functions. Therefore, those driving factors and PMO models were examined in a focus group to explore their suitability in the context of Hail. The research findings revealed that the Enterprise PMO is the main model for Hail public construction projects, followed, respectively, by the Program Management Office model and the Project Management Center of Excellence (PMCOE). This method of selection for a PMO model encourages construction companies and related businesses to change in order to improve the sector while also addressing construction project delivery challenges in Hail province.

**Keywords:** functions; models; PMO; construction; Saudi Arabia



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## 1. Introduction

The Saudi construction industry contributes significantly to the gross domestic product [1]. According to Alsheihri et al., between 2008 and 2013, the Saudi government spent USD 575 billion on public construction projects. Also, there are more than 5200 ongoing public construction projects valued at USD 819 billion [2]. In addition, it is critical to the development and support of the Saudi Arabian kingdom's infrastructure and other industries, including Hail public construction projects. Hail Municipality strives to make Hail province extraordinary in terms of infrastructure, buildings, and services in order to guide urban development into cities and villages. It also offers services that promote dwellers' well-being [3]. The Saudi government unveiled the Saudi "Vision 2030" initiative in 2016, which is a strategic plan that begins a new direction aimed at optimizing the economy for increased efficiency and reduced financial waste. According to Alghamdi et al., the waste generated from new construction projects is around 50–60 tons/1000 m<sup>2</sup>, and 700–1200 tons/1000 m<sup>2</sup> is from demolishing buildings within Saudi Arabia [4]. The government confirmed its commitment to realizing Vision 2030, which includes enabling economic diversification, supporting local content, and developing creative prospects for the future [5]. MASHROAT is an Arabic term meaning projects, which was first used to name the national program responsible for projects. Furthermore, the Saudi government established "MASHROAT" in August 2015, which is the National Program to Support Project Management, Operation, and Maintenance in Public Entities [6]. Five years later, in February 2021, the Expenditure and Projects Efficiency Authority (EXPRO) was established, with the goal of transforming MASHROAT and the Spending Efficiency Achievement

Center into EXPRO. Thus, the goal of establishing EXPRO is to (1) achieve efficient spending in government agencies; (2) improve the quality of projects, assets, facilities, infrastructure planning, programs, initiatives, and operational processes; and (3) monitor and control program and initiative implementation [7]. EXPRO fulfills the role of PMO for all national projects.

The project management office (PMO) is described by the PMI as a framework that standardizes procedures and allows for the sharing of resources, tools, methodologies, and methods in which the PMO's tasks vary from delivering PM support services to overseeing project monitoring [8]. External environmental factors compel organizations to adopt innovative products and services, including the application of project management practices, in order to remain competitive and suit the needs of their customers [9]. Therefore, a project management office (PMO) is an organizational structure tasked with numerous obligations linked to the centrally located and well-organized oversight of projects, involving various models and functions that span from PM support functions to directing the entire project [10]. Obtaining PMO success, on the other hand, is hard to achieve [11]. Stanleigh discovered that around 75 percent of PMOs in the information systems and technology sector shut down after three years of launching [12]. Nevertheless, Liu and Yetton investigated the influence of PMOs on project performance and discovered that while PMOs had a moderate impact on the IT sector, they did not increase project performance in the construction industry [13]. The literature indicates a very limited cover of the application of the PMO in the Saudi construction industry.

Hence, PMO establishments should place more emphasis on motivators (drivers) to assist decision makers in construction organizations in making better selections. Eriks-son and Leiringer identified four motivators for organizations to create PMOs, including a lack of strategic management support, a lack of training and education, poor project monitoring and control performance, and poor project portfolio management [14]. Furthermore, Oliveira et al. identified seven driving factors to create a PMO, including a lack of standardized PM processes, decentralized information, a disregard for cost management, complications in managing turnover growth, complications in internal planning management, inadequacies in communication management, and misunderstanding perceived responsibilities [15]. Finally, Ntshwene et al. identified nine driving factors for the establishment of a PMO: poor documentation and record keeping, a lack of project management main pillars, unmanaged risk events, a lack of project methodology, an inability to optimize resources, a lack of project communication, an inability to define business goals, a lack of project governance, and an inability to recruit competent staff [16]. Nowadays, the construction industry expects that more productive and efficient PMOs will lead to improvements and add value to the project management environment [17]. As a result, achieving positive outcomes from implementing a PMO in construction firms depends on capturing the intrinsic capabilities of a PMO [16]. Thus, it is obvious that the selection of a PMO model is complex unless driving factors are defined to guide the understanding of their suitable match with PMO functions.

Several researchers covered the models and functions of PMOs [10,16–21]. Monteiro et al. reviewed and summarized the available literature into twenty-five models addressed in the literature [22]. Of those, only seven models are applied in this research due to the identification of driving factors to establish a PMO in the Saudi construction industry. These PMO models are the Enterprise PMO, Program Management Office, the Project Management Center of Excellence, PMOCoe, Project Office, Business Unit PMO, Controller, and Project Support Office. The Enterprise PMO is primarily responsible for project business management through division unit PMO oversight, as well as reporting and oversight of important organization projects [18]. A Program Management Office is a control center that aims for entire power for hiring and training project managers, strategy alignment, and project selection [19]. The Project Management Center of Excellence (PMOCoe) is a methodical approach that seeks to standardize processes while also improving best practices and building the team's skills and knowledge [20]. The function of a Project Office is to

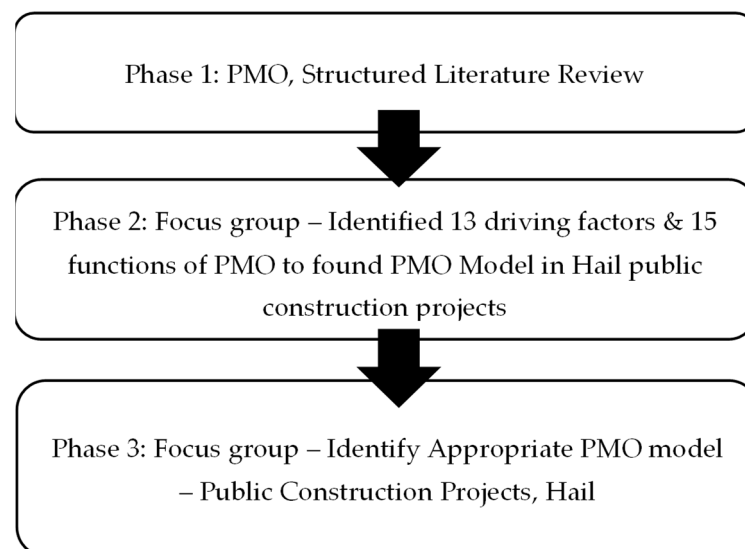
manage data for a single or several projects by keeping records of the project, monitoring advancement, and developing project operations and modifications [21]. The Business Unit PMO enables business management throughout the administration of portfolios and programs, including project prioritization and controlling resources among projects [10]. Project Control drives big and sophisticated single projects, thereby providing several schedules incorporated into the whole program schedule and providing data for signifying corrective actions [23]. The Project Support Office is an administrative support model that provides project controls, planning and scheduling, document management, and PM tools [24].

The fifteen PMO functions are divided into five main categories, including strategic management, monitoring performance of projects, organizational learning, development of PM methodology, and multi-project management [25]. Each category consists of a set of functions that distinguish one PMO model from another. The strategic management category includes three functions: providing advice to top management [16], participating in strategic planning, and cost management [9]. The monitoring projects' performance category includes two functions: reporting project status and monitoring and controlling performance [15]. The organizational learning category includes three functions: managing archives of project documentation, implementing and managing a database of lessons learned, and implementing risk management [16]. The development of the PM methodology category includes four functions: developing and implementing a standard methodology [9], promoting PM within the organization [16], developing the capability of personnel and training, and providing a set of tools to standardize [25]. The multi-project management category includes three functions: communications between projects [9], identifying and prioritizing new projects, and allocating resources among projects [16]. Furthermore, the program management model involves all categories, while the Enterprise PMO model concentrates on all categories, except for strategic management [25]. But, the PMOCoe model embraces more the monitoring and controlling project performance and the development of PM methodology categories [9]. Moreover, the project office model and the business unit PMO focus on organizational learning with little concentration on monitoring and controlling projects [16]. Eventually, the controller model is more about monitoring project performance, while the project support office strictly focuses on the organizational work [15].

According to Alshihri et al., the Saudi construction industry experiences delays within over 70% of public construction projects. The time and cost challenges play a major role in the delay of public construction projects [2]. The construction industry has the nature of a multi-project set, systematic financial control, communication, and leadership, which are musts to guarantee fruitful project delivery [17]. This nature requires a strong project management structure [26]; the most recognized structure is the project management office (PMO) [18]. The type of projects and the level of maturity in project management influence the choice of the best PMO model for the organization [27]; thereby, the drivers (motivations) were examined. Also, the selection of a PMO model is based on the model functions. The more functions the organization has, the greater its importance and obligation [4]; thereby, the functions were examined. An argument by Crawford stated that the application of a PMO model should concentrate on activities [10]. An enormous diversity of PMO functions and models appeared in the studies, and according to Oliveira et al., the purpose of applying the PMO is to define the functions in order to understand permitting operations. Thus, it is vital to adjust the functions of a PMO model to the strategic and organizational context in order to improve project outcomes and fulfill requirements [15]. This research contributes to finding the appropriate PMO model for an organization, especially construction businesses. However, this study aims to explore the applicable PMO model for Hail public construction projects.

## 2. Methods

An exploratory approach was employed throughout this research. The exploratory technique might initially investigate and identify variables, constructs, and theories for testing and aid in the identification of objects and scales used to create instruments [28]. Also, qualitative methods, including prime and subordinate data gathering, including structured literature reviews and focus group phases, are shown in Figure 1. According to Doody et al., focus groups have been widely used as a qualitative data collection method [28]. Although there has been few studies establishing PMO that are conducted with focus groups within the Saudi construction industry, this study uses a focus group as an inductive method to explore the context of Hail. The focus group method is an efficient way to collect valuable data on susceptible participants' feelings, beliefs, and behaviors [29]. Practitioners for the focus group were selected from Hail Municipality and were involved in construction and several private construction companies and consultants in Hail province, KSA. Altogether, practitioners held project management roles and had more than 10 years of experience in construction. Thus, a focus group was organized in September 2023. Focus groups usually include 5 to 12 individuals [30]; thereby, there were 14 participants in the focus group, and all were at the managerial level in either governmental or private construction consultancy companies.



**Figure 1.** Research design.

Participants were asked in phase 2A to rate the most influential driving factors to founding a PMO for Hail public construction projects, and a total of 14 participants responded. Participants' consensus can be determined by measuring the variance in the responses. A lower variance leads to a higher consensus rate. Thus, the median, standard deviation, and interquartile range were used for measuring the consensus of participants. The driving factors (reasons) for founding a PMO for Hail province were discovered based on participants' knowledge and their experience in the construction field. The point of identifying the reasons for Hail public construction project failure is to fit the establishment of a PMO into the context of Hail. The identified reasons for project failure clarified the current situation regarding Hail public construction projects, which facilitates evaluation for driving factors. Participants then identified the most influential driving factors that satisfied resolutions for the reasons of Hail public construction project failure. The PMO functions are considered a reflection of the driving factors to founding a PMO. Thus, participants also identified the most influential functions in establishing a PMO for Hail public construction projects. Functions are identified that will facilitate the exploration of the appropriate model for Hail public construction projects.

Fourteen practitioners participated in this study in the Hail construction sector. A descriptive analysis was used to present the demographic information of the respondents. Table 1 represents years of practitioners' experience while Table 2 shows their level of education. Governmental employees represented 40% of the focus group, whereas contractors and consultants represented 30% and 30%.

**Table 1.** Years of experience.

Years of Experience	Participants
10–15	6
16–20	3
+20	5

**Table 2.** Level of education.

Level of Education	Participants
Bachelor	9
Master	5
PhD	0

This research applies a level of assurance in the regular focus group method and applies significant outlines for focus groups developed by Dodds and Hess, which are recruitment and data collection considerations [31]. Thirteen driving factors to founding a PMO were uncovered for the structure literature review. All practitioners were given a 20 min presentation covering the driving factors to founding a PMO in Hail public construction projects, in addition to a 20 min presentation regarding the functions of PMO models that meet the needs of organizations. Supplementary File S1 illustrates the relationship between 15 functions to 7 PMO models, which was used to help instruct the session. Efficiently, practitioners were then clustered into three groups with an organizer for each group. Therefore, all practitioners were given 30 min to discuss and respond to the questions regarding the driving factors to founding a PMO for Hail public construction projects. Also, they were given 30 min to discuss and respond to the questions regarding the functions of PMO models in accordance with the construction context. Supplementary File S2 illustrates the questionnaire for the focus group, phase 2A (13 driving factors), phase 2B (15 functions of PMO), and phase 3 (7 Model of PMO). However, the three exploring phases applied in this study are, respectively, (1) a secondary phase, which includes a structured literature review, (2) a primary phase, which includes a focus group to identify driving factors and functions of a PMO for founding a PMO for Hail public construction projects, and (3) a primary phase, which includes a focus group to explore the appropriate PMO model for Hail public construction projects. Consensus is represented by a smaller spread, which means a smaller standard deviation. Also, a consensus can be satisfied by the interquartile range (IQR). Therefore, the median, standard deviation, and interquartile range were implemented to measure the consensus of the participants.

In the first phase, subordinate data gathering was covered through a structured literature review (SLR), which was performed to identify related published research regarding the purpose of establishing a PMO as well as the functions of PMO models. Therefore, thirteen deriving factors were identified and fourteen functions and seven substantial models of a PMO were identified out of twenty-five models covered in the SLR. This study limited the number of models to only 7 because of the potential driving factors that are applied to Hail public construction projects and the nature of the construction industry. Therefore, drivers, functions, and models serve the objectives of the focus group and were the first to confirm agreements on the identified drivers to founding a PMO for Hail public construction projects and then confirm the possible functions to suit those confirmed



drivers—through triangulating drivers to functions of PMO models—to eventually confirm the conceivable functions of PMO models for Hail public construction projects. Three questions were asked as follows:

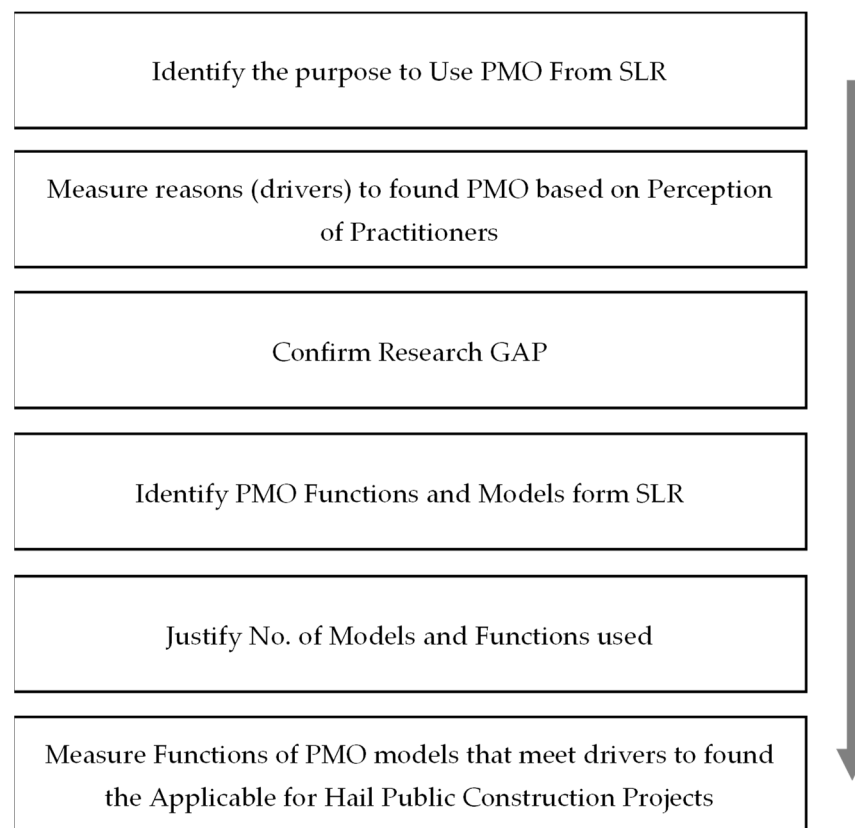
RQ1—What are the main drivers for founding a PMO for Hail public construction projects?

RQ2—What are the required functions of a PMO for Hail public construction projects?

RQ3—What are the appropriate PMO models for Hail public construction projects?

In the second phase, a prime focus group was used to examine the purposes that are driving the adoption of PMOs. Participants were given a 20 min presentation covering the thirteen driving factors to founding a PMO and the functions of PMO, as well as 30 min for discussion. The practitioners were asked to share their opinions regarding difficulties facing public construction projects in Hail province. To determine the level of necessity for a PMO for Hail public construction projects, participants were asked to rate the importance of each driver for establishing a PMO on a scale from 1 (“not important at all”) to 10 (“very important”). Awang et al. found that a ten-point Likert scale is better for granularity and precision than a five-point Likert scale for measurement [32]. These driving factors to founding a PMO in the construction industry include (1) poor performance of projects, (2) lack of strategic management, (3) unstandardized processes for PM, (4) uncontrolled risk events, (5) absence of key PM components, (6) disregard for cost management, (7) ineffective communication for projects, (8) communication management deficiencies, (9) lack of documentation, (10) inability to hire qualified personnel, (11) poor optimization of resources, (12) poor training and education, and (13) deficiency of project approach. Thus, practitioners were asked to respond on a 10-point Likert scale and leave comments. Therefore, the main influence driving factors to founding a PMO for Hail public construction projects were identified. These factors were used to analyze the function and description of models and typologies of PMOs in the literature, thus justifying appropriate PMO models to be examined. Therefore, seven models were identified, confirmed, and explained as the function of each model for practitioners.

In the third phase, the 20 min presentation and 30 min discussion covered all aspects regarding every function and model, and each has different criteria that differentiate from others. Fifteen PMO functions were evaluated. To determine the appropriate PMO functions for Hail public construction projects, participants were asked to rate the importance of each function for a PMO on a scale from 1 (“not important at all”) to 10 (“very important”). The functions are (1) reporting project status (2) monitoring of projects’ performance, (3) developing and implementing a standard methodology, (4) promoting PM within the organization, (5) developing the capability of personnel and training, (6) providing a set of tools to standardize, (7) communications between projects, (8) identifying and prioritizing new projects and allocating resources among projects, (9) providing advice to top management, (10) participating in strategic planning, (11) cost management, (12) managing archives of project documentation, (13) implementing and managing lessons learned, (14) and implementing risk management. Afterward, to select the appropriate model of a PMO for Hail public construction projects, participants were asked to rate the agreement on triangulation from highly scored drivers and functions to founding a PMO on a scale from 1 (“not important at all”) to 5 (“very important”). The seven models were also measured through a focus group to identify the applicable model for Hail public construction projects according to the articulation of responses to driver factors and the functions of a PMO. Figure 2 illustrates the process of founding a PMO model for Hail public construction projects. These models are Enterprise PMO, Program Management Office, PMOCoe, Business Unit PMO, Controller, Project Support Office, and Project Office. Thus, practitioners were asked to respond on a 5-point Likert scale and provide comments. In addition, practitioners were asked to rank the top three driving factors.



**Figure 2.** Selection process for the PMO.

### 3. Results

#### 3.1. Phase 1: Literature Review

The SLR reviewed the studies covering the reasons (driving factors) that drive organizations to establish a PMO. Also, it reviewed the functions and models of a PMO. The results revealed that 13 driving factors were identified to establish a PMO, and furthermore revealed 15 functions involved with the PMO. It also revealed seven PMO models. Those driving factors were examined in the context of public construction projects in Hail province. Therefore, Table 3 shows the driving factors, while Table 4 represents the relationship between the driving factors and the functions of a PMO in Hail province. Correspondingly, the seven PMO models are (1) the Enterprise PMO, (2) Program Management Office, (3) the Project Management Center of Excellence, PMOCoe, (4) Project Office, (5) Business Unit PMO, (6) Controller, and (7) Project Support Office.

#### 3.2. Phase 2A: Focus Group

The first session presented the 13 driving factors to establish a PMO within the organization. The PMO's role will differ depending on the nature and type of the organization. Therefore, it was critical to gather input from stakeholders regarding Hail public construction projects in order to recognize issues, requirements, and suggestions in order to identify how and where the PMO will function; therefore, participants were carefully selected to fulfill this concern. Many particular project management difficulties came to light, and the PMO functions intended to remedy them. The 14 participants rated the most influential driving factors to founding a PMO for Hail public construction projects. According to the consensus measures, Table 3 represents the median, SD, and IQR. Therefore, the most important driving factors are poor performance of projects [ $X = 8.71$ , Std. = 0.70, IQR = 1.0], lack of strategic management [ $X = 8.43$ , Std. = 0.82, IQR = 1.0], unstandardized processes for PM [ $X = 8.50$ , Std. = 0.91, IQR = 1.0], inability to hire qualified personnel [ $X = 8.64$ ,

Std. = 0.89, IQR = 1.0], poor optimization of resources [X = 8.29, Std. = 0.96, IQR = 1.0], and deficiency of project approach [X = 8.79, Std. = 0.77, IQR = 1.0].

**Table 3.** Driving factors to founding a PMO for Hail public construction projects.

	Driving Factors to Founding a PMO in Public Construction Projects, Hail	X	Std.	IQR
DF1	poor performance of projects	8.71	0.70	1.0
DF2	lack of strategic management	8.43	0.82	1.0
DF3	unstandardized processes for PM	8.50	0.91	1.0
DF4	uncontrolled risk events	6.64	1.80	3.0
DF5	absence of key PM components	7.86	1.77	2.3
DF6	disregard for cost management	6.71	1.58	3.0
DF7	ineffective communication for projects	7.14	1.51	2.3
DF8	communication management deficiencies	6.64	1.54	3.0
DF9	lack of documentation	6.50	1.59	2.3
DF10	inability to hire qualified personnel	8.64	0.89	1.0
DF11	poor optimization of resources	8.29	0.96	1.0
DF12	poor training and education	7.50	1.45	3.0
DF13	deficiency of project approach	8.79	0.77	1.0

The second session presented the 15 functions of PMOs. Accordingly, all participants rated the possible functions of PMOs that could enable and validate the most important driving factors to founding a PMO for Hail public construction projects. Participants agreed on the functions of PMOs that enable the most important driving factors to founding PMOs for Hail public construction projects. This agreement was merged with the responses to the driving factors. Both responses were identical and agreed on the driving factors and the functions. Table 4 represents practitioners' responses to the possible functions of PMOs that satisfy driving factors to founding a PMO for Hail public construction projects. The most important functions of PMOs are monitoring and controlling performance [X = 8.71], participating in strategic planning [X = 8.43], developing and implementing a standard [X = 8.43], providing a set of tools to standardize [X = 8.5], developing the capability of personnel and training [X = 8.64], allocating resources among projects [X = 8.29], and identifying and prioritizing new projects [X = 8.79].

**Table 4.** Functions of PMOs that enable driving factors to founding a PMO for Hail public construction projects.

Code	Driving Factors to Founding PMOs	Functions of PMOs
DF1	poor performance of projects	- monitoring and controlling performance
DF2	lack of strategic management	- participating in strategic planning - developing and implementing a standard methodology
DF3	unstandardized processes for PM	- providing a set of tools to standardize



Table 4. Cont.

Code	Driving Factors to Founding PMOs	Functions of PMOs
DF4	uncontrolled risk events	- implementing risk management
DF5	absence of key PM components	- promoting PM within the organization
DF6	disregard for cost management	- cost management
DF7	ineffective communication for projects	- communication between projects
DF8	communication management deficiencies	- reporting project status - providing advice to top management
DF9	lack of documentation	- managing archives of project documentation - implementing and managing lessons learned
DF10	inability to hire qualified personnel	- developing the capability of personnel and training
DF11	poor optimization of resources	- allocating resources among projects
DF12	poor training and education	- developing the capability of personnel and training
DF13	deficiency of project approach	- identifying and prioritizing new projects

### 3.3. Phase 2B: Focus Group

It is now evident that operating construction projects in Hail province are facing strategic, methodological, and administrative difficulties. Therefore, participants agreed on the appropriate PMO models for Hail public construction projects according to their responses on the driving factors and function of PMOs in phase two. In addition, each model has certain functions that were analyzed in accordance with the identified driving factors for PMO establishment. As a result, practitioners evaluated comparable PMO models based on identified functions in order to find the appropriate PMO model for Hail public construction projects, and practitioners ranked the top three models. Agreement includes 70% of responses in the top-rated functions to guide the appropriate PMO model, while other models are limited and did not satisfy the agreement. Participants used illustrations from Supplementary File S1 to rate each model based on their functions. Table 5 illustrates the functions involved in the Enterprise PMO Model. Thus, the Enterprise PMO model involves the most functions that satisfy the driving factors to founding a PMO for Hail public construction projects.

**Table 5.** Functions of the Enterprise PMO model linked to the driving factors.

Driving Factors	Functions	Enterprise PMO Model
DF1	Monitoring and control of project performance	Yes
DF2	Participating in strategic planning Developing and implementing a standard methodology	Yes Yes
DF3	Provide a set of tools to standardize	
DF4	Implement risk management	Yes
DF5	Coordinate between projects	Yes
DF6	Cost management	Yes
DF7	Communications between projects	Yes
DF8	Provide advice to top management	
DF9	Manage archives of project documentation Implementing and managing lessons learned	
DF10	Developing the capability of personal and training	
DF11	Allocate resources among projects	Yes
DF12	Developing the capability of personal and training	Yes
DF13	Identify and prioritize new projects	Yes

Similarly, the Program Management Office model involves most of the functions that satisfy the driving factors to founding a PMO for Hail public construction projects. Table 6 illustrates the functions involved in the Program Management Office Model.

**Table 6.** Functions of the Program Management Office model linked to the driving factors.

Driving Factors	Functions	Program Mngt Office Model
DF1	Monitoring and control of project performance	Yes
DF2	Participating in strategic planning Developing and implementing a standard methodology	Yes
DF3	Provide a set of tools to standardize	Yes
DF4	Implement risk management	Yes
DF5	Coordinate between projects	Yes
DF6	Cost management	Yes
DF7	Communications between projects	Yes
DF8	Provide advice to top management	Yes
DF9	Manage archives of project documentation Implementing and managing lessons learned	Yes
DF10	Developing the capability of personal and training	Yes
DF11	Allocate resources among projects	Yes
DF12	Developing the capability of personal and training	Yes
DF13	Identify and prioritize new projects	Yes

Moreover, the PMOCoe model includes most of the functions that fulfill driving factors to founding the PMO for Hail public construction projects. Table 7 illustrates the functions involved in the PMOCoe.

**Table 7.** Functions of the PMOCoe model linked to driving factors.

Driving Factors	Functions	PMOCoe Model
DF1	Monitoring and control of project performance	Yes
DF2	Participating in strategic planning Developing and implementing a standard methodology	Yes
DF3	Provide a set of tools to standardize	Yes
DF4	Implement risk management	Yes
DF5	Coordinate between projects	
DF6	Cost management	Yes
DF7	Communications between projects	
DF8	Provide advice to top management	Yes
DF9	Manage archives of project documentation Implementing and managing lessons learned	Yes
DF10	Developing the capability of personal and training	
DF11	Allocate resources among projects	Yes
DF12	Developing the capability of personal and training	
DF13	Identify and prioritize new projects	

The third session presented the seven PMO models. Therefore, participants rated the PMO model in phase 2B, and a consensus was reached according to the median, SD, and IQR. Table 8 represents the top three models of the PMO that are the most applicable. The appropriate PMO models for Hail public construction projects are, respectively, (1) Enterprise PMO [ $X = 4.29$ , Std. = 0.83, IQR = 1.0], (2) Program Management Office [ $X = 4.07$ , Std. = 0.92, IQR = 0.98], and (3) PMOCoe [ $X = 3.93$ , Std. = 0.83, IQR = 5.0].

**Table 8.** Appropriate PMO models for the Hail public construction projects.

	PMO Models	X	Std.	IQR	Rank
PM1	Enterprise PMO	4.29	0.83	1.0	1
PM2	Program Management Office	4.07	0.92	0.98	2
PM3	PMOCoe	3.93	0.83	0.5	3
PM4	Project Office	4.21	1.05	1.0	–
PM5	Business Unit PMO	3.43	1.70	4.0	–
PM6	Controller	3.07	1.77	3.3	–
PM7	Project Support Office	3.64	1.15	2.3	–

#### 4. Discussion

According to the study findings, the Enterprise PMO model is the ideal MPO model for Hail public construction projects. The program management office and PMOCoe models are applicable as well. The practitioners' evaluation revealed that the main driving factors to founding a PMO for Hail include poor performance of projects, lack of strategic management, unstandardized processes for PM, inability to hire qualified personnel, poor optimization of resources, and deficiency of project approach. These driving factors are consistent with the literature in different contexts. The findings also indicated that the most significant functions of PMOs for Hail public construction projects are monitoring and controlling performance, participating in strategic planning, developing and implementing a standard methodology, providing a set of tools to standardize, developing the capability of personnel and training, allocating resources among projects, and identifying

and prioritizing new projects. These functions of PMOs are consistent with the literature in different contexts.

#### *4.1. Driving Factors to Founding a PMO for Hail Public Construction Projects*

The driving factor “poor performance of projects” is in concord with Swan et al. since it indicated that central oversight of schedules and expenses would probably enhance project managers’ attention on temporary outcomes of the project while decreasing their incentive for transferring inter-project learning [33]. The driving factor “lack of strategic management” is in accordance with Carvalho, who stated that the strategic oversight role may direct projects by analyzing the organization’s approach and then advocating the governing of the business’s commercial objectives in the project context [34]. The driving factor “unstandardized processes for PM” matched the statement of Aubry et al., in which the standardized management of projects is commonly used to cope with the daily and planned work. [11]. Moreover, the driving factors “Inability to hire qualified personnel” and “poor optimizing for resources” are in concord with Engwall and Jerbrant, who stated that there is project interconnectedness and limited resources, disruptions, or inefficiencies in a single project can have an adverse effect on other projects when manpower is split between projects [35]. The driving factor “deficiency of project approach” is also in concord with Bersman, who stated that engaging with a person is generally preferred by project managers, overlooking data within paperwork and systems that depend on a social interface for past experience [36].

#### *4.2. Linking Functions of a PMO to Driving Factors to Founding a PMO for Hail Public Construction Projects*

Certain functions distinguish one PMO model from another. Meanwhile, the main driving factors that lead to founding a PMO in Hail public construction projects include poor performance of projects, lack of strategic management, unstandardized processes for PM, inability to hire qualified personnel, poor optimization of resources, and deficiency of project approach. These driving factors describe the weaknesses in running projects while also expressing the functionality offered by PMO models that would possibly strengthen that weakness. Therefore, the function “monitoring and controlling of performance” satisfies the driving factor “poor performance of projects”. Both functions “participating in strategic planning” and “developing and implementing a standard methodology” satisfy the driving factor “lack of strategic management”. The function “providing a set of tools to standardize” satisfies the driving factor “unstandardized processes for PM”. The function “developing capability of personnel and training” satisfies both driving factors the “Inability to hire qualified personnel” and “poor training and education”. The function “allocating resources among projects” satisfies the driving factor “poor optimizing for resources”. And, the function “Identifying and prioritizing new projects” satisfies the approach driving the “deficiency of project factor”.

However, the Enterprise PMO allows providing for information on projects in deciding processes and builds an entire project portfolio management ability [24], including aligning project and program work to business strategy, monitoring departments, prioritizing initiatives, and choosing projects [20]. In addition, the Program Management Office approach emphasizes entire project oversight and accountability for project manager recruitment and development, as well as choosing proper projects [27]. Nonetheless, the PMoCE model can improve the effectiveness of personnel [20], enhancing project execution through standards, methodologies, and tools that allow effective project delivery [8]. Thus, practitioners were fully aware of the main motives that led to founding a PMO for Hail public construction projects, thereby understanding the functions of a PMO that provide resolutions for these weaknesses.

#### 4.3. Applicable Model of a PMO for Hail Public Construction Projects

Consequently, the Enterprise PMO, Program Management Office, and PMOCoe models that emerged from this research are appropriate for Hail public construction projects. The Enterprise PMO model was ranked as the first fit for Hail public construction projects. The second fit is the Program Management Office model, while the third fit is the PMOCoe model. The practitioners in entirely three groups highly agreed on the Enterprise PMO model and the Program Management Office model among other models of PMOs. This is due to the specific interrelatedness between the identified driving factors to founding a PMO and the functions of both models. According to Kerzner, the Enterprise model mainly oversees organizational activities along with support across the organization, concentrating on organizational and strategic concerns [37]. Meanwhile, the Program Management Office model is an enterprise with several divisions, several assistance divisions, and active projects across every division [10]. The PMOCoe model received moderate agreement in this research due to its general aspects. Aspects include creating and maintaining project organizational practices, education, methodology, training, standards, and project management skills across the business [20].

#### 5. Conclusions

The Saudi government is undergoing an accelerated development period that will last through 2030, and this development includes the construction industry, including Hail public construction projects. The construction business, like other critical industries, requires administrative and technical solutions to improve the sector's work. The PMO shows serious potential as a managerial tool in several industries, including construction. Meanwhile, the PMO models incorporate functions that each model serves differently. Hence, this study investigated the appropriate model for Hail public construction projects, with the goal of improving the delivery of construction projects. The most significant driving factors to founding a PMO for public construction projects within Hail province includes poor performance of projects, lack of strategic management, unstandardized processes for PM, absence of key PM components, inability to hire qualified personnel, poor optimization of resources, poor training and education, and deficiency of project approach. The identification of these driving factors contributes to facilitating the evaluation of the possible functions of a PMO to satisfy the driving factors. Therefore, the most influential functions of PMOs for public construction projects within Hail province are monitoring and controlling performance, participating in strategic planning, developing and implementing a standard methodology, providing a set of tools to standardize, developing the capability of personnel and training, allocating resources among projects, and identifying and prioritizing new projects. Participants agreed on the most appropriate PMO model for Hail public construction projects.

The findings revealed that the Enterprise PMO is the appropriate model for Hail public construction projects based on the circumstances of the project's status. The research suggested that the Enterprise PMO is the ideal paradigm for Hail public construction projects based on the functions of the PMO that lead to the driving factors to founding a PMO. This is due to the nature and scope of the Enterprise model, which serves the concept of portfolio management while also focusing on internal concerns like standards, methodology, and development. Moreover, the Program Management Office model and the PMOCoe models were ranked as the second and third options. This research contributes to the use of a selection method for a PMO model for an organization through a focus group method in the field of construction. The founding process includes first identifying the driving factors to founding the PMO within the organizations and then evaluating the functions of the PMO that satisfy driving factors in order to lead to the appropriate model of the PMO. This research contributes to the presentation of a workflow to find the appropriate PMO model for an organization, establishing a rapid method for further selection of the PMO model for various construction businesses. This workflow includes the measurement of driving factors to founding a PMO, merging those driving factors into



the functions of PMO models, and eventually evaluating the matched PMO models. Time is a limitation of this study. Because the implementation of PMOs in an organization takes at least three years to provide results, this study suggests further research into the way of monitoring and managing the process of implementing PMOs in the construction industry.

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su16188177/s1>, Supplementary File S1: Illustration for Functions Involved in Each PMO Model. Supplementary File S2: A: Please Rate the Influence for Each Driving Factor to Found PMO for Hail Public Construction Projects? B: Please Rate the Importance for Each Functions to Found PMO for Hail Public Construction Projects. C: Please Rate the Appropriate for Each Model to Found PMO for Hail Public Construction Projects?

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