

**STRUCTURAL MODEL OF FACTORS AFFECTING PMO  
PERFORMANCE IN UAE MEGA CONSTRUCTION PROJECTS**

**MAITHA TAHER SALEH ALMANSOORI**

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Sincerely dedicated to my great country, the UAE to which I am proud to belong and to my beloved family for their unconditional supports in all my endeavours and to my brother, sisters, and friends for their encouragement and support.



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## ABSTRACT

Project Management Office (PMO) implementation has gained traction in a variety of fields around the world. It is gaining popularity in the construction industry as well, particularly in large and mega projects. However, in construction it is facing several challenges, including the incorporation of inexperienced managers, a lack of a clear PMO perspective, management unawareness of the scope for implementation, and a failure to follow processes that can benefit the organisation. The United Arab Emirates (UAE) construction industry is also quickly adopting PMO implementation. As a result, the purpose of this research was to investigate the factors influencing the performance of project management offices (PMOs) in the UAE construction industry. Using the SmartPLS software and the structural equation modelling technique, a structural relationship model of factors influencing PMO implementation performance in UAE mega construction projects was developed. A designed questionnaire was used to collect data in a quantitative manner. The questionnaire was validated in a pilot study by 18 UAE construction industry experts. A total of 200 questionnaires were distributed to practitioners of mega construction projects, and 171 valid responses were received with an 85.5 percent response rate. The top five factors identified by mean index and standard deviation analysis were inaccurate information reporting, a poor communication strategy, increased administrative workload, environmental challenges, and the selection of a PMO manager. The developed PLS-SEM structural model demonstrated adequate convergent and discriminant validity. The overall model was found to be satisfactory, with a goodness-of-fit (GoF) value of 0.356. The model results were then validated by ten construction experts, who determined that the overall rank generated by the PLS model can be accepted based on their knowledge and experience in PMO. As a result, the validated model is the main contribution of this study, which is the body of knowledge for the benefit of the academic community, and the model's outcomes benefited construction practitioners involved in PMO implementation, particularly in the UAE.

## ABSTRAK

Pelaksanaan Pejabat Pengurusan Projek (PMO) telah menjadi daya tarikan dalam pelbagai bidang di seluruh dunia. Ia juga semakin popular dalam industri pembinaan, terutamanya dalam projek besar dan mega. Walau bagaimanapun, dalam industri pembinaan terdapat beberapa cabaran seperti mempunyai pengurus yang tidak berpengalaman, kekurangan perspektif PMO yang jelas, ketidaksedaran tentang skop pelaksanaan pengurusan dan kegagalan untuk mengikuti proses yang boleh memberi manfaat kepada organisasi. Industri pembinaan UAE juga dengan cepatnya boleh menerima pakai pelaksanaan PMO. Oleh itu, penyelidikan ini bertujuan untuk menyiasat faktor-faktor yang mempengaruhi prestasi pejabat pengurusan projek (PMO) dalam industri pembinaan UAE. Dengan menggunakan perisian SmartPLS dan teknik pemodelan persamaan struktur, model hubungan struktur faktor yang mempengaruhi prestasi pelaksanaan PMO dalam projek pembinaan mega UAE telah dibangunkan. Soal selidik yang direkabentuk digunakan untuk mengumpul data secara kuantitatif. Soal selidik telah disahkan dalam kajian rintis oleh 18 pakar industri pembinaan UAE. Sebanyak 200 soal selidik telah diedarkan kepada ahli projek pembinaan mega, dan 171 jawapan sah telah diterima dengan kadar respons 85.5 peratus. Lima faktor ranking teratas yang dikenal pasti melalui analisis indeks purata dan sisihan piawai ialah pelaporan maklumat yang tidak tepat, strategi komunikasi yang lemah, beban kerja pentadbiran yang meningkat, cabaran alam sekitar dan pemilihan pengurus PMO. Model struktur PLS-SEM yang dibangunkan menunjukkan kesahan penumpuan dan diskriminasi yang mencukupi. Model keseluruhan didapati memuaskan, dengan nilai goodness-of-fit (GoF) 0.356. Hasil model kemudiannya disahkan oleh sepuluh pakar pembinaan, yang menentukan bahawa kedudukan keseluruhan yang dijana oleh model PLS boleh diterima berdasarkan pengetahuan dan pengalaman mereka dalam PMO. Oleh itu, model yang telah disahkan adalah sumbangan utama kajian ini, yang menyumbang pengetahuan induk untuk manfaat komuniti akademik, dan juga memberi manfaat kepada pengamal pembinaan yang terlibat dalam pelaksanaan PMO, khususnya di UAE.

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## LIST OF SYMBOLS AND ABBREVIATIONS

$M$	-	Mean
$X$	-	Individual data points
$N$	-	Sample size
$S^2$	-	Standard deviation
$X$	-	Individual score
$M$	-	Mean of all scores
$N$	-	Sample size
$f^2$	-	Effect size
$R^2_{included}$	-	Coefficients of determination ( $R^2$ ) value of the endogenous latent variable when a selected exogenous latent variable is included in from the model
$R^2_{excluded}$	-	Coefficients of determination ( $R^2$ ) value of the endogenous latent variable when a selected exogenous latent variable is excluded from the model
$q^2$	-	Predictive relevance
$Q^2_{included}$	-	Value of the endogenous latent variable where all the exogenous latent variables are included in the model
$Q^2_{excluded}$	-	Selected exogenous latent variable is excluded from the model
$GoF$	-	Goodness-of-fit
$AVE$	-	Average communality

$R^2$	-	Coefficients of determination
SEM	-	Structural equation modeling
PLS-SEM	-	Partial Least Squares Structural Equation Modeling
SPSS	-	Statistical Package for Social Sciences
CSV	-	Comma delimited
AVE	-	Average variance extracted



## CHAPTER 1

### INTRODUCTION

#### 1.1 Research background

A Project Management Office (PMO) is an office within an organisation that delegate projects. Its primary responsibility is to define and maintain the organization's project management quality. The PMO is also in charge of setting the direction and standards for the organization's projects. Organizations with small operations may be able to manage projects without the use of a project management office (PMO). However, for organisations that run multiple cross-functional projects at the same time, the PMO must play multiple roles within the organisation. The roles differ significantly from one corporation to the next due to the size and scope of the managed projects. A successful PMO application requires a combination of quality people, good processes, and tools. In terms of project authority, the PMO primarily establishes policy, regulations, processes, and standard operating procedures (SOP). It describes the formation, management, and control of projects, as well as programmes or portfolios (Khan, 2013; Harthi, 2015).

The construction industry is commonly described as having poor quality, aggressive relationships, low productivity, and a reluctance to change. Traditional construction project implementation is typically conducted through an uncompromising and resistant boundary between processes and stakeholders. As a result, communication, cooperation, and integration of project management processes become difficult to carry out. As a result, a new approach to methods and management practises is required, and organisations must undergo organisational restructuring in



order to improve performance through the implementation of PMOs (Winch, G. M. 2010).

Many Middle Eastern countries, including the United Arab Emirates (UAE), see petroleum as a key driver of economic growth. However, realising that oil is not a sustainable commodity, the UAE government is shifting its investment focus to large-scale construction projects that will transform Dubai into the ultimate tourist destination (Ameri & Awad, 2016). As a result, the authority has proposed the use of PMO for mega world-class construction projects. To ensure the success of this adoption, appropriate measures must be taken to address any challenges or issues that arise as a result of the PMO implementation. Owners or clients of these megaprojects in the UAE are interested in completing them as soon as possible, which increases the risks involved during construction. The demands place an additional burden on construction experts [contractors, engineers, and designers], and these demands can be improved by implementing PMO.

The UAE construction industry hopes that proper implementation of PMO will improve project profitability and quality. This is due to the elimination of inefficiency and resource waste. One of the most difficult aspects of implementing PMO is the lack of uniform and standard procedures that can be accepted during construction project operations and processes. The majority of clients or project owners request the use of a project management office (PMO) in their projects. Even if the clients were unaware of the financial and quality implications (Van der Linde & Steyn, 2016). In addition, there is a global construction industry movement advocating for the PMO's adoption and implementation. As a result, the UAE construction sector must catch up with the global market in adopting PMO across all projects, as it is the ideal initiative for monitoring multiple projects to ensure appropriate coordination and efficiency during the construction process.

Despite the increased adoption of PMO, there are debates about how valuable PMO is to construction projects, with the focus on the adoption's failure or success. According to some research studies, PMO methods can be used to manage construction projects in general, but not all of them result in the effective achievement of defined objectives and targets, such as on-time completion (Khan, 2013). Management experience, project size, and organisational type are the most important factors in PMO implementation. (Al Ahababi, 2014) Several studies have found that clearly stated objectives, senior management support, a well-defined plan, and

effective communication are all necessary for a successful PMO implementation. Too and Weaver (2014)

Globalisation's ongoing progress explains why countries such as the UAE invest billions of dollars in development projects. As a result, the purpose of this study is to investigate and evaluate factors influencing PMO implementation performance in UAE construction organisations. It is important to note that the lack of research on PMO in construction (Al Ahabbi, 2014) has made it difficult for organisations to invest financially in large projects that use PMO tools and processes because it does not guarantee efficiency and profitability in terms of time and resources.

## **1.2 Problem statement**

The primary role of the project management office (PMO) in the construction industry is to aid in the effective implementation of the company's construction projects. Several studies have found that PMOs are unable to meet the set objectives of a construction organisation, owing to challenges such as unrealistic objectives, poor implementation setup, and staff mismanagement (Baiden, Price, & Dainty, 2006; Levy, 2018; Al Khoori & Hamid, 2018). The challenges in the United Arab Emirates (UAE) are generally related to the nature and size of constructions. Currently, the UAE is dealing with ineffective government policies that guide the implementation of PMO, particularly for construction firms (Al Khoori & Hamid, 2018). Over the years, the PMO has faced significant implementation challenges in large-scale construction projects. For example, during the construction stage, project completion schedules have proven to be the most difficult task for project managers (Levy, 2018; Alshammari, Yahya, & Haron, 2020). The project is being delayed as a result of the PMO's poor implementation process, which includes slow decision-making, late approval of drawings, and poor planning (Babaeianpour & Zohrevandi, 2014; Oliveira, C Tereso, & Fernandes, 2017). PMO faces several obstacles to proper implementation, including the incorporation of inexperienced managers, a lack of a clear PMO perspective, management unawareness of the scope for implementation, and failure to follow processes that can benefit the organisation (Schibi, 2013).

Essentially, the purpose of PMO is to ensure that the performance of construction projects is managed in a standardised and efficient manner. PMO can help

organisations that work on a variety of projects achieve their strategic objectives and goals (Aubry, Hobbs,&Thuillier, 2008). According to Jalal and Koosha (2015), several studies have been conducted in different countries such as Iran, Vietnam, and India to examine PMO challenges such as meeting timelines and cultural issues specific to the construction industry. The UAE construction industry, like that of other countries, is concerned about project performance and is interested in the implementation of PMO in the industry. The success of a construction project may not necessitate the establishment of a formalised PMO, but PMO can exist within the organisational structure. Even though the name is not PMO, the roles it performs are similar (Salamah&Alnaji, 2014;Alqahtani, 2019). This is consistent with the suggestions made by Godbole (2014) and Wedekind& Philbin (2018) that PMO roles are important in ensuring project success.

Because PMO is still relatively new in the UAE construction industry, it provides an opportunity to investigate PMO-related issues. During the implementation of a construction project, the PMO faces numerous challenges. These difficulties will have an impact on the PMO's performance. As a result, no literature review on this specific topic could be found, leaving gaps in this study. The study's gaps are identifying the challenging factors affecting PMO implementation performance and developing a structural relationship model of these factors, with a focus on mega construction projects in the UAE. By identifying these factors, PMO is able to take appropriate actions with regard to the factors, ensuring excellent performance of PMO in ensuring the success of the construction project in UAE, as the UAE has made a significant investment in the construction industry recently.

### **1.3 Research questions**

From the research problem statement, the researcher can formulate the following research questions:

- (i) What are the factors affecting PMO implementation performance?
- (ii) What is the univariate ranking of the factors affecting PMO implementation performance?
- (iii) What is the model of factors affecting PMO implementation performance?
- (iv) How do the experts view the outcomes of the model?

#### **1.4 Research aims and objectives**

The purpose of this study is to develop a structural equation model (SEM) of the factors that influence Project Management Office (PMO) performance in construction organisations. To achieve this aim, the following objectives were developed:

- (i) To identify the factors affecting PMO implementation performance of mega projects in UAE
- (ii) To determine the univariate rank of factors affecting PMO implementation performance
- (iii) To develop a structural equation model of factors affecting PMO implementation performance
- (iv) To verify the outcome of the model

#### **1.5 Scope of the research**

The implementation of a Project Management Office (PMO) in the construction industry is the focus of this research. The study was carried out in the construction industry of the United Arab Emirates (UAE), which involved large-scale construction projects. This is because PMO is commonly used to manage and coordinate large-scale projects that must be repeated and standardised. This study focuses on all types of mega construction projects, such as sustainable city development, infrastructure projects such as tunnelling, new airports, railway metros, and other related civil engineering construction works. The data for this study was gathered through a questionnaire survey of construction practitioners in the UAE who are familiar with PMO implementation, such as contractors, consultants, senior management, project managers, and civil engineers. The collected data is then used to develop the structural equation model, which is the study's goal.

## 1.6 Significance of the research

The purpose of this study is to create a structural equation model of the factors influencing the Project Management Office (PMO) of a construction company in the United Arab Emirates (UAE). Because PMO implementation in the UAE construction industry is still in its early stages, this study benefits several parties involved in PMO implementation. The identified factors and model serve as the body of knowledge of the PMO discipline applied in mega construction projects for researchers and policymakers. The findings of this study benefit construction practitioners by identifying these factors for reflecting their strengths and weaknesses, allowing them to develop long-term competitive strategies.

## 1.7 Definition of terms

Key terms that making frequent appearances in the Project Management Office (PMO) discussion from various sources related to research. Some of these words or terms with meanings include:

- (i) Project: An organisation that is temporarily needed to generate a specific outcome within a stated period of time by using an estimated amount of resources.
- (ii) Project management: This involves the use of techniques, tools, and skills to attain the requirements of a project through a series of project activities.
- (iii) Project management office (PMO): PMO with the main role is to assist the effective implementation of projects undertaken by the construction organisation.
- (iv) Challenges: The hurdles or obstructions or constraints that affect the performance of PMO in construction organisations
- (v) Organisational performance: This is an estimation of the success of the project which includes the growth of sales resulting from the project, benefits from project savings as well as the project overall performance in comparison to the previous situation.

## 1.8 Organisation of the thesis

The thesis for this study is organized into 6 chapters as follows:

- (i) Chapter One  
The chapter outlined pertinent elements such as the research background, problem statement, specifying the research aim & objectives, and the research scope.
- (ii) Chapter Two  
The chapter provided a review of the research literature relating to the factors affecting Project Management Office (PMO) implementation performance in order to develop a theoretical understanding of and a foundation for research instruments.
- (iii) Chapter Three  
The chapter discussed and studied the rationale of the methodology applied to this study.
- (iv) Chapter Four  
The chapter dealt with data presentation, the univariate statistical analyses and interpretation of the results.
- (v) Chapter Five  
The chapter dealt with data presentation, the multivariate statistical analyses for development PLS-SEM model and interpretation of the results. The experts' verification on the model was also undertaken to ensure that the model is relevant to the UAE construction environment.
- (vi) Chapter Six  
The chapter summarised the research and the conclusions to be drawn, and recommendations for further research.

## 1.9 Summary

The introduction chapter has provided an overview of Project Management Office (PMO) and its application in construction industry. Then the researcher developed the problem statement which highlights information regarding issue, gaps and purpose related to study topic. This is followed by determining the aim and objectives, scope, research questions, and significance of research. Finally, the researcher presented definition of terms and concludes with the organization of the thesis. In chapter 2 the United Arab Emirates (UAE) construction industry and PMO knowledge areas are reviewed.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter presents literature review on United Arab Emirates (UAE) construction industry, Project Management Office (PMO), roles and functions of PMO, factors affecting PMO implementation, impacts of PMO, related studies on organisation performance, and conceptual framework of study. The understanding on these theories is important to further investigate its application in construction industry. The following literature review provides a foundation for the proposed research to establish the structural relationship of challenges affecting PMO performance in construction organisation.

#### 2.2 Construction Industry

The construction industry is described as an economic sector that plans, designs, builds, modifies, maintains, repairs, and eventually demolishes buildings of all types, civil engineering works, mechanical and electrical engineering structures, and other related works. (Tasleem *et al.*,2019). Construction industry has great potential for growth of any country due to high demanding for residential, commercial, housing, institutional, and infrastructure developments. It brings substantial and significant impacts to the country's economy (Al-Emad *et al*, 2016; Emere *et al.*, 2019). It involves a diverse group of stakeholders and has several connections to other areas of activity such as manufacturing and material consumption, energy, finance, labour, and equipment. Construction industry is classified into various segments such as industrial,



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