

# THE IMPACT OF RISK MANAGEMENT AND PROJECT MANAGEMENT SKILLS ON THE PERFORMANCE OF CONSTRUCTION PROJECTS IN UNITED ARAB EMIRATES

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## ABSTRACT

*The construction projects have witnessed fast development in recent decades and sustainable growth in the United Arab Emirates (UAE). Today many multinational construction companies entered the UAE construction market which imposes more pressure on local companies to improve construction performance. In many instances, construction contractors are blamed for poor project management and criticized for having limited knowledge in the application best management techniques, especially construction risk management. The records showing that a large construction companies have won many residential projects in UAE but at the end they have a big loss due improper handling to project schedule over a series of sub-contracts. Hence, the aim of this study is to examine the impact of risk management and project management skills on the performance of construction projects in UAE. This study applies quantitative methods based on SEM to examine the relationship between the variables. The survey was managed in three large construction companies located in Abu Dhabi and Dubai. The total number of population equal to 1270 individuals. Those individuals represent project managers, civil engineers, quantity surveyors, project director, mechanical engineers, electrical engineers, ICT, architects and landscape architects. The finding shows that risk management and project management skills have significant effect on the project performance of construction companies. Project managers assigned for construction projects can benefit from the finding of this study and understand the main skills for project management, whereas the practices of risk management (e.g. risk identification, risk assessment, risk response, and risk monitoring) are the basic skills that every project manager should be experienced to foster construction performance.*

**Keywords:** Risk Management, Construction Project Performance, Projects Management Skills.

## INTRODUCTION

Today, the construction industry is a pillar of the national economy of every country because of its significant contribution to a country's infrastructure and wealth (Yusof et al., 2016; De Araujo et al., 2017). The construction projects in United Arab Emirates (UAE) reflect the economic growth. In recent decades, the fast developing in construction projects in UAE shows a significant importance of this sector to the country. In comparison to other industries, the construction projects now face a various types of risks due to several issues such as unexpected budget, delay in execution of project phases, increasing costs of materials, poor quality, and lake of effective project management (Sambasivan et al., 2017). Because risks in construction projects are unpredictable, risk management has been identified as a critical method for meeting project goals in terms of timeliness, cost, quality, safety, and environmental sustainability. Risk

management in construction domain is a comprehensive discipline. In other words, it has been found that project management in construction projects was not efficient to avoid potential risks facing the construction works (Nawaz et al., 2019).

Project management is a systematic way for accomplishing construction phases throughout the lifecycle of any construction project, it starts from planning to completion, project management is essential factor of success and gaining stakeholder satisfaction (Iqbal et al., 2015). Furthermore, recognizing crucial success criteria in construction, risk management is necessary to ensure that construction works are completed successfully (Waleed, 2018). As a result, building projects should always be overseen by qualified managers who are capable of dealing with the possible risks that may arise during project implementation (Elgadi, 2019).

The UAE is a global icon for progress in a variety of disciplines, particularly infrastructure and real estate. In addition, the UAE has unique economic and cultural traits when compared to other Middle Eastern countries. Construction projects in the United Arab Emirates are a pillar of current and future success. In terms of work requirements and type of production, the UAE construction sector is based on quality and efficiency. As a result, in order to ensure these two criteria, the construction projects in UAE should focus on hiring qualified project managers, and adopting the methods that reduce potential risks on large-scale construction projects, whereas the construction businesses in the UAE are currently looking for experienced individuals with efficient managerial skills rather than technical competence (Hassan et al., 2016). As a result, project managers in the UAE, particularly in the construction industry, should have extensive experience and qualifications in many aspects including risk management. According to Al-Hajj & Sayers (2015), project management is an important discipline for the UAE's economic growth. Based on these arguments, these studies analyzed the concept of risk management and project management in construction projects, and identify their impact on construction project performance.

## THE AIM OF STUDY

The aim of this study is identifying the practices of risk management that influence construction projects, and examine the role of project management and risk management on project performance in construction industry. In order to achieve this objective, a literature review on risk management in building projects was conducted, with a focus on UAE. The identified risk factors can help the project meet its objectives, which include time, cost, and quality. Thereby, this study developed a robust risk management framework for improving the performance of construction projects.

## RESEARCH METHODOLOGY

This study utilized quantitative approaches to validate the hypotheses and answer research questions. Quantitative methodology is widely used for identifying the significance of relationships and measures the strength of association between a set of variables (Debra, 2015). The survey was managed in three large construction companies located in Abu Dhabi and Dubai in UAE, namely: Aldar Properties (Abu Dhabi), Emaar (Dubai), and Dubai Construction Company (Dubai). The total number of population equal to 1270 individuals. Those individuals represent project managers, as well as other professionals, including: Civil Engineers, Quantity Surveyors, Project Director, Mechanical Engineers, Electrical Engineers, ICT, Architects and

Landscape Architects. Simple random technique was adopted to collect the primary data from the respondents. The analysis is conducted according to SEM methods.

## CHALLENGES OF CONSTRUCTION PROJECTS IN UAE

Despite the fact that the UAE's construction industry has experienced exceptional growth over the last decade. However, the majority of the projects experienced delays and cost overruns, indicating that a significant percentage of project management professionals lack professional project management skills and do not attend required professional risk management training (Mohamed et al., 2010). In the same vein, Ajmal, et al., (2017) investigated the underlying dimensional structure of project management techniques in order to discover significant aspects that contribute to project success. Formal training in project management methodology and standards for the project team is required, according to the survey findings of their study; construction projects should improve risk management strategies. Because of the numerous types of operations involved in construction works, these projects have become riskier and complex in recent years (Chatterjee et al., 2018). It faces a variety of obstacles, which are referred to as construction risk (Salah & Moselhi, 2016). As a result, risk management can be an important part of any construction project's decision-making process (Ebrat & Ghodsi, 2014).

According to records, large construction companies have won many residential projects in the UAE, but they have suffered a significant loss as a result of improper project scheduling across a series of subcontracts (Michael, 2019), as construction delays are a common occurrence in civil engineering projects (Remon & Abdel-Hakam, 2016). Negative cash flow on construction performance in the Dubai area is another challenge. Cash shortages can result in project failure and stop of execution in construction works (Khalil et al., 2012). All these risks necessitate good practicing in risk management. In another words, significant construction projects in the UAE necessitate project managers with both hard and soft skills, allowing them to deal with potential risks and influence the project management process on project performance. However, without an effective harmonizing between project managers' roles in the interaction between project management and project performance, and risk management, difficulties will continue to exist.

Despite the fact that several risk management models have been highlighted in earlier researches in a variety of industries (Iqbal et al., 2015; Nawaz et al., 2019), a study of the literature reveals few empirical evidence in the UAE construction setting. It is evident that the lack of a project management has a detrimental impact on construction organizations' performance and inhibits them from responding to risks in a systematic and reasonable manner throughout the project's phases. Given that managing potential risks can reduce uncertainty and minimize losses, it is critical to assess current practice and develop a new model by developing effective project management practices and implementing them on construction sites, allowing project management to play a central role in achieving stable construction work execution. As a result, risks are expected at every stage of the project lifecycle, and some risks may arise at many stages. Based on the previous debates and findings, this research identified the need for a robust risk management framework in the construction industry that explains the impact of risk management on construction performance. Such a framework could aid construction companies to minimize construction-related risks.

## LITERATURE REVIEW

### Risk Management

Risk, according to PMI, is described as "an unpredictable event or scenario that, if it occurs, has a positive or negative impact on the project's goals". Risks are not limited to having a negative impact on the implementation of projects, while successful project management include the practices for completing a project ahead of schedule, achieving greater results than expected, and using all of the resources assigned to the project (Ghassan, 2017). But the failure to adopt risk management may affect all the efforts spent by project managers and hinder the execution of construction projects. Thereby, in all types of projects, risk management is a critical component of management and accountability. It is a systematic approach to identifying, analyzing, assessing, prioritizing, and monitoring risks throughout the project lifecycle, which supports the achievement of the project's strategic objectives through the use of a proactive approach in identifying, analyzing, assessing, prioritizing, and monitoring risks (Petr & Blanka, 2018).

The implementation of risk management helps companies in dealing with future issues and threats, and dealing with uncertainties; nonetheless, risk management cannot be isolated from prioritisation and planning methods. The purpose of the risk management strategy is to assure project work's long-term viability. Furthermore, by constantly looking into the future and implementing "worst-case" scenarios, risk management assists organizations in reducing unforeseen risks. It also provides a standardized process for project implementation, and it is critical to note that risks and opportunities are not mutually exclusive. Accordingly, effective risk identification strategies concentrate on opportunities as well as risks (Al Ariss & Guo, 2016).

### Risk Management in Construction

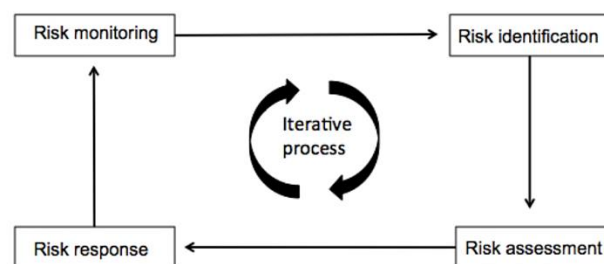
Risk is one of the main factors that affect the success of construction projects. It is defined as an unforeseen incident or circumstance that has a positive or negative impact on the construction project (Qasem, 2012). It is defined by Raftery (2003) as a divergence from the desired, expected outcome of a construction project. According to Simu (2006), uncertainty is associated with the incidence of some loss in almost all construction projects. Furthermore, Tetteh (2014) claimed that risk in construction is the probability of loss, damage, or unfavorable effects in continuity of a project. In construction works, there is a cause and an effect. For instance, the cause maybe the shortage of resources or labor, and the effect is the stop of execution in the construction (Al-Mukahal, 2020).

Risks are typically classified as rates of defects in the execution of construction which in turn affect the expected results (in terms of quality, schedule, and cost) based on the construction approach (Bahamid et al., 2019). In terms of risk assessment therefore, the evaluated of risks in construction industry is to see how such risks affect the implementation of the whole project (Taroun, 2014). Over the last four decades, there have been significant advancements in the administration of building projects (Chatterjee et al., 2018). In poor countries, the construction projects are vulnerable to a number of unknown issues. In a number of projects, effective risk management is being employed so that to prevent unexpected issues during the implementation of construction tasks (Bahamid & Doh, 2017). Because of the involvement of several stakeholders, construction projects have been classified as either being exposed to risk or having an apparent assumed risk (Chatterjee et al., 2018). Several construction projects in underdeveloped countries are plagued by insufficiency, such as quality issues, high cost, and failure to complete all

scheduled tasks within the specified time frame. These issues are mainly lead to make a project unprofitable (Odimabo, 2016). The results of research on the risk associated in construction projects undertaken in rich countries are not always appropriate in developing countries. This means that concerns about project risks are subject to the country's specific economic, environmental, and political circumstances (Fernando et al., 2017).

Risk management in construction industry is regarded as one of the most essential activities for ensuring project success. There is no doubt that risk management is one of the most important pillars of project management in the construction context, as it is impossible to implement any construction project without first considering the risks that may arise during the project's execution, necessitating the need to work on developing a clear and thoughtful methodology for managing these risks in the most effective way possible in order to meet the project's objectives (Etges et al., 2017). Over the last decade, the importance of risk management has grown, and Critical Risk Factors (CRFs) have gotten more attention from scholars and practitioners. Large and complex construction projects contain a variety of risk variables, and the successful completion of such projects is contingent on competent risk management (Sharma & Gupta, 2021). A construction project's cost, schedule, and quality are all affected by risks. With the growing size and complexity of projects, the ability to manage risks throughout the construction process has become important to preventing unintended consequences. How risks are divided among project participants is heavily influenced by the procurement decision and the content of the corresponding contract conditions. As a result, project players must select the optimum project procurement option (Ekaterina, 2008).

The Project Management Institute (2008) promotes risk management as one of nine knowledge areas. Furthermore, risk management is a detailed and systematic technique to recognising, assessing, and responding to hazards in order to accomplish project goals in the context of construction project management. The risk management process has many benefits, including identifying and assessing hazards, as well as enhancing construction project management processes and resource usage (Nerija & Audrius, 2021). Despite the fact that it is one of the most expensive goods, many construction companies have never addressed the cost of risk (Cavignac, 2012). Risk management allows primary project stakeholders—the client, the contractor or developer, the consultant, and the supplier—to keep their promises and reduce negative repercussions on construction project cost, time, and quality. Traditionally, construction project success has been connected to three factors: timeliness, cost, and quality (Nerija & Audrius, 2021). The following risk management model shows that the process of risk management composed of four main practices (e.g. risk identification, risk assessment, risk response, and risk monitoring) as shown in Figure-1 (Dario, 2017) and explained below.



**FIGURE 1**  
**RISK MANAGEMENT MODEL (DARIO, 2017)**

## **Risk Identification**

The process of recognizing and recording information regarding the associated risks is known as risk identification. Although it is not easy to control all potential risks in a construction project, it is highly important to focus on the most serious threats that could have an impact on the project's execution. The most significant step in the risk management process is risk identification, which is commonly recognized as the most crucial step (Banaitene & Banaitis, 2012). Hence, identifying all potential threats could be futile and time consuming (El-Sayegh & Mansour, 2015). The aim of risk identification isn't to make perfect predictions about what will happen in the future; rather, it's to identify prospective risk sources that could have a big influence on a project if they happen. It should be noted that the identification of all conceivable risks is not possible, and that should not be the ultimate goal (Smith et al., 2006). As a result, the aim behind the identification and addressing the risks is to ensure that potential risks are well managed in a way that allows for the achievement of the overall targets (Dario, 2017).

## **Risk Assessment**

Risk identification is only the first stage; some of the risk remain without been discovered will be much more severe enough to require further assessment. The next phase is to assess the significance of a potential risk before moving on to reaction management. The purpose of risk assessment and analysis is to completely describe and priorities risk scenarios (Schieg, 2006). In general, risk assessment literature is divided into two categories: qualitative and quantitative analysis. Surveys, checklists, and brainstorming are used in the former, while a data-driven process is used in the latter (Banaitene & Banaitis, 2012). Quantitative risk analysis determines the severity of each risk on a level of high to low, and also the probability of occurrence (Dario, 2017).

## **Risk Response**

The third phase of the risk management process specifies what actions should be taken in response to a variety risks and threats identified before (Mhetre et al., 2016) Forming options and deciding on measures to improve possibilities and reduce risks to the project's goals. The effectiveness of this phase will determine whether the project's risks rise or decline. Risk response requires assigning parties to bear the responsibility for each accepted risk response. As per the literature, there are four main risk mitigation strategies that can be used to lower project risk exposure (Dario, 2017).

## **Risk Monitoring**

It is useful to analyze and examine potential risks on a regularly in order to carry out the risk management procedure. It ensures the detection and control of new threats. Cooper, et al., (2005) suggest that the project manager keep track of a list of major risks identified for potential mitigation action in management review meetings (Cooper et al., 2005). This is the final step in the process, and it's just as important as the others. The possibility and impact of the risks can be reviewed as additional information becomes available, and once the predicted risk incident has happened, they can be eliminated from the risk list (Winch, 2010).

## Construction Project Management

Construction project management is described as an operational management that supervises the whole activities of a project, according to modern management standards (Marcelino-Sádaba et al., 2015). It also appropriately organizes its tasks and takes the necessary steps to expedite the completion of those activities in order to meet the project's deadline. The manager of a construction project oversees and monitors the completion of the project's agreed-upon tasks (Al-Mukahal et al., 2020). Because the requirements for sustainable projects are becoming more complex, the project manager's function, which includes general supervision of a building's many construction phases, is evolving and becoming increasingly important for achieving pre-determined sustainability targets (Ruth et al., 2020). In today's constructions, sustainability of works has become critical, necessitating a shift in how project management performance is measured away from the previous traditional methods to recognized levels in terms of time, delivery, budget, and quality (Radujkovic & Sjekavica, 2017).

Originally, a project manager traditionally accepts certain goals for considering a project is successful, for example a project manager always looking to ensure that a project should be delivered on time, and the work should be completed within the prescribed budget, and that the project must be high quality (Toljaga-Nikolic et al., 2020), often referred to as the "iron triangle" of project success (Radujkovic, 2017) or the "triple constraint," an important concept in project management (Pollack et al., 2018). However, because the project manager is in charge of overseeing the many development phases of a construction project, he or she may be uniquely qualified to deliver on the claimed sustainability of proposed building projects, as proposed by Hope & Moehler (2014).

Some authors, such as Maltzman & Shirley (2010) claimed that project managers have always been fitted for fulfilling the purpose of a particular project, maybe accidentally. In actuality, the need for a project manager has existed since the early 1950s, following the industrial revolution, as a result of advances in more complicated building processes and material technologies, as well as the need to manage complex projects with more resources more efficiently (Ruth et al., 2020). The mission of management in the field of construction is not confined to a specific phase of a project, but also starts when a project begins and continues until the accomplishment of all scheduled tasks (Silvius et al., 2017). As a result, management must define all requirements for each activity, as well as any concurrent operations that are carried out at the same time (Musa et al., 2012). During the execution of a project, the possible risks should also be recognized by project manager in order to avoid them. With a corresponding allocation of human resources and the supplies, the time line for completing each task, as well as its beginning and conclusion dates, should be established by the project management team. One of the basic responsibilities of every construction project is identifying and analyzing deviations that arise during the implementation of project phases, and then adopt the necessary actions to rectify the issue (Gabel, 2013).

According to Loader (2006) the notion of construction project management is based on numerous aspects, the first aspect is the scope of construction works. Moreover, the scope of a construction project is determined during project's life cycle, and the project's objectives should be known before starting the project. The second aspect is the possible changes in the scope of construction works. There are numerous predictions that a change in the scope of works could occur in the construction project, necessitating the implementation of systems that will help to regulate this shift and mitigate any issues. The third aspect is planning. Through the life cycle of a

construction project, management team seeks to establish a high degree of information for comprehensive plans. The fourth aspect is management. The construction project manager is in charge of project management as well as leading teamwork to meet the goals of the project. Other aspects linked to project management are quality, timeliness, and budget limits, whereas these aspects determine whether a project is successful or not.

The measurement of project management in construction domain is important to evaluate the performance of a project manager. According to studies by Sense & Kiridena (2014), and Mouchi, et al., (2011), the skills of a project manager lie into 23 different elements, such as communication, resource management, continuing learning, and team building. Below are the most cited factors for measuring project management in construction projects (Faisal et al., 2020). These elements are described below.

- **Communication:** Organizational communication regardless of oral/verbal, written and comprehensive (Awan et al., 2015). Hence, a project manager should be capable to have oral skills in communication, and the ability to make a presentation; writing communication skills are the ability to write letters and documents, as well as reports, general skills to understand both the expressed and unexpressed meaning of others.
- **Team Building:** It is essential for a project manager to know everything about the team structure, capacities and skills (delegation and integration) of the different members of the project team (Deepa & Seth, 2013).
- **Planning and Coordination:** The project manager must have a good mastery of objective-oriented direction, so a project manager must have the capacity to build harmonious relations between the members of his team, and to manage disputes between workers (Brenton & Levin, 2012).
- **Problem Solving:** Having the ability to discover problems in a timely manner, problem analysis skills, judgment and decision making skills (Awan et al., 2015).
- **Interpersonal Skills:** Having strong relationships with all kinds of people (Brenton & Levin, 2012), thus persuading motivational and incentive skills. According to (Cornelius, 2012) it is necessary to influence other people to quickly achieve the objectives of the project. While Khamaksorn (2016) emphasized on knowing the needs and expectations of team members in the project and motivate them to work better.

## Project Performance

Every project is assessed according to the performance. The performance of construction project is measured through various aspects such as timetables, budgets, building material availability, logistics, public inconvenience, and bidding (Beatham et al., 2004). Careful planning is required for the project's successful implementation because it affect the performance of the project (Zaghloul & Hartman, 2003). The success criteria for almost all projects determine the outcome of each construction project. A project's success factors are parts of the project that are likely to be affected by a higher possibility of success. Some scholars argue that the criteria for a successful project are measures of a project's positive outcome; they are a dependent variable that determines a project's success (Katic & Bevanda, 2019). The success factors such as quality, time of deliver, cost should be available in any high performance project (Robson, 2014). Because different people choose distinct standards of success criteria, the success elements of one project are not universal for all initiatives (Ahadzic, 2015). For example, a project's delay is one of the main factors that hinders project performance. However, by constructing a functional center deal with unexpected delays in the delivery of project materials is essential (Ankomah et al., 2010). While completing a project is a difficult task, projects with high performance always accomplish all phases of execution in time (Cross, 2019). Sumesh (2015) suggested that the success factors of projects deemed to be high performance projects are: management coordination, target



achievement, top management support, teamwork, monitoring, effective planning, quality control, and effective communication.

## Construction Performance

Construction is a branch of the construction business that is closely related to the subjects of architecture and civil engineering. It specializes in the study of structural engineering, which is the process of creating structures or establishing a location's infrastructure. Large construction operations include a wide range of professions and businesses, and are far from being a single activity. It is usually overseen by the construction manager, design engineer, construction engineer, or project engineer, and managed by the project manager job (Egwunatum, 2017). Project performance in construction domain has been discussed widely in the literature. The success of construction projects is determined by four key metrics: cost, schedule, quality target, and participant satisfaction (Oladapo, 2010). Cost performance is a statistic for evaluating project performance in terms of project cost (Egwunatum, 2017). Cost a crucial aspect because project resources are generally restricted, and construction costs can easily spiral out of control. The second element of project performance in construction is time performance which is the duration of a project is an important aspect in determining its success. One of the numerous difficulties in construction projects is the extension of execution and delivery time. The goal of time monitoring is to evaluate a project's performance in relation to the intended timetable within a specific period (Mahmoud, 2020). Hence, schedule or time performance is measured as a percentage increase in the actual completion time compared to the anticipated completion time. The third element is quality performance; the goal of project quality performance measures is to evaluate project performance against the quality requirements specified in the contract. As a result, the quality of materials and work can be assessed in terms of compliance with the contract's specifications (Egwunatum, 2017).

The success of the construction works can be also measured through performance indicators (KPI) (Ofori-Kuragu et al., 2016) whereas a KPI measurement of the performance is a well-known tool in many researches in construction domain. Most performance indicators help measure the dimension of a projects in a particular industry. Thereby, to improve the performance of construction companies, it is necessary to rely on KPI because it is a trusted tool for measuring the performance of wide spectrum of industries (Beatham et al., 2004). There are two categories of indicators in KPIs, which can be used to evaluate the performance of a construction project. It is evident that KPIs act a vital role in offering information on the performance of construction jobs, projects, and businesses. Many investigate and studies are piloted to determine KPIs. Largely of them are project particular. They focus on the performance measurement at the project stage. Current research, which has been directed for performance estimate and comparison at the establishment point, is incomplete in the literature. Also, most of the conducted academics have improved KPIs that are appropriate for exact national characteristics. Other scholars used financial performance to measure and estimate the performance of construction projects (Bassioni et al., 2004). The most important problem deceits in the fact that financial indicator are cover indicators, in the sense that they express the results of managerial activities already taken. Though, managers demand recent financial information and up-to-date in order to be able to take precise decisions which in turn affect the performance of a construction project (Bassioni et al., 2004). Based on the above mentioned models and studies, the potential KPI performance indicators are used in this study to measure the performance of construction projects. Six

dimensions namely: Health and safety, quality management, project productivity, construction cost, construction time, client satisfaction. These performance indicators are selected as the most cited indicators of in construction industry.

## THEORETICAL BACKGROUND

The review of previous studies revealed a robust association between risk management and construction project performance. Risk management is widely acknowledged as a critical component in improving the performance of construction projects. The completion of project schedule, cost, quality, safety, and environmental sustainability objectives determines the success of a construction project. Lawrence (2015) found that risk management strategies used during the planning stage had an impact on project performance. As a result, implementing good risk management strategies has a beneficial impact on construction project performance, resulting in a high level of project success. It has been discovered that poor construction project performance is caused by a lack of basic information and poor risk management (Mohd et al., 2019). More focus should be made on connection and risk management by developing plans for effective communication and risk handling when carrying out projects, and more emphasis should be placed on risk management according to their effect and influence (Cross, 2019). Roque & Carvalho (2013) investigated the impact of risk management on building project performance in the same setting. Adopting risk management strategies has a considerable significant impact on project success, according to the findings of their study. The following assumption statement will be investigated in the empirical phase of this study based on the findings of prior studies.

*H1 Risk management has a significant effect on project performance in construction industry in UAE.*

It is obvious that the projects are different from each other, but there is only one factor that puts them in common, that factor is the human factor that can lead to the success of all these projects. Over the past decades, several studies established certain approaches for various construction companies to help project managers easily utilize best management practices. Whereas the principles of effective project management should be based on risk management skills and knowledge (Violante, 2018), while the Project Management Institute (PMI) documents sets of methodologies, processes, and practices through the Project Management Body of Knowledge (PMBOK) Guide, where risk management is included. As projects have multifaceted nature and size, and adopting a multidisciplinary strategy in managing projects requires a giving legitimate regard for risk management (Aziz et al., 2019). Alshibly (2013) looked into the impact of risk management on the success of construction projects. According to the findings of Alshibly's research, the risk assessment and risk identification have strong influences on project success, planned budget, scheduled time for delivery, and the capability to meet stakeholders' technical specifications. Projects in the domain of construction industry are complex and always face certain risks. Therefore, the application of an active risk management may help effective construction project management (Dario, 2015). Projects Managers cannot efficaciously spread project's objectives deprived of being helped by some tools (Ansah & Sorooshian, 2017; Bygballe & Vaagaasar, 2016). Quality Management and Risk Management are approaches that have verified to be effective in the past (Marty, 2015). Both these procedures get many profits to a project, but inappropriately, they are too often deemed distinctly (Gallego, 2017). Another study was carried out by Abazid & Harb (2018) in order to get a thorough conceptualization of risk and

its repercussions in the realms of construction and needed management operations. The impact of risk on project evaluation is also explored, along with the tools and strategies used to control risk in the construction sector.

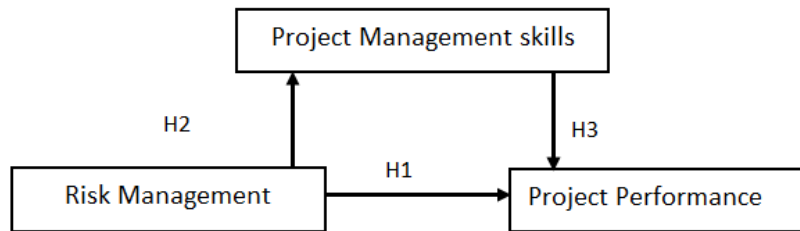
According to Opran (2012); "a higher risk may lead to a higher reward," and limiting project risks will enhance project production. By accepting risk management, reserves capabilities can be achieved in construction projects. For this aim, for project managers over and above real estate makers, a thought of the risk management process is valuable. Based on the findings of previous studies, the following hypothesis statement will be tested in the empirical part in the survey.

*H2 Risk management has a significant effect on project management skills in construction industry in UAE.*

Furthermore, a review of past research found a robust link between project management skills and construction project performance. Project management is a concept that is gaining traction in a variety of industries. Many companies implement a project management approach in their projects in order to improve performance and revenues (Ewelina & Mikaela, 2011). Project management is widely acknowledged as a valuable exercise that adds value to a project and enhances construction project performance. While elements like cost, time, and quality are important indicators of a construction project performance in the construction business, effective risk management can determine whether a project succeeds or fails (Mohd et al., 2019). As a result, implementing effective project management procedures has a beneficial impact on construction project performance, resulting in a high degree of project success. It has been discovered that bad construction project performance is caused by a lack of proper knowledge and inadequate project management in construction projects (Mohd et al., 2019). More attention should be paid to project management and communication by establishing strategies for efficient communication and risk management while carrying out projects and more attention should be paid to arranging project management according to their impact and influence on project performance (Cross, 2019). In the same context, Roque & Carvalho (2013) evaluated the impact of project management on construction project performance. Adopting project management principles has a considerable favorable impact on project success, according to the findings of their study. They also indicate that having a risk manager on board has a beneficial impact on project success. From a practical standpoint, paying attention to uncertainties during the project, employing project management approaches, and having a thorough understanding of the business environment are essential success aspects that demand project managers' and risk managers' attention. The findings from the previous researches on this relationship reveals that project management skills are linked to project performance in construction industry, based on this claim, the next hypothesis will be assessed.

*H3 Project management skills have a significant effect on project performance in construction industry in UAE.*

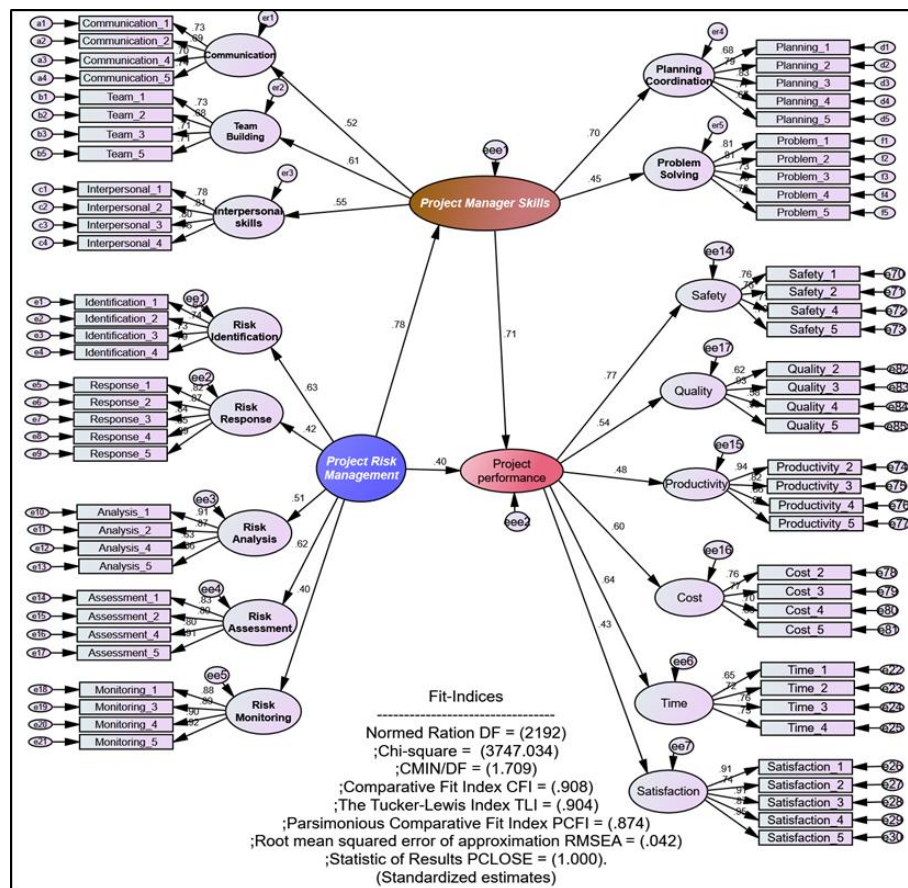
According to the previous arguments, this study develops a framework for construction industry in UAE to construct risk management, project management skills, and the project performance in construction domain. This framework will be assessed based on SEM quantitative methods as shown in Figure-2.



**FIGURE 2**  
**RISK MANAGEMENT FRAMEWORK IN CONSTRUCTION PROJECTS**

**RESULTS AND FINDINGS**

The first stage in SEM analysis is to evaluate the fit of the conceptual framework. Hence, the testing on the association between the constructs will be conducted in this analysis, and then examine the hypotheses. The early review of data output from SEM analysis indicates that the majority of fit-indices are acceptable enough to agree a good model-fit for the framework with the primary data collected from the survey in Oman construction companies. Figure-3 shows the final structural models with the indication of fit indices.



**FIGURE 3**  
**THE CONSTRUCT OF STRUCTURAL MODEL (RISK MANAGEMENT FRAMEWORK)**

Reviewing the framework in Figure-3, it is found that the magnitudes of fit-indices lie within the cut-off points for SEM. Reading the value of PCLOSE=1.000 (perfect non-significant), and RMSEA=0.042 ( $\leq 0.08$ ) which indicates a high degree of model-fit with the empirical data. Furthermore, CFI=0.908 ( $\geq 0.80$ ), CMIN/DF=1.709 ( $\leq 3.00$ ), and TLI=0.904 ( $\geq$

0.80). Assessing the values of fit-indices and compare them with the cut-off points accordance to SEM standards, it is concluded that a sufficient degree of model-fit in risk management framework in construction projects has been achieved.

To examine the hypotheses, the Critical Ratio (C.R) is utilized to assess each hypothesis, and assessing regression coefficients so that to identify the degree of significance which is based on the magnitude of C.R (Hair et al., 2010); if C.R greater than 1.96 for a particular relationship, then a hypothesis is accepted, or else the hypothesis should be rejected, and also the weight of path coefficient for each relationship should be significant (Sig.  $\leq 0.05$ ). Hypothesis (1) states that "Risk management has a significant effect on project performance in construction projects in UAE" (Sig.=0.003, C.R=2.984  $\geq 1.96$ ), whereas Hypothesis (2) states that "Risk management has a significant effect on project manager's skills in construction projects in UAE" (Sig.=0.000, C.R=5.716  $\geq 1.96$ ), finally Hypothesis (3) states that "Project manager's skills has a significant effect on construction project performance in UAE" (Sig.=0.000, C.R=4.633  $\geq 1.96$ ). Based on these results, it is concluded that all three hypotheses are accepted and not rejected. Therefore, there are significant effects (direct and positive) between the three constructs (i.e. risk management, project manager's skills, and project performance), and the framework constructing these three variables is fit with the empirical data.

## CONCLUSION

This research shows the importance of risk management in fostering performance of construction companies in UAE, as well as the provide empirical evidence to the role of project management skills on this relationship. The outcome of this paper explains why risk management in construction work is essential to protect these projects and satisfy stakeholders.

Project managers assigned for construction projects can benefit from the finding of this study and understand the main skills for project management from the findings of this research. In UAE, a few academic works have been done in the past to identify risk in construction works, as well as the skills requirement for project managers in construction which are essential to enhance the performance of construction companies. No insight evidences were provided into the overall performance of construction firms in UAE. The result revealed that the practices of risk management (e.g. risk identification, risk assessment, risk response, and risk monitoring) are the basic skills that every project manager should be experienced with. Moreover, managing risk correctly, a project manager can confirm that the projects will be disposed to fewer loses and will be accomplished within the restrictions of scope, time, cost and quality and advance the performance of the project at the end.

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