

The Effect of Risk Management on the Performance of Construction Companies in the United Arab Emirates

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Abstract

The construction industry in the United Arab Emirates (UAE) is flourishing. The number of foreign construction firms have entered the UAE market is on the rise. Despite the booming of construction projects in UAE, the performance of construction companies is a major concern for stakeholders and clients. Contractors are usually blamed for lack of risk management which increase the delays of delivery and raising the cost of construction. This situation is the main reason of poor accomplishments of these projects across sub-contracts. Hence, the aim of this study is to investigate the relationship between risk management and the performance of construction companies in UAE. In this study, quantitative approaches are used to evaluate the relationship between project risk management and project performance. The population is made up of 1270 individuals. Those individuals represent project managers and staff from three construction companies, namely: EMAAR (Dubai), Aldar Properties (Abu Dhabi), and Dubai Construction Company. The results reveal that risk management has a significant effect on construction project performance. This findings shows that project managers should be capable to deal with the potential risks that may delay the executions of construction works, and consider not only risk from outside but also risks come from inside the company. However, it is highly recommended that project managers in these three companies to understand complex situations during construction works and use their hard and soft skills to control risks before affect the performance of the project and lead to failure.

Keywords: Project Risk Management (PRM), Construction Project Performance (CPF), Risk Management (RM), Construction Projects.

Introduction

Because of its significant contribution to any country's infrastructure, the construction industry is an economic cornerstone (De Araujo et al., 2017; Yusof et al., 2016). In comparison to other industries, the construction industry today confronts a potential risk due to unforeseen financial and schedule issues (Sambasivan et al., 2017). Because dangers in construction projects are unpredictable, risk management in construction projects has been recognized as a critical strategy for meeting project objectives in terms of time, cost, quality, safety, and environmental sustainability. Project Risk Management (henceforth referred to as PRM) is a comprehensive discipline, according to this reasoning. It has been reported that several poor countries lack adequate PRM in construction projects (Nawaz et al., 2019). When implemented in a systematic manner throughout the lifecycle of a construction project, from the planning stage through completion, PRM is advantageous (Iqbal et al. 2015). Furthermore, knowing essential success aspects in organizational risk management is required to assure the

completion of construction projects successfully (Waleed, 2018). Building projects should always be overseen by qualified managers who are prepared to deal with any hazards that may arise during project implementation (Elgadi, 2019).

The United Arab Emirates (henceforth referred to as UAE) is a global leader in development, particularly in infrastructure and real estate. Furthermore, the UAE differs from other Middle Eastern countries in terms of economic and cultural aspects. Building projects are critical to both current and future growth in the United Arab Emirates. The UAE construction business has taken a quantum leap in terms of work requirements and output type. As a result, construction businesses in the UAE are actively employing experienced personnel with effective administrative skills rather than technical competence to mitigate potential hazards on large-scale building projects (Hassan et al., 2016). As a result, it is critical that project managers in the UAE, and particularly in the construction business, have substantial skills and qualifications. The great majority are highly qualified professionals from a range of fields. According to Al-Hajj and Sayers (2015), project management may be a vital discipline for the UAE's economic growth. Based on these factors, this research will investigate the idea of risk management in construction projects and evaluate its relationship to Construction Project Performance (CPF).

Challenges of construction projects in UAE

Despite the fact that the UAE construction industry has grown significantly over the last decade. However, the majority of projects experienced delays and cost overruns, indicating that a significant proportion of project management professionals lack academic degrees in project management and do not attend necessary professional risk management training (Mohamed et al., 2010). Ajmal et al. (2017) conducted similar research, studying the dimensions of project management methodologies to identify the elements most significant to successful project completion. According to the survey results of their study, formal training in PRM procedures and standards for the project team is required to boost the coverage and accuracy of project risk assessments.

Large construction corporations have won multiple residential projects in the UAE, but have suffered significant losses due to poor project sequencing over a series of sub-contracts (Andrew, 2021), as construction delays are common in civil engineering projects (Aziz & Abdel-Hakam). Negative cash flow on construction performance in the Dubai area is another danger. Cash flow problems can lead to project and company failure (Al-Joburi et al., 2012). Given all of these hazards, effective risk management is necessary. To put it another way, significant construction projects in the UAE require project managers that possess both hard and soft abilities in order to cope with potential risks and influence the PRM process on building project performance. As a result, risk management concerns persist in the absence of a complete grasp of project managers' responsibilities in the link between PRM and CPP.

Various studies have found that the absence of a PRM has a negative impact on the performance of construction organizations, preventing them from responding methodically and logically to risks throughout the project phases. Because managing possible risks can reduce uncertainty and minimize losses, it is critical to review current methods and generate new models by developing effective PRM processes and putting them into practice on construction sites. PRM can thus play an important role in achieving steady construction work execution. As a result, risks should be anticipated at all stages of the project's life cycle, and certain risks may emerge at many times. According to the Fitch Solutions Operational Risk Index, the UAE has a fair level of PRM index, but there is still room for improvement to exceed the 90-degree index, as indicated in Table 1.

Table 1: Risk Index in the UAE

	Operational Risk	Labour Market Risk	Trade and Investment Risk	Logistics Risk	Crime and Security Risk
UAE Score	72.2	71.3	79.1	67.9	70.5
MENA Average	47.4	52.3	48.0	48.1	40.9
MENA Position (out of 18)	1	1	1	3	1
Global Average	49.7	50.3	49.8	49.3	49.2
Global Position (out of 201)	18	11	3	42	33

100 = Lowest risk, 0 = Highest risk, Source: Fitch Solutions Operational Risk Index

Despite the fact that diverse risk management strategies have been discovered in previous studies in other industries, a study of the literature reveals a scarcity of empirical data in the UAE scenario (Iqbal et al., 2015; Nawaz et al., 2019). This study identified an effective risk management framework that clarifies the influence of RM on contractor performance in the building industry as a priority. A structure like this could assist construction organizations in reducing hazards in construction projects.

Project risk management

Project management and accountability include risk management (RM) as a crucial element. It's a proactive method of finding, analyzing, assessing, prioritizing, and monitoring risks that may arise at any point in the project's lifespan, from the earliest planning stages to the last review of completed tasks (Petr and Blanka, 2018). Implementing RM helps businesses deal with future challenges on the job and deal with uncertainty. Prioritization and planning techniques are intrinsically tied to RM. By using the RM technique, the project activity's long-term viability is ensured. Moreover, RM supports businesses in lowering unplanned risks by continually anticipating and carrying out "worst-case" scenarios. It is critical to remember that dangers and opportunities are not mutually exclusive elements. It also provides a consistent method for project implementation. Failure to monitor odds of meeting project goals is a risk that must be addressed using appropriate risk detection methodologies (Al Ariss and Guo, 2016).

Project risk management, or PRM, is one of the most critical approaches for ensuring a project's success (hence abbreviated as PRM). Given that no project can be completed without first evaluating the various hazards that may develop during its execution, risk management is an unquestionably important component of every project management strategy (Etges et al., 2017). The

Project Management Institute defines risk as “an unknown event or scenario that, if it occurs, has a positive or negative impact on the project's objectives”. Risks do not always have a negative impact on the project's objectives; sometimes a positive effect happens, which is lacking in some since most people equate the term "risk" with only bad results, which is not the case in reality. Positive risks include the project being completed ahead of schedule, producing better outcomes than expected, and not using all of the project's resources (Ghassan, 2017; Al-Shami & Rashid, 2022).

Risk management in construction projects

There are numerous dangers and hazards that might impact construction projects (Hussain et al., 2018). Several studies have identified risk factors in construction projects. Risk is described in the construction business as a difficulty that must be handled and controlled during all phases of the project (Waleed, 2018). Construction project risks include the unpredictability of project completion, output quality, and project final cost. As a result, the risk in construction project operations is not confined to a single cause (Oladapo, 2006). There are numerous dangers and hazards that might impact construction projects (Hussain et al., 2018). Several studies have identified risk factors in construction projects. Risk is described in the construction business as a difficulty that must be handled and controlled during all phases of the project (Waleed, 2018). Construction project risks include the unpredictability of project completion, output quality, and project final cost. As a result, the risk in construction project operations is not confined to a single cause (Oladapo, 2006). The importance of RM in building projects has been demonstrated by several empirical studies, and RM experts are able to recognize and address risks in any building project, regardless of its scope or scale. Differences in design and scope of work, as well as project completion schedules, are the most common dangers in these projects. Construction projects are inherently risky because of their complexity, and any modifications to the original blueprint might add new layers of peril, extend the duration of the build, and possibly increase the budget (Abazid and Harb, 2018). Over the last two decades, there has been a surge in interest in studies on risk management in construction projects. To fulfill the goals of construction projects and assure their success, significant attention must be paid to recognizing, reducing, and managing the myriad risks that may develop throughout project implementation (Yuan et al., 2009). Construction project threats can originate from a lack of quick judgment, inadequate project planning and management, and slow project phase implementation (Ali et al., 2018). According to Jafarnejad et al. (2014), the risks associated with each construction project can be classified into three broad groups.:

External Risks. Financial, political, legal, and ecological perils all fall under this category.

Internal Risks. The project's design, construction plan, management, and interpersonal relationships all pose possible risks.

Force Majeure risks. Natural catastrophes, pandemics crises, and wars.

According to Zavadskas et al. (2010), the construction business and building projects in general are exceedingly risky. Iqbal et al. (2015) asserted that risks in construction projects can affect project goals such as time, cost, and quality, but they also assumed that construction project risks include late payments, financial issues, accidents/safety issues, poor planning, poor performance by subcontractors, interchangeable currency rates, erroneous perimeter rates, and material delivery delays. According to Jaser (2005), risk management in construction projects is a defined technique for methodically identifying, analyzing, and responding to risks throughout the project's execution phase in order to maintain an acceptable level of risk control, as indicated in Figure 1.

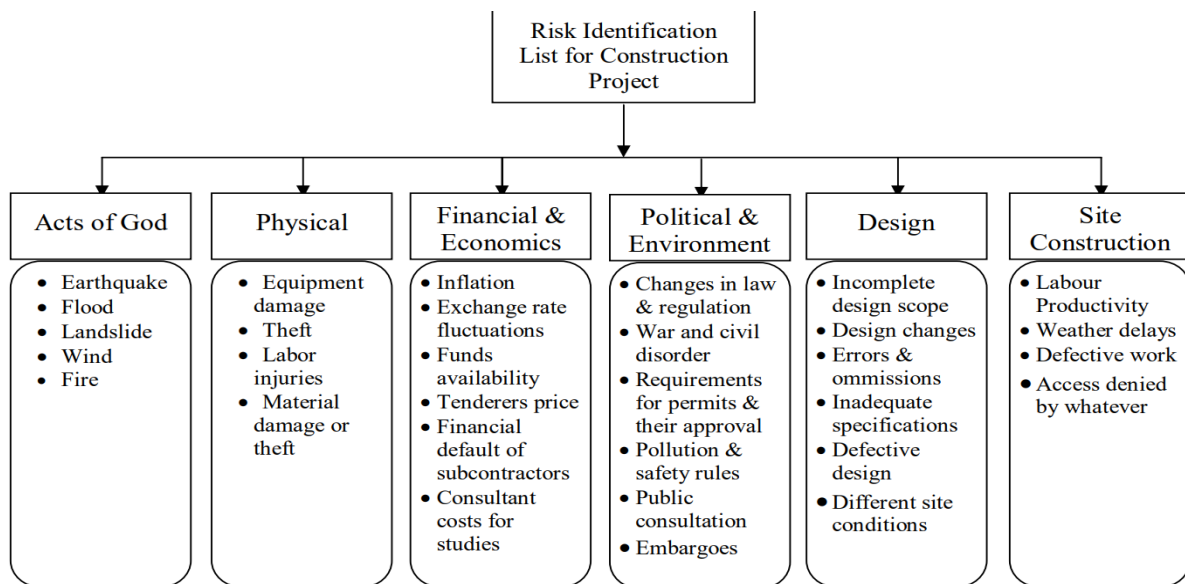


Figure 1: Risk Categorization List (Source: Jaser, 2005)

Regular maintenance of the RM system's functionality is also required, even though RM practices are an important method for reducing the likelihood of construction projects. This section's literature review illustrates that construction firms must be competent risk managers and employ a number of beneficial risk response approaches. The effectiveness of the RM strategy should be ensured by construction businesses using enough resources throughout the duration of a project (Basova and Mitselsky, 2011). When an organization is incapable to practice RM, then project accomplishment will be not accurately defined. In another sense, identifying possible risks before beginning the early part of a construct project is crucial.

A competent strategy to risk management and, eventually, measuring management presentation during a project must protect the project from future blunders (Al-shami, Majid, Rashid, & Fasasi, 2012). Furthermore, as will be demonstrated in the coming sections, it is critical that both RM construction performances be linked together. Risk can be avoided by delaying the purchase of a home or restarting a business to avoid legal obligations, for example (Fang et al., 2013). This strategy is commonly employed when the danger is high, but it can be applied for any sort of hazard. However, this strategy has drawbacks since it hinders the decision-maker from responding to specific demands or delays the pace of the project or activity. As a result, this technique is risk-free because the company is not at risk. The fact that this method completely eliminates risk should be stressed (Mcshane and Rustambekov, 2015). To be ready for future risks that are not expected, every construction company should understand the fundamental RM constructions (Zhang and Fan, 2014). There are two types of risk management approaches primary strategy and sub-strategy. These approaches focus on avoiding, transferring, minimizing, and regulating unfavorable risks (PMI, 2013). Sub-strategies include methods such as risk distribution that use more precise estimation methodologies (Jung et al., 2016). To deal with dangers, almost all construction companies use the risk management strategies listed below (Ali et al., 2018).

Risk identification

The initial step in PRM process is risk identification (Abdulmoneim et al., 2008). It is vital to identify potential risks that could hinder project implementation in order to minimize them. Before beginning the first phase of the project, the anticipated dangers must be assessed

and recognized. Alshibly (2013) evaluated the impact of risk management on the success of a construction project. Alshibly's research results suggest that risk identification and risk assessment have an impact on project success, scheduled time, planned budget, and capacity to meet technical specifications.

Risk evaluation

The risk evaluation is the next step in risk management. Several statistical techniques should be used in this stage for determining the level of risk, but should not be complicated and efficient, and widely used in the past. Risk evaluation is also used to decide whether the risk is high or medium. Table 2 illustrates this method by highlighting the risk evaluation and the chance of risk occurrence. It is evident that the lower the risk is to the left, the less severe the impact will be, both in terms of likelihood and severity

Table 2: *Risk Levels (Ohanian, 2010).*

Likelihood	Consequences				
	Insignificant <i>Risk is easily mitigated by normal day to day process</i>	Minor <i>Delays up to 10% of Schedule Additional cost up to 10% of Budget</i>	Moderate <i>Delays up to 30% of Schedule Additional cost up to 30% of Budget</i>	Major <i>Delays up to 50% of Schedule Additional cost up to 50% of Budget</i>	Catastrophic <i>Project abandoned</i>
Certain >90% chance	High	High	Extreme	Extreme	Extreme
Likely 50% - 90% chance	Moderate	High	High	Extreme	Extreme
Moderate 10% - 50% chance	Low	Moderate	High	Extreme	Extreme
Unlikely 3% - 10% chance	Low	Low	Moderate	High	Extreme
Rare <3% chance	Low	Low	Moderate	High	High

Risk analysis

The third stage of risk management is risk assessment. Abu Hujair's (2014) research indicated how firms analyze risks utilizing the methodologies listed in Table 2.3. In partnership with multiple other professional organizations in the UK, the Institute of PRM (IRM) has produced a standard on which the various risk analysis approaches are based.

The precise goals of PRM planning are to define all forms of risks using qualitative or quantitative risk analysis, launch risk responses, and manage risks to protect the project (Etges et al., 2017). The qualitative risk analysis process requires the operating assets, scope statement, and plan of the organization as inputs (Rahman, 2018). Risk analysis methods include upside risk (e.g., Market Survey, Prospecting, Marketing Test, Research and Development, Business Impact Analysis) and downside risk (e.g., threats analysis, error tree analysis, failure analysis, last upside and downside risk, e.g., dependency swot analysis, event - tree analysis, business planning, external environment analysis, uncertainty decisions (Abu Hujair, 2014).

Risks control

The fourth step of the RM process is risk management, which involves limiting or eliminating risk's impact on the project. This phase must follow the preceding three processes of risk detection, evaluation, and analysis. Risk management includes the methods necessary to cope with hazards based on the practices outlined below (Baccarini et al., 2004).

Risk monitoring

Risk monitoring is the final stage of the risk management process. While these activities should be executed appropriately and consecutively, the final stage is to constantly assess the risk while also completing the following processes (Rahman, 2018): The PRM was tested in accordance with the plan. establishing whether or not PRM produces accurate risk identification and testing Current threats can be used to better prepare for future threats. As shown in Figure 2, the five PRM dimensions - risk identification, risk evaluation, risk analysis, risk control, and risk monitoring - were chosen as the most often mentioned PRM indicators in the literature and were thus incorporated into the empirical design of the PRM measurement model.

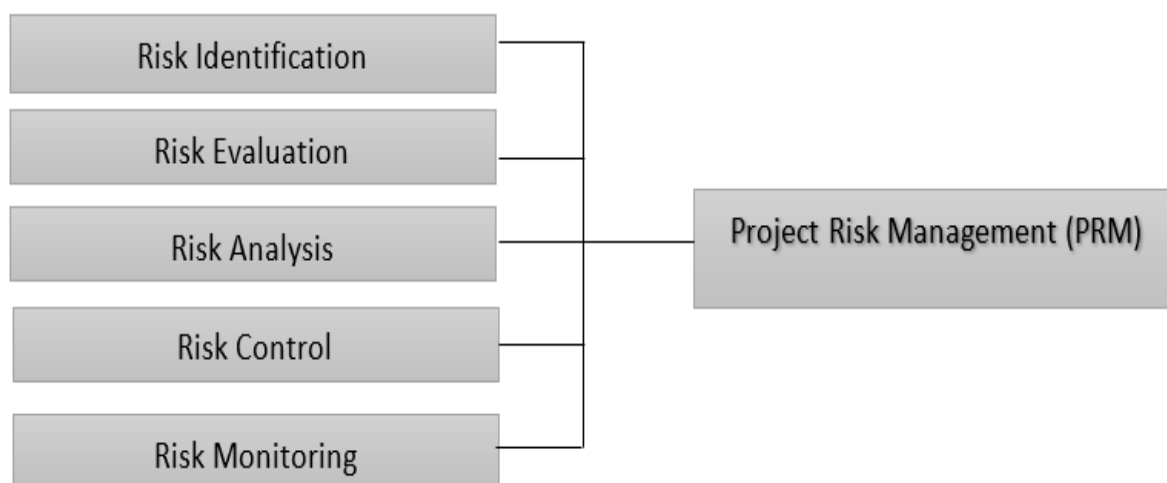


Figure 2: *The construct of risk management in construction projects*

Project performance

In order to be successful, the project must be meticulously prepared. It considers environmental consequences, timetables, budgets, industrial security on construction sites, building material availability, logistics, public discomfort, and bidding (Beatham et al., 2004). The success criterion determines the performance of each building project. A project's success factors are project components that are likely to be affected by an improved possibility of success; they are independent variables that raise the likelihood of success. The project success criteria, which are measurements of a successful project outcome, determine the success of a project. A success factor is a component of a management system that contributes to the success of a project or business, either directly or indirectly (Robson, 2014). Because different projects and people choose distinct sets of success criteria, the success elements of one project are not applicable to all endeavors. The success criteria for each project fluctuate, and what is accepted in one project without affecting perceived success is regarded an unneeded mistake in another

(Ahadzie, 2015). Delaying a project to guarantee that the objectives are met, for example, has no impact on the project's success. However, if a functioning center is not established before the project begins, this delay can be deadly (Ankomah et al., 2010). It is a challenging process to complete a project. This often includes a number of human, financial, and technical components. Critical success factors (CSF) in project management are features, circumstances, or variables that can have a major impact on the success of a project if appropriately supported, managed, or handled (Cross, 2019). Figure 3 depicts the conceptual framework proposed by Sumesh (2015), which stresses the main features and linkages between CSF and project performance.

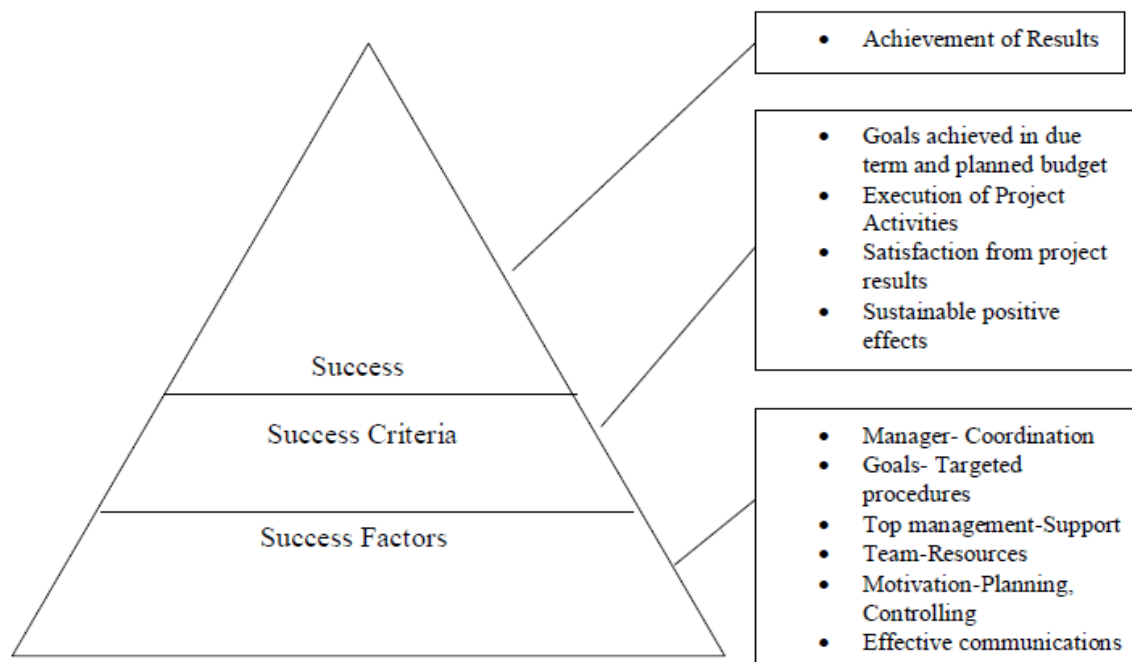


Figure 3: *The critical success factors in projects (Sumesh, 2015).*

Construction project performance

Construction is a field that is closely related to architecture and civil engineering, with a concentration on structural engineering, which is the process of producing structures or improving a place's infrastructure. Large construction activities, far from being a single activity, encompass a diverse variety of professions and sectors. It is usually in charge of the project manager, who is overseen by the design engineer, construction engineer, or project engineer (Egwunatum, 2017). Several studies on construction project performance have been undertaken (hereinafter referred to as CPP). Building project success is defined by four essential metrics: cost, duration, quality target, and participant satisfaction (Oladapo, 2010).

Cost Performance

A metric called "project cost performance" is used to evaluate how well a project is performing in relation to its cost (Egwunatum, 2017). It is significant since the resources of projects are sometimes inadequate, while the costs may raise during the implementation of construction process.

Time Performance

Project duration is a critical factor in determining project performance. The passage of time is one of the countless obstacles in construction operations. The purpose of time monitoring is to assess how effectively a project is progressing in regard to the predicted

timetable over a specified period of time (Mahmoud, 2020). As a result, schedule or time performance is measured as a percentage increase above the projected completion period in the actual completion period.

Quality Performance

The purpose of assessment of performance quality through specific metrics is to analyze project performance in relation to the contract's quality requirements. Consequently, the degree of compliance with the contract's requirements can be used to gauge the quality of the materials and work (Egwunatum, 2017).

Relationship between project risk management and construction project performance

Previous research has found a substantial relationship between PRM and CPP. According to Opran (2012), "a higher risk may lead to a larger profit," and that minimizing risks in projects will boost project output. Risks have a substantial impact on the price, completion schedule, and quality of a building project (Dumbravă & Vlăduț, 2013). As the number and complexity of projects have expanded, the capacity to manage risks throughout the construction process has emerged as a critical component in preventing unintended repercussions. Risk management is supposed to improve the performance of construction projects. The achievement of time, cost, quality, safety, and environmental sustainability objectives in a construction project reflects the project's success. According to Gitau (2015), the success of a project can be influenced by how well its planners handle risks when they develop throughout the planning phase.

The concept of PRM is gaining traction in a variety of industries. Several businesses use a PRM approach in their endeavors to increase efficiency and profitability (Gajewska & Ropel, 2011). PRM is a critical activity that boosts CPP and adds value to a project. Even while cost, time, and quality are important indicators of a CPP in the construction business, good risk management can determine the success or failure of any construction project (Mohd et al., 2019). As a result, developing outstanding PRM methodologies helps CPP, resulting in high project success. Insufficient information and inadequate PRM in construction projects have been demonstrated to result in low CPP (Mohd et al., 2019). More emphasis should be focused on structuring PMS based on their impact and influence, as well as communication and PRM by building plans for effective communication and risk management when carrying out projects (Cross, 2019). In a similar vein, Roque and Carvalho (2013) assessed the influence of PRM on CPP. Using PRM methodologies has a considerable favorable impact on project success, according to their research. Furthermore, they show that having a risk manager on board helps ensure the project's success. Paying attention to uncertainties during the project, using PRM approaches, and having thorough awareness of the business environment are all success factors that require the attention of project managers and risk managers.

Ekaterina (2008), on the other hand, explored PRM in a number of gaining scenarios, including design-bid-build contracts, design-build contracts, and collaborative forms of joining. Higher project output and value are projected for both clients and independents as a result of a deeper understanding's expected contribution to more successful PRM. The study covers nine freshly displayed building projects in Sweden, as well as a feedback form evaluation and a series of conversations with consumers, contractors, and consultants involved in these construction projects. He discovered a significant relationship between PRM and CPP in the Swedish construction industry. Alshibly (2013) reached some conclusions in an examination of the impact of risk management on the completion of construction projects. Alshibly's research results suggest that risk identification and risk assessment have an impact

on project success, scheduled time, planned budget, and capacity to meet technical specifications. Similarly, Abazid and Harb (2018) did another study to gain a better knowledge of risk and its implications in the construction and management sectors. In addition to the technology and strategies used to control risk in the construction industry, the impact of risk on project appraisal is explored.

Research methodology

This study applied quantitative methods to test the relationship between risk management and the performance of construction projects in three construction companies, i.e., EMAAR (Dubai), Aldar Properties (Abu Dhabi), and Dubai Construction Company. The respondents who participated in the survey are project managers as well as other professionals such as quantity surveyors, civil engineers, project directors, electrical engineers, mechanical engineers, ICT, and landscape architects. Simple random sampling has been used to distribute the questionnaires. The total number of distributed questionnaire to the study samples = 450, whereas 397 valid questionnaire have been considered for data analysis.

Results and findings

To test the relationship between risk management the performance of construction projects, the regression analysis is utilized to evaluate the strength of this relationships as well as its significance. Table 3 indicates the degree of association between risk management and the performance of construction project is relatively high (beta = 0.40), and this relationship is significant (p-value ≤ 0.05).

Table 3: *The relationship between risk management and construction project performance*

Directions of effects	Beta coefficient	C.R	Sig.
Risk management → project performance	0.40	2.98	0.00

The Critical Ration (C.R) to use examine the validity of this relationship. If C.R is greater than 1.96 for a particular relationship, the relationship should be supported, otherwise a hypothesis will be rejected. As shown in Table 1, (C.R = 2.98 \geq 1.96, Sig. = 0.00); therefore applying risk management in construction projects will help the construction companies in UAE to improve the performance and complete the projects without delays.

Conclusions

The study's findings enhanced understanding of risk impacts and their implications for UAE construction projects. All of the recognized risk management methods in this study are consistent with the overarching premise of risk management through construction project execution. Project managers and other professionals can use the recommended skill organization to advance plans to effect and manage risks in a variety of scenarios. By properly managing risk, project managers can ensure that their projects incur fewer losses and are completed within the constraints of scope, time, money, and quality, thereby improving the project's overall performance. Several past efforts in the UAE have been undertaken to generate risk and skill indicators that can be used to assess construction success. There is no evidence that there is awareness of how construction enterprises function overall.

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