
EVALUATING SIGNIFICANT RISKS IN THE MIDDLE EAST NORTH AFRICA (MENA) CONSTRUCTION PROJECTS FROM PERSPECTIVE OF MULTINATIONAL FIRMS.

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ABSTRACT

The Middle East North Africa (MENA) construction industry has experienced an unexpected boom over the past decade, with increasing interest from both local and multinational construction companies. However, MENA construction market is fraught with unique set of risks, which should be identified and managed adequately to overcome any unfavorable overruns or impact on project performance. This study identifies the significant risks encountered in MENA construction industry. The risks were grouped to political, economic, legal, social, nature, design, construction, financial, management and maintenance risks. The risks were then rated through a questionnaire distributed to multinational construction companies working or had worked in MENA. The overall Relative Importance Index (RII) was calculated for each risk group in terms of frequency, impact on project cost, schedule, performance and company performance. The relationship between the RII of relative frequency and RII of relative impact from different aspects were examined using the Risk Mapping Matrix (RMM). The study reveals that political, social, nature, design, financial, and maintenance risks were low importance risks, while legal; construction and management risks were moderate importance risks. On the other hand, economic risks had high influence over the project cost, and moderate influence over project schedule, performance and company performance.

Keywords: Risks, Multinational construction firms, MENA construction industry, Relative Importance Index (RII) , Risk Mapping Matrix (RMM).

1. INTRODUCTION

International construction is an attractive endeavor to many multinational construction firms as it allows them to diversify their risks across different markets, and take advantage of the potential growth in the foreign economy. However, the international construction market is typically characterized with high level of complications, uncertainty and risks beyond those encountered in domestic projects (Ozorhon et. al 2008; Hastak and Shaked 2000). Moreover, multinational construction firms are exposed to a complex collection of risks such as currency, interest rates, inflation, and other business risks related to political, economic and cultural environment in the host country (Lee et. al. 2011). Therefore, poor performance with respect to project's budget, schedule, quality, and safety is a common occurrence which can be offset by expertise and knowledge about the host countries' characteristics (Andi 2006).

Despite an environment fraught with uncertainties, multinational construction firms continue to play an important role in the development of construction projects in both industrialized and third world nations. The top 225 international contractor companies' revenue from this type of construction has

significantly increased from \$106.5 billion in 2001 to \$383.7 billion in 2010. This is mainly due to increase in construction activity in regions like Asia, Europe, and Middle East North Africa (MENA) which represent 20 percent, 24.5 percent, and 26.6 percent of the contractors' total revenue respectively (ENR 2011).

In response to this increased interest, the governments in MENA have established a set of laws and provisions to attract foreign investors and multinational organizations to their countries. However, this does not eliminate some of the unique risks associated with MENA projects, which should be carefully considered by any construction firm a priori.

This paper reports the results of an extensive study that was undertaken to identify, and assess the frequency and impact of unique risks most commonly encountered by multinational construction firms associated with projects located in MENA.

2. LITERATURE REVIEW

Several authors investigated risks specific to the international construction market including socio-cultural, economic, political, regulatory restrictions, contractual arrangements, and foreign exchange risks to name a few (Baloi and Price 2003; Chua et al. 2003; Chan and Tse 2003; Ashley and Bonner 1987). Some studies have provided assessment tool to evaluate risks occurrence and duration across the life-cycle of the project and enhance their performance (Gibson et. al. 2003). From MENA projects perspective, numerous studies focused on identifying risks usually encountered by local (as opposed to multinational) construction firms. Tumi et. al. (2009); Sweis et. al. (2008); El-Razek et. al. (2008); El-Sayegh (2008); Assaf and Al-Hejji (2006); Koushki et. al. (2005); Mezher and Tawil (1998) and others cited various significant factors that contributed to a project's schedule and cost increase in countries like Saudi Arabia, Kuwait, United Arab Emirates (UAE), Jordan, Lebanon, Egypt and Libya. All of them concluded that inclement weather, difficulties in obtaining permits, shortage or unqualified workforce, ineffective project bidding/award system, changes during construction, delayed payment on contract, defective design, coordination and communication problems, non-availability of material, inadequate early planning of the project, slowness of owner's decision making process, slow government authorities approval, sudden changes in prices, unrealistic construction schedule, improper intervention, unforeseen site conditions, incompetent technical staff were among the major causes of projects' poor performance in terms of schedule and cost in these countries. On the other hand, Fattal et. al. (2001) have concluded that political risks and economic risks had a great impact on schedule delays and budget overruns located in Lebanon. They have also investigated risks response and control measures that include risks avoidance, mitigation, transfer, contingency planning, and risks acceptance to eliminate or reduce the risks effect on the project performance.

However, there is little to no detailed studies in literature that focus on identifying risks encountered by multinational firms executing construction projects in MENA. Only one such study was conducted by El-Sayegh (2008) who examined risks encountered by multinational firms in the UAE construction market, and found that they do not differ much than those identified above. Given the large number of multinational firms who are interested in executing MENA projects, it is imperative to conduct a more comprehensive analysis of the unique characteristics of that region and the resulting risks to multinational firms.

3. RESEARCH OBJECTIVES

The main goal of this study is to examine the risks encountered by multinational firms associated with MENA construction market. These include the Arabian Gulf Countries (AGC) (Iraq, Kuwait, Bahrain, Saudi Arabia, Qatar, UAE, Oman, the Republic of Yemen), Mediterranean Countries (MC) (Syria, Jordan, Lebanon, Palestine), and Northern African Countries (NAC) (the Arab Republic of Egypt, Libya, Tunisia, Algeria, Morocco). The multinational construction firms include owner, design/consultants, project managers, contractors, subcontractors and suppliers, who are working independently or as a joint

venture with local firms in MENA. Additionally, the relationship between the risks expected relative frequency and relative impact in terms of project's cost, schedule, performance and company performance will be analyzed.

4. RESEARCH METHODOLOGY

4.1 Risk Identification

The initial task of the research methodology was targeted toward identifying the top risks encountered in MENA construction industry. These risks are then incorporated in a comprehensive survey that was completed by multinational construction firms. First, risks factors typically encountered in construction markets were primarily identified through an extensive review of literature as follows: international construction markets (Ozorhon et. al. 2008; Ozorhon et. al. 2007; Dikmen and Birgonul 2006; Gunhan and Arditi 2005a; Gunhan and Arditi 2005b; Chan and Tse 2003; Baloi and Price 2003; Hastak and Shaked 2000); the Asian construction market (Ling and Poh 2008; Zou et. al. 2007; Sambasivan and Soon 2007; Alaghbari et. al, 2007; Andi 2006; Chua et. al 2003) and studies on construction risks encountered in specific MENA countries (Tumi et. al. 2009; Sweis et. al. 2008; El-Razek et. al. 2008; El-Sayegh 2008; Elyamany et. al. 2007; Assaf and Al-Hejji 2006; Zaneldin 2006; Abdul Rashid and Bakarman 2005; Koushki et. al. 2005; Al-Reshaid et. al. 2005; Goda 1999; Mezher and Tawil 1998).

Second, standardized construction contracts from different perspectives such as design and construction contracts that are currently in use at construction projects in the MENA region were examined and risks on such contracts were identified with the help of employees at multinational companies currently workign in the region (Richard, K., Nisreen, B. and Hamadne, A. 2010, February 22. Email interview).

Finally, an open-ended questionnaire distributed to 222 multinational construction companies to list the top five risks encountered in the MENA construction industry. Twenty-two companies completed the questionnaire, representing approximately 10 percent of the targeted sample size. The respondents included contractors, construction managers, engineering/architecture firms and suppliers from United States (US), United Kingdom (UK) and Ireland. Most of the projects were located in Bahrain, Qatar, UAE, Saudi Arabia and Kuwait. The general characteristics of the sample are shown in Figure 1 and the top five risks identified by the preliminary respondents are listed in Table 1, where 1 represents "most encountered" and 5 represents "least encountered". Insufficient scope definition was cited by most of the respondents (45.5 percent) followed by inadequate schedule (41 percent). Unforeseen site conditions were the least encountered risk by the questionnaire respondents.

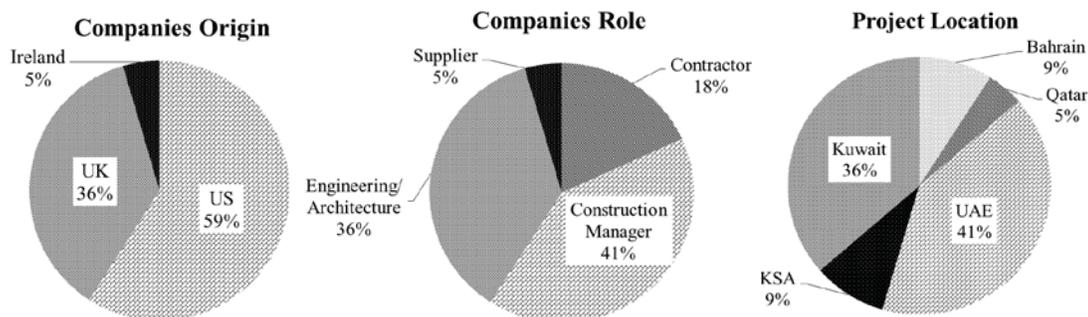


Figure 1: Characteristics of Questionnaire Respondents

Table 1: The Top Five Risks encountered in MENA Projects

Risk	Rank	% of Respondents
Insufficient Scope Definition	1	45.5%
Inadequate Schedule	2	41%
Defective Design Documents	3	36%
Subcontractors Performance	3	36%
Change Orders	4	32%
Authorities and Regulations Requirements	4	32%
Unforeseen Site Conditions	5	18%

This preliminary risk identification task resulted in a total of seventy-four (74) risk factors for multinational companies working on MENA projects classified into external risks and internal risks. A total of 27 external risks that are beyond the control of the project team and related to objective market or natural environment influence were grouped into (1) political risks, (2) economic risks, (3) legal risks, (4) social risks, and (5) nature risks. On the other hand, a total of 47 internal risks that arise from the specific nature of the project and events, and are within the control of the project team were divided into (1) design risks, (2) construction risks, (3) financial risks, (4) management risks; and (5) maintenance risks. Both the external and internal risks and their associated subgroups are summarized in Table 2. It was found that some risks (e.g. material, equipment or work furnished by owner) could be included in more than one category; however, the risks were incorporated in the most applicable category to avoid double counting.

Table 2: External and Internal Risk Categories

External Risks (27)	Internal Risks (47)
<p>Political risks (6): War threat (1), political instability (2), government act (3), insecurity and crime (4), bribe and corruption (5), disputes and strikes (6).</p> <p>Economic risks (5): Tax rate (1), currency exchange rate (2), fund transfer fees (3), price inflation (4), resources availability and quality (5).</p> <p>Legal risks (8) : nationalism and protectionism (1), Legal entity establishment (2), import and export restrictions (3), authorities and regulations requirements (4), intellectual property protection (5), permits and licenses (6), altered contract forms (7), law and arbitration system (8).</p> <p>Social risks (4): Language barrier (1), religious differences (2), holidays and celebrations (3), culture differences (4).</p> <p>Nature risks (4): Pestilence (1), inclement climate (2), natural catastrophic events (3), different time zones (4).</p>	<p>Design risks (6): Defective/late design documents (1), excessive design review (2), inaccurate supplemental design information (3), latent design defect (4), differences in design practices and standards (5), contractors/subcontractors design insurance (6).</p> <p>Construction risks (14): Project location and accessibility (1), hazardous material (2), new technology (3), long lead material/equipment (4), material, equipment or work furnished by owner (5), material, equipment or work furnished by other contractor (6), testing laboratories (7), equipment and labor productivity (8), subcontractors performance (9), nominated subcontractors performance (10), differing and unforeseen site conditions (11), inadequate schedule (12), progress acceleration (13), accident/safety (14).</p> <p>Financial risks (8): Error in bids/quotation (1), subcontractor payments (2), late, nonpayment and minimum amount of interim payment (3), constructive changes (4), cardinal changes (5), retention (6), assessment of liquidated damages (7), indirect, consequential and punitive damages (8).</p> <p>Management risks (12): Insufficient scope definition (1), insufficient compensation and project delivery strategies (2), coordination between design firms (3), packages consideration (4), projects supervision and administration (5), coordination between subcontractors/suppliers (6), power of engineer to fix rates (7), no damages for delay (8), submittals and approvals (9), request for information (10), , insurance, bonds and guarantees (11), contractual relationship intervention (12).</p> <p>Maintenance risks (7): Testing and acceptance (1), warranty and decennial liability (2), as build drawing preparation (3), site clearance (4), substantial completion acceptance and payment release (5), maintenance period (6), final payment (7).</p>

4.2 Data Collection

After completing the risk identification task, a comprehensive survey was developed to quantitatively evaluate each risk factor from the perspective of multinational firms working on MENA projects. The survey was broken down into three main sections and designed to rate risks for individual projects. The first section asks for general company and MENA project information such as location of parent company, MENA project type and location. In the second and third sections, the participants were requested to rate the 74 identified risks' relative frequency; as well as, impact on project cost, schedule, overall project performance, and company performance as defined in Table 3. The expected relative frequency was scaled: never, seldom, sometimes, often, usually and always (on a 1 to 6 point scale respectively). Similarly, relative impacts were categorized as: no impact, negligible, minor, moderate, significant, and extreme (on a 1 to 6 point scale respectively).

Table 3: Rating Attributes Definitions

Attributes	Definitions
Expected Relative Frequency	The risk's likelihood of occurrence in projects located in MENA.
Relative Impact on Project Cost	The risk's relative impact on the approved total budget represented by the number of approved changes related to the risk.
Relative Impact on Project Schedule	The risk's relative impact on the approved project schedule including activities' logic, flow, durations and resource loading.
Relative Impact on Project Performance	The risk's relative impact on the project's: <ol style="list-style-type: none"> 1) Quality represented by the number of defects and failed tests that occurred during the project progress/commissioning. 2) Safety measured by the number and severity of accidents encountered during the project progress.
Relative Impact on Company Performance	The risk's relative impact on the multinational firm's performance in terms of its legal obligations, probability of new businesses, organization's reputation and financial capacity (e.g., profit margin, cash flow sufficiency, and ability to fund other current projects).

A total of 280 multinational construction firms associated with the MENA construction industry were contacted, and given the choice to complete the survey electronically (i.e., web-based form), manually (i.e., paper-based form), or via personal interviews conducted by the research team in Kuwait, Saudi Arabia, Qatar and UAE in summer of 2011. This resulted in a 43.6 percent response rate for a total of 122 completed surveys. A list wise deletion was implemented, where any case with missing data was excluded from the analysis. Consequently, 66.4 percent (i.e., 81 out of 122) of the completed surveys were used for the analysis presented in this paper.

The characteristics of the multinational companies responded to the survey and their associated projects are shown in Figures 2 and 3 respectively. The companies consisted mainly of designer/consultant (56 percent) and project-manager (36 percent), and were from US (70 percent) and UK (24 percent). They were mainly involved in building projects located in the AGC region. The contract form was FIDIC (79 percent), and the governing law is that of country where the project is located (96 percent). Most of the projects used the lump sum as a financial contract type (83 percent). In most cases, companies were involved during the construction phase (66 percent).

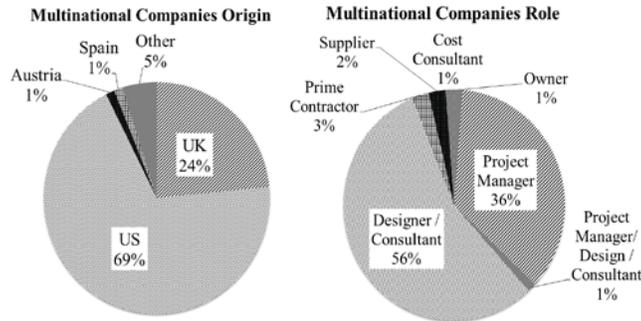


Figure 2: Characteristics of the Multinational Companies Responding to Survey

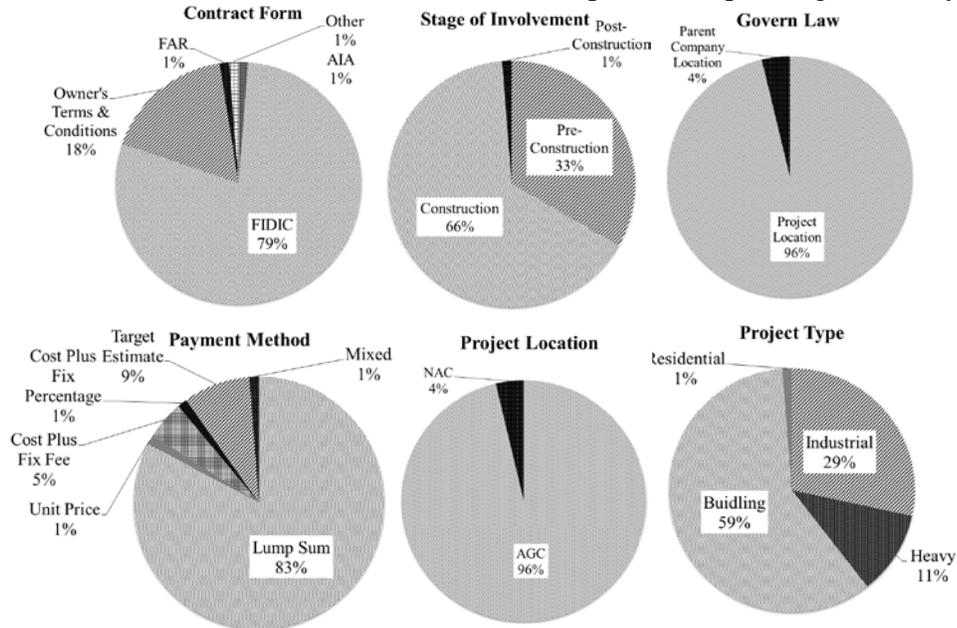


Figure 3: General Characteristics of the MENA Projects

4.3 Data Analysis

The data was analyzed by evaluating the relative importance index (RII) of each risk factor at both external and internal levels. This index has been extensively used in several construction risk management literature to rate various causes of projects failure (El-Sayegh 2008; Sambasivan and Soon 2007; Odeyinka et. al. 2006). RII was adopted in the present research to identify the significance of the risks with regards to expected relative frequency, relative impact on project cost, relative impact on project schedule, relative impact on project performance and relative impact on company performance. Given the 1-6 scale adopted for the relative frequency and impact, the RII value ranges from 1 to 6 where the higher value represents more important risk factor. The numerical scores assigned by respondents in the survey were transformed to RII using Equation (1).

$$\text{Relative Importance Index, RII} = \sum_{i=1}^6 WiXi/81. \quad (1)$$

Where:

Wi = Weight assigned to the i th response; $Wi = 1,2,3,4,5$ or 6 . Accordingly, $W1 = 1$ assigned for never or no impact scale point, $W2 = 2$ for seldom or negligible, $W3 = 3$ for sometimes or minor, $W4 = 4$ for often or moderate, $W5 = 5$ for usually or significant, and $W6 = 6$ for always or extreme.

Xi = Number of respondents corresponding to weight category Wi for a particular risk factor. The total number of respondents is 81.

i = Response category index = 1,2,3,4,5, and 6.

A total of 74 RII for expected relative frequency and 4x74 RRI for relative impact were calculated. These were then represented using the Risk Mapping Matrix (RMM). RMM provides a graphical technique to examine the relationship between the RII of the expected relative frequency and RII of the relative impact on different aspects including project cost, project schedule, project performance and company performance. The RMM is one of the quantitative risk analyses methodologies used in the risk management literature to graphically portray and classify the risks' impact (Kerzner 2009; Conrow 2000). The matrix converts the subjective values of the frequency and the relative impact into a corresponding risk levels to permit prioritization of risks. Thus, a 5 X 5 matrix representation of the RII of expected relative frequency versus the RII of the relative impact is used to map the risks into four different levels including low, moderate, high, and extreme, as illustrated in Figure 4.

The relative frequency and relative impact axes are divided to five ordered qualitative categories starting from never (1) to always (6), and from no impact (1) to extreme (6) respectively. The twenty-five level of importance intervals included in the matrix are illustrated with outer triangle of high to extreme importance risks that is not a mirror representation of the inner triangle used for low to moderate importance risks. This asymmetric matrix warrants the rational representation of the risks importance. Where the outer triangle roughly classifies risks with high frequency and high impact, however, the inner triangle almost reflects risks with low frequency rated and low impact.

The average RII of the expected relative frequency versus the average RII of the relative impact on project cost, schedule, performance and company performance for each external and the internal risks group are shown in four different RMM shown in Figure 5. For example, the RII for the political risk group under external risks is obtained by averages the RII of the six risks included under that group (See Table 2). This allows for a closer examination of the overall frequency and impact of each risk group.

In addition to developing the RMM for the external and internal risks, the five most significant external and internal risks on project cost, project schedule, project performance and company performance were determined to have the highest Significance Score (SS) obtained as shown in Equation (2) and listed in Tables 4 and 5 respectively.

$$\text{Significance Score, } SS = RII(\text{frequency}) \times RII(\text{Impact}). \quad (2)$$

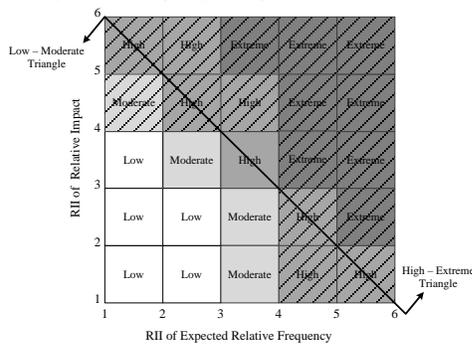


Figure 4: Risk Mapping Matrix

5. RESEARCH FINDINGS AND DISCUSSION

A close examination of the results in Figure 5 indicates that none of the RII coordinates (i.e., frequency, impact) on the matrices fall in the (often (4), always (6)) and (moderate (4), extreme (6)) bands highlighted in Figure 4 and therefore excluded from the overall matrices analyses. This is a very important preliminary result indicating that for most of the 81 MENA projects analyzed, the participants did not encounter external or internal risks that had significant impact on their projects and company. This indicates that multinational firms working in MENA projects are using risk mitigation techniques to avoid the escalation of external and internal risks to threatening levels. However, the results in Tables 4 and 5 as well as the discussion below indicate that some of the risks are in the medium to high category. Project

participants need to be aware to these risks when working on new MENA projects to be able to manage them as early as possible in the project.

Based on the overall matrices depicted in Figure 5, it was found majority of the risks groups impose low importance with regard to all of the indices. For Instance, political, social and nature risks groups in the external risks were found to have low significance with regards to project metrics considered in this study (i.e., cost, schedule, project performance and company performance). On the other hand, the design, financial and maintenance risks groups within the internal risks falls in the low importance band in all of the four overall matrices. However, the external economic risks were found among the high importance risks with respect to project cost however; they had a moderate importance on the other three metrics. Yet, the external legal risks represented a moderate influence on the four project metrics. Finally, the internal construction and management risks had moderate overall importance for all of the metrics

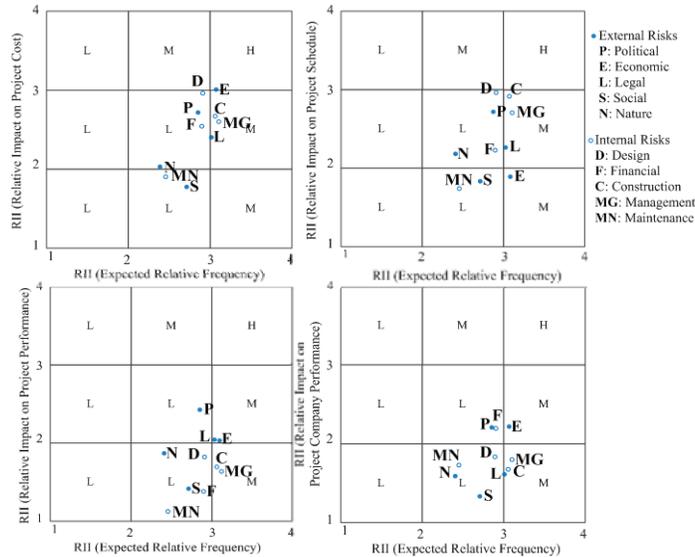


Figure 5: Overall Matrices

6. SUMMARY AND CONCLUSION

The MENA construction industry has been experiencing an unexpected boom over the past decade, with increasing interest from both local and international construction companies. However, MENA construction market is fraught with unique set of risks, which should be identified and managed adequately to overcome any unfavorable overruns or impact on the project performance. This study identifies and assesses significant risks encountered in the MENA construction industry from multinational construction companies' perspectives. The study aids in assisting the multinational construction companies in completing their projects with the least impact on the projects and their performance.

Seventy-four risks were identified through literature review, current MENA contract review and an open-ended questionnaire. The risks were classified into external and internal risks. The external risks were further grouped to political, economic, legal, social and nature risks. The internal risks were grouped to design, construction, financial, management and maintenance risks. The identified risks were then incorporated in a comprehensive survey that was designed to rate the identified risks with respect to their frequency and impact on cost, schedule, performance and company performance. The study reveals that political, social, nature, design, financial, and maintenance risks were low importance risks however the legal, construction and management risks were moderate importance risks. On the other hand, economic risks had high influence over the project cost, and moderate influence over project schedule, performance and company performance. None of the risks investigated in this study represented an extreme risk scenario.

Ongoing and future research is directed toward analyzing the effect of the identified risks on projects' cost, schedule, performance and multinational firms' performance in MENA, and developing models that will be used to assist multinational construction firms in examining the risks' consequences on their projects and firm performance. Also, misallocation of risks will be examined to determine strategies to reduce their adverse consequence on the project performance.

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