Controlling the Risk of Construction Delay in the Middle East: State-of-the-Art Review

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Abstract: The financial crisis in late 2008 arrested economic development in the construction sector in the Middle East, with the result that investors' confidence in the sector is severely depressed. Delays constitute one of the highest impediments to project success. In this respect, the traditional management is no longer sufficient for construction project success. The objective of this study is to conduct a literature review to identify additional effective measures for controlling the potential delays risks in construction projects in order to maximize the opportunities for success in those projects. Thirty-six scholarly articles published between 2000 and 2011 are reviewed to identify related MDRC (measures for delays risks control). This survey reveals that 60% of the studies are related to decision-making, performance, risk management variations and poor management knowledge of stakeholders and that 20% of these studies are undertaken in the Middle East. A further 25% of the studies are related to the lack of financial risk by stakeholders, and of these 14% are in the Middle East. A knowledge gap is identified in terms of project performance, stakeholder management and risk management, which are seen as significant measures of success in controlling project delay.

Key words: Measures of delays risks control, risk management, project management, stakeholders, Middle East.

1. Introduction

Construction delay is ubiquitous in the Middle East construction business and considered as one of the highest risks that can hamper project success. This phenomenon is largely due to the overlapping roles and interests of the project stakeholders in a multicultural society. Stakeholders have long been involved in construction projects, as either individuals or organizations. Moreover, their interests might be affected positively or negatively according to the success or failure of the project completion [1]. Mitchell et al. [2] argued that a project manager must understand the characteristics of the stakeholders' power and authority that largely affect the project environment and outcomes. Hence, it is important to identify stakeholders and their management input

throughout the duration of a project, since their nature and numbers could vary with the project life-cycle [3]. Accordingly, stakeholders should update their respective commitments and satisfaction, with a view to improving the chances of project success.

Risk management is the most crucial practice in the management of any project if completion is to be achieved. Royer [4] expressed the importance of risk management experience, saying: "experience in the risk management must be of critical concern to the project managers and the like in the project network since ill-managed risks are one of the primary causes of project failure". Unfortunately, many project stakeholders and contributors have not yet realized the need for risk assessment knowledge, which is a key element in the risk-management process, and some actually believe that risk identification is only achieved by trial and error experience. Artto et al. [5] defined risk from the project management perspective as "an uncertain event or condition (favorable or

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unfavorable) that results from the network form of work, having an impact that contradicts expectations. An event is at least partially related to other actors in a network". Referring to this definition, four risk-source categories have been identified based on the project sub-contractors' interrelations with: (1) other sub-contractors; (2) clients; (3) external competitors; and (4) non-business actors such as the municipality and other area authorities [5]. At the same time, it is accepted that lack of professional managerial knowledge and skills might cause unavoidable risk management failure [6]. The risk of construction project cancellation and delay in the Middle East, particularly in Dubai, has evoked many worries among investors about remaining in the construction business [7].

Project delays have a major negative impact on stakeholders whose economic activities have been depressed, and in the Middle East, this situation is prevalent, as stakeholders are notably dissatisfied. Nonetheless, they are being criticized as they are not dynamically involved in the process of delay control, which requires a concerted approach in order to guarantee project success. The risk of project delays has been investigated in many Middle Eastern countries such as Jordan [8, 9], Kuwait [10, 11], Saudi Arabia [12], the UAE (United Arab Emirates) [13, 14], Oman [15] and Iran [16]. However, these studies have focused entirely on the delay causes and effects rather than on the control aspects. At the same time, the recent global financial crisis has slowed down the construction boom, leading to the postponement and cancellation of construction projects that are already underway. The financial difficulties resulting from the crisis have created the great dilemma whereby stakeholders have experienced shortages in cash liquidity which in turn has resulted in delayed payments to real estate developers, and subsequently to delays in project schedules and completion [17].

The key objective of delay control management is to minimize the risk whilst maximizing the

opportunities for successful project completion. If this objective is to be achieved by the stakeholders' management, those responsible for initiating and formulating projects must be capable in this respect. In this study, a number of significant MDRC (measures for delay risks control) were selected from 36 scholarly studies published between 2000 and 2011, which included delays to construction projects resulting from the effects of the global financial crisis. The outcome of this study is expected to encourage further comprehensive research. The paper is organized as follows: Section 2 discusses the stakeholders' management and satisfaction when criteria beyond the traditional ones are used; Section 3 outlines the research methodology adopted, which seeks to improve the stakeholders' management, and identify a number of MDRC as a means of bridging the knowledge gap caused by the traditional criteria of time, cost and quality; Section 4 discusses the findings; and Section 5 provides constructive conclusions and recommendations for further related studies. A list of the cited references appears in References Section.

2 Beyond the Traditional Criteria and Stakeholder Satisfaction

Although the traditional criteria for project success are widely accepted, in the last two decades, construction project management has shown a slow departure from the traditional criteria (time, cost and quality) measures towards more effective measures, since criticisms have been made of the traditional criteria in their ability to enable success. Specifically, it is accepted that whilst the components of time, cost, and quality are indeed important, it is also essential to meet the precise specifications of a project [18]. Additionally, Alarcon et al. [19] criticized the criteria as being unable to produce long-term improvement and for being considered too late in the project life cycle to correct problems, thereby not being capable of guaranteeing quality. Hence, it is recognized that

project success can no longer be expected purely by adhering to the traditional criteria only [20], since they are too basic to function as internal measures of project management efficiency [21]. It is noted that, to improve efficiency, projects should aim to manage risks better, and that the degree to which risks are managed should be a measure in this respect.

The fact that stakeholders have conflicting interests brings different views regarding what constitutes project success and satisfaction [22], and these variations cause stakeholders to try to exert influence over projects in different degrees. Clearly, stakeholders have significant knowledge concerning particular aspects of a project and that knowledge could be valuable in formulating the risk response strategy [23]. This suggests the potential for an innovative knowledge framework that would allow for the continual building of a stakeholder body of knowledge and for better overall management of risks [24].

The most important issue to be considered in respect of project success criteria is the extent of the influential variables caused by stakeholders in relation to the performance, decision-making and variations to the project. Although performance is generally considered to be the outcome of the traditional components, cost benefits saving [25], early completion [26], improve quality [27], there is also a fact that conflicts occur due to stakeholders' dissatisfaction with the quality of overall work.

According to the nature changing of buildings functions and demands, performance should be considered as particular to each project and therefore might be evaluated differently according to the precise circumstances of the project [28]. Satisfaction in respect of project performance is essential in a world of hyper-competition, and where construction projects suffer from delay and budget overrun, it is an important criterion to meet. Powerful construction organizations are seen to compete in the marketplace by creating value for their stakeholders [29]. But

studies are required to explore in more depth how different stakeholders perform in terms of management and their perception of risk assessment. Landin [30] considered that, to achieve long-term construction project performance, stakeholder satisfaction is crucial and other researchers, Bakens et al. [31] and Young [32] noted the importance of effective communications management.

The empowerment of stakeholders in decision-making has been encouraged in project management, but has always been limited, as it has been thought more important for stakeholders to set goals and keep inventories, leaving planning and other decisions to expert stakeholders or teams that have a greater impact on decision-making effectiveness. The aim has been to complete projects on time, within budget and within specifications [33], and significant historical information and knowledge has been used to improve decision-making and the outcome of project control [34].

Variations/change orders requested by clients, contractors or other stakeholders were shown to have increased project delays in Jordan [35], and in the UAE context, excessive clients change orders [36]. Likewise, in Oman, change orders invoked by the clients and consultants [15] are cited as being prevalent, with the result that schedules are delayed, stakeholders come into conflict and costs are exceeded. Arain [37] argues that if knowledge is effectively shared during the earlier project life cycle stages, variations management can be better discharged.

Additionally, financial measures are important since the potential loss of revenue can arise in respect of any of the stakeholders' mismanagement of their finances or fundamental inability to pay [38, 39]. Delays in payment by the client, poor cash flow on the part of the contractor [40-42], and financial delays caused by bankers, quantity surveyors, architects, consultants, and other construction parties may affect directly or indirectly the process of payment and the continuation of work according to schedule. Invalid

claims by contractors, certification delays by consultants poor work valuation and insufficient documentation, the involvement of too many stakeholders in the certification process, and the heavy workload placed on consultants to work on evaluations are all cited as contributors to difficulties in the financial area. Moreover, the outcomes of the financial crisis (2008-2010) on the Middle East are enormous. Clearly, such constraints on the cash flow associated with the full range of stakeholders have led to delays in payments.

Market forces are of importance in this respect, since inflations and the endemic instability in the financial market have generated cash flow issues [40] and the inability of governments to create funding programmes [43]. Khamis and Senhadji [17] observe this situation as very serious in the Middle East where the global financial crisis has brought difficulties in approving and obtaining loans, thereby causing a crisis within the GCC (Gulf Cooperation Council) real estate markets. In this context, the stakeholders (developers) and the associated financial bodies are among the largest openly scheduled companies in Arab markets, and both were adversely affected by the recession. At the same time, the increase in real estate prices in the Middle East ended in 2008 and the average inflation rate declined from 10.8% in 2008 to 3.7% in 2009 [44]. In turn, the banks stopped giving mortgages. And as a result, many banks came under financial distress.

3. Research Methodology

A literature review was undertaken to identify the gaps in delays control and project success. Thirty-six research studies published in scholarly and refereed journals associated with construction projects were reviewed, together with some non-conventional documents such as dissertations, technical reports, working papers and authenticated websites, as listed in Table 1. The data were analyzed using an Excel spreadsheet.

4. Findings and Discussions

The results of the study are summarized in Table 1. It can be seen that the MDRC was 3% in 2000, 8% in 2002, and decreased in 2003 and 2004 to 3%. In 2005-2006, measures improved were 14% and 16%, respectively, and decreased again to 3% in 2007, and 6% in 2008 and clearly improved in 2009 and 2010, to 19% and 31%, respectively, as illustrated in Fig. 1.

The MDRC have been grouped as follows: Group 1 comprises decision-making, performance, variations and risk management, Group 2 comprises the financial risks, and Group 3 comprises the traditional measures of time, cost and quality.

Group 1 accounts for 60% of studies (2000-2011) which are related to stakeholders' management and knowledge in variations and decision-making. These pay limited attention to risk management and performance issues. Between 2008 and 2011, these studies represented 30% of those reported.

Group 2 accounts for 25% of studies and are related to financial risk. Between 2008-2011, they represented 20% of studies and reflected interest generated as a result of the financial crisis.

Group 3 accounts for the remaining 15% of studies relating to the traditional criteria of time, cost and quality.

It is shown in Fig. 2 that about 60% of studies have focused on the level of stakeholder management (Group1), worldwide and that of these 25% have been conducted in the Middle East. Twenty-five percent of the selected research has been identified by Group2. Financial risk in global including the Middle East represented 14%, and 15% for the traditional measures in global.

As a result, the ranking of MDRC issues associated with construction projects shows stakeholders' lack of management ability and knowledge in the specific area of risk management, performance, variations and decision-making, running from top to bottom, with the financial risk following, as illustrated in Fig. 2.

Table 1 Measures for delays risks control.

No.	Studies/country (region)	MDRC	Research method	Causes and effects of delay	Impact on stakeholders
1	Ng et al./ Hong Kong (Asia) [45]	A conceptual case-based decision model for construction delays mitigation (Group 1)	Quantitative	Slow-decision by contractor	Increase knowledge—good for inexperienced planner
2	Odeh and Battaineh/Jordan [9] (Middle East)	Contract performance development (Groups 1 and 2)	Quantitative (questionnaire)	Owner interference, inadequate contractor, financial, labour productivity slow decision-making	Minimize owner interference, labour and finance
3	Aibinu and Jagboro/Nigeria (Africa) [34]	Acceleration of site activities and contingency allowance (Group3)	Quantitative (questionnaire)	Client-related delay	Eliminate time overrun
4	Shenhar et al./(N/A) [46]	Risk identification, probabilistic risk and trade off (Group 1)	Quantitative (100 projects)	Time overrun	Improve risk management
5	Fernie et al./(N/A) [47]	Knowledge sharing (Group1)	Quantative (observations)	Knowledge problematic	Lesson learned
6	Nguyen/Vietnam (Asia) [48]	COMs (comfort, competence and commitments) (Group 1)	Quantitative (questionnaire)	Complexity of projects (many factors)	Improve knowledge in project handling
7	Lee et al./(N/A) [49]	DPM (dynamic planning and control management) for project change management (Group 1)	Exploratory (case study)	Concurrent design changes and their subsequent impacts on project performance	Cost and schedule control
8	Lee et al./USA [50]	Converted lost productivity into delay duration (Group3)	Quantitative (case study)	Lost productivity	Settlement of schedule delay
9	Arain/Singapore (Asia) [37]	KBDSS (knowledge-based decision support system)(Group 1)	Quantitative (questionnaire, depth interview)	Owner and contractor-related project variations	Control variation orders and improve decision-making
10	Oliveros/(N/A) [51]	Fuzzy logic model (Group 3)	Quantitative (empirical)	Time overrun	Updating project schedule
11	Koushki/Kuwait (Middle East) [11]	Adequate funds, good allocation of time and money, competent consultants and contractors (Group 1 and 2)	Quantitative (personal interviews)	Time delay and cost overrun	Minimize time and cost overrun
12	Wang and Haung/China [52]	Relation criterion (Group 1)	Quantitative (questionnaire)	Poor stakeholders performance	Maximize owner and organization performance
13	Shahalizadeh and Farhadyar/Iran (Middle East) [53]	Knowledge management (Group1)	Quantitative (questionnaire)	Waste time and cost	Lesson learnt
14	Abdul-Rahman et al. /Malaysia (Asia) [43]	Effective management method (Group1)	Quantitative	Uncertainty and more variables	Reduce diversions/variations
15	Zaneldin/UAE (Middle East) [54]	The negotiation used to resolve construction claims (Group 1)	Quantitative (124 claims)	Excessive client orders	Avoiding disputes, good knowledge from past projects; cooperation by risk philosophy between the client and the contractor
16	Arditi and Pattanakitchamroon/ N/A [55]	Selection of proper delay analysis method (Group 3)	Exploratory (20 researches from literature)	Time overrun	Availability of scheduling data
17	Oladapo/N/A [56]	Variations management (Group 1)	Quantitative (questionnaire and 30 buildings)	Time and cost overrun	Managing variations
18	Zeng et al./(N/A) [57]	Fuzzy reasoning techniques of risk assessment (Group 1)	Exploratory	Uncertainty	Risk assessment

(Table 1 continued)

No.	Studies /country (region)	MDRC	Research method	Causes and effects of delay	Impact on stakeholders
19	Abdul-Rahman et al./Malaysia (Asia) [58]	Conceptual delay mitigation model using a project learning approach in practice (Group 1)	Exploratory (literature, developed model, case studies, questionnaire)	Poor project knowledge	Improve knowledge, positive schedule and performance
20	Luu et al./ (N/A) [39]	Bayesian belief networks (Group 2)	Quantitative (questionnaire, expert interviews, case studies)	Financial difficulties by owner and contractor and shortage of materials	Financial and time development for stakeholders
21	Abdul-Rahman et al./Malaysia (Asia) [59]	Well managed cash flow by banks (Group2)	Quantitative	Financial related factor by client	Prompt payment practice
22	Tumi et al./Libya (Africa) [60]	Risk management (Group1)	Quantitative (questionnaire)	Ineffective co-ordination and communication	Performance knowledge
23	Mulcahy/(N/A) [23]	Corrective action (Group 3)	Exploratory from field experience	Activity longer estimation	Project close to schedule
24	Motaleb/UAE (Middle East) [14]	CMCS (collaboration, management and control solution) (Group 1)	Quantitative (questionnaire)	Lack of risk management	Improve risk knowledge
25	Said/Saudi Arabia (Middle East) [61]	Corrective action optimization (Group1)	Exploratory (literature, case studies)	Rework that caused time and cost overrun	Control performance
26	Motaleb and Kishk/UAE (Middle East) [62]	Client and project team training (Group 1)	Quantitative (questionnaire)	Excessive client orders	Improve client decision-making and reduce variations
27	Thanh and Dapice/(N/A) [63]	Controlling and preventing delay of sub-project (Group 3)	Exploratory (case studies)	Poor planning and controlling, poor finance contractor competence	Time delay overcome and efficiency during construction
28	Preston/Gulf (Middle East) [64]	Liquidated damages for delay (Groups 1 and 2)	Exploratory (literature)	Financial (2010 gulf recession)	Adjust the contractor finance risk and performance obligations
29	Omran et al./Malaysia [65]	Working drawing stage solve problem (Group 1)	Quantitative (questionnaire)	Contractor related factor and owner's slow decision making	Preconstruction knowledge
30	Olawale and Sun/UK [66]	Preventive, predictive, corrective and organizational measures (Groups 1 and 3)	Exploratory (face-to-face interviews)	Design changes inaccurate time duration, subcontractor inadequate performance	Improve the effectiveness of project control (cost and time control)
31	Manase/UK [67]	The PFI (private finance initiative) procurement (Groups 1 and 2)	Exploratory (literature review)	Financial-related crisis 2009	Client positioning in term of risk allocation
32	Hasna and Raza/GCC (Middle East) [22]	PPM (project portfolio management) (Group 2)	Exploratory	Financial problems uncontrolled budget	Good knowledge of financial resources
33	Arditi et al./ (N/A) [68]	Lesson learned system (Group 1)	Exploratory data base	Design related problems	Avoiding the same mistakes in the past projects—improve knowledge
34	Brendel et al./UAE (Middle East) [69]	Set up qualified civil rights for contractors to assured payment for work (Groups 1 and 2)	Exploratory (literature)	Financial contractor-related	Knowledge of civil code and code provisions
35	Al Tmeemy et al./ (N/A) [70]	Project management, product and market success measures (Group 1)	Quantitative (postal and e-mail survey)	Failure in (cost, time and quality)	Long-term project success
36	Abdul-Rahman et al./ (N/A) [71]	Cash flow management (Group 2)	Quantitative (interviews)	Financial client-related	Prompt payments by client

Fig. 1 Measures for delay risks control (2000-2010).

Fig. 2 Measures for delays risks control in the Middle East and worldwide.

Fig. 3 The proposed future model of MDRC for project success.

The fact that the lack of knowledge in risk management and performance appears as the top ranking shows that stakeholders, particularly those in the Middle East region, must think beyond the traditional measures. A new model of MDRC and project success is therefore presented in Fig. 3

As shown in Fig. 3, this indicates three levels at which the MDRC should be considered: issues related to the stakeholders' management in terms of greater depth of knowledge. The project can be classed as successful if it gives: (1) stakeholders satisfaction; (2) quality of performance; (3) advance knowledge in risk assessment. It is unlikely that project delays can be controlled if stakeholder management is not added to the traditional success criteria. Furthermore, the mind-set relating to performance management should be transformed from the functional approach to one which is strategy-focused, and this should be undertaken by governmental organizations such as municipalities.

From the authors' point of view, additional measures may encourage greater interaction and stronger relationships among stakeholders. This will enable greater opportunities for changes to be predicted in the early stages of the project life cycle and for the disruptive effects of these to be minimized. Moreover, if time is included for risk assessment in the early stages of the project life cycle, the project team can be assisted in its decision-making and consequently, project performance can be improved with the result that stakeholder expectations can be met.

5. Conclusions and Further Research

After conducting the literature review, several conclusions regarding opportunities for further research are identified.

The potential risk management factors influencing the success of stakeholder management have not yet been fully developed. Most of the studies reviewed were focused on stakeholder management in

controlling delays risks. Only a few considered the stakeholders' perceptions of risk assessment as antecedents of possible events and responses and the principles of delays control in risk management measures.

The range of practical approaches such as in-depth investigation and integration which are necessary to ensure quality in project performance has not yet been fully considered.

A framework is proposed for structuring effective delays risks control measures. This involves conducting effective risk assessment (knowledge), including stakeholder management and increasing knowledge concerning the performance. The framework is offered in the light of the empirical evidence on the context-specific feature of construction delay in the Middle East, particularly on project nature and objectives base. The model helps to move the scope of the research one step further along the pathway towards understanding the process to secure project success in different environments. The limitations of previous studies suggest that there has been an inappropriate validation of delay risks control measures.

This study reflects the general view, but more in-depth investigation is required in other regions to enable comparison and validation of the findings with other studies. It is recommended that:

- In practical terms, risk management organizations in the Middle East should provide integrated training containing appropriate knowledge for society in general. This should become part of a well-defined approach to risk management, and it requires more experts in risk management who can provide both general and specific training of various kinds to ensure that effective risk assessment knowledge is developed;
- The framework should be developed further to become more practical and ensure that the lesson learned aspect is highlighted. It is accepted that the research into the quality of performance and

stakeholders management to ease the approach to the identification and assessment of the prioritized risks associated with risk response;

- This framework should be trialed with more real-life cases that have experienced delay risks since the recent financial crisis began in 2008-2009. Observations should relate to real case studies that will be conducted from project managers' departments in construction companies in one or more countries in the Middle East and hence, more information will be forthcoming. Hence, more research could be undertaken with project staff to enhance the knowledge and understanding in the area;

- Generally, project managers should perceive the framework as being suitable for project success with both large and small projects. In addition, it is recommended that the development of regulations is essential to ensure the framework components' integration and optimization.

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