

EXPLORATION OF TIME DELAY AND COST OVERRUN IN LIBYAN PUBLIC HOUSING PROJECTS

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There is great concern in Libya about the delays in public sector projects. Libyan construction projects habitually deviate from estimated timelines and financial profiles. Such frequent failures impose a financial burden on the state and causes significant delays in the implementation of these essential public projects. Globally, there has been considerable debate on how to minimise risk factors that affect completion of such construction projects. Whilst literature specific to Libya reveals ineffective project management practices typify Libyan construction projects with extensive time and cost overrun not only accepted, but seen as routine practice. As long ago as 2004 the Libyan government acknowledged that their contractors by and large provided a highly ineffective and inefficient service with little credence given to the need for effective risk management yet little action to address these failings subsequently followed. Contributing to this body of work, the results from an exploratory qualitative survey based on a series of 16 semi-structured interviews undertaken with Libyan construction professionals are reported. The rich data emerging from the interview process provides a valuable insight into the specific nature of project risk and effectiveness of risk management techniques in Libya. Whilst the respondents emphasized their unfamiliarity with risk management, a myriad of project risks emerged from the interviews suggesting project overruns in Libya are a resultant effect of failings to initiate effective project management.

Keywords: Delay, Cost Overrun, Libya, Risk Management.

INTRODUCTION

As Libya struggles to recover from the conflict in 2011 with two different governing powers, post-conflict recovery is massively dependent on accessing the 48.36bn barrels of oil held in vast oil reserves, the largest in Africa and amongst the largest in the world (OPEC 2015). To fully exploit these oil reserves, the Libyan GNC has instigated \$140bn investment between 2016 and 2026 including the development of oil and civilian infrastructure including 500,000 new homes. Critical to the success of these projects, is ensuring their timely completion within the agreed budget. However, with delay and financial overrun estimated to severally impact 69% of projects undertaken in Libya (Ghadar, 2017) understanding their cause and developing strategies to mitigate their impact on the project is essential to the successful achievement of the NGC's objectives. Consequently, this research aimed to explore the underlying causes of delay and cost overrun within the Libyan construction industry. Literature relating to time delay and cost overrun is reviewed. The results of an initial exploratory study collecting data from 16 construction professionals exploring the nature of project delay and cost overrun is presented. Finally, the paper concludes by proposing further research to validate the findings with a larger sample together a detailed review of Libyan contractual provisions related to project delay and cost overrun.

REVIEW OF LITERATURE

A project is considered successful when it is completed on time, within budget, in accordance with specifications (Aziz 2013). In practice, these three dimensions are strongly interdependent and correlated. The inability to achieve these objectives, typically manifest as delay and overrun (Adam *et al* 2017) with risk and thus the outcomes of risk events, overruns, becoming endemic in the construction industry. Several large multi-national studies, such as Flyvbjerg *et al*'s (2002) analysis of 258 infrastructure projects which revealed they have an 86% probability of exceeding their budget estimate. Morris' (1990) seminal work investigating overruns in India revealed 65% of 290 projects experienced cost overruns. Together with Baloi and Price's (2003) analysis of 1,778 World Bank funded projects revealed a sizable majority (63%) exceeded their initial budgets.

The extant literature, appraising project overrun, continues to reaffirm the truly global perspective. Adam *et al*'s (2017) recent exhaustive review of the state of art revealed 1,748 publications exploring the causes and effects of time delay and cost overrun. Despite revealing exponential growth in literature, little is revealed by way of consensus related to the dominant causes of delay or overrun. Nevertheless, Adam *et al*'s (2017) analysis of the literature revealed eight root causes of delay and overrun, shown in table 1. Although it was acknowledged the significance of each cluster manifests differently once a temporal analysis of the literature is considered.

Table 1: Hierarchy of Delay and Overrun causing factors (adapted from Adam et al (2017)'

Cause	Instances	Cause	Instances
Communication	Lack of stakeholder communication, inefficient communication	Material	Shortage of equipment, poor material planning
Management	Poor site management, inadequate managerial skills, poor monitoring & control, slow decision making, client change, poor labour planning	Organizational	Unsuitable management structure, poor organisational structure, poor process procedures
Psychological	Optimism bias, Deception	Project	Project complexity, project duration.
Financial	Delayed payments, poor financial planning, price fluctuation	Weather	Harsh weather conditions, Unforeseen ground conditions.

Notwithstanding the comprehensive nature of the extant literature, Amadi and Higham (2017) raised concerns about bias evident in the geographical contextualisation of the research. Noting the majority of primary data is collected in developed rather than developing nations, where the potential challenges associated project delivery are more perspicuous. Although studies focusing on developing nations are limited (Amadi & Higham 2017) those that have been undertaken reveal the eight clusters determined by Adam *et al* (2017) remain relevant. However, their prioritisation changes significantly with studies contextualised in developed nations advocating project related risks to be the most significant factor impacting on overrun. A situation not replicated in developing nations where corruption, client and consultant induced risk impacts significantly on project outcomes (Adeyemi & Masalila 2016). In furtherance of this argument Fang *et al* (2004) opine causes of delay and overrun are habitually unique to the nation of interest. Different social and economic systems in tandem with historical, religious and cultural backgrounds routinely influence construction methodology and project management practice. Consequently, the specific nature and propensity of risks identifiable within each of the fundamental

clusters is likely to change. Thus, a clear distinction is needed between a cause and its explanation (Adam *et al*, 2017). Whereby explanations will often not be directly transferrable.

Time Delay and Cost Overrun Risk in Libya

In comparison to other developing nations, Libya has been focus of very limited research appraising the manifestation of risk within the project environment leading to project delay (Abubaker *et al* 2008, Elharare *et al* 2016, Ghadar 2017). Albeit Libya can be identified as one of the most impacted with delays of 69% not uncommon. From the extant literature, it can be said that failings in project management, poor client understanding and performance are largely associated with the extensive delays and overruns identified. Whilst Abubaker *et al* (2008) is at pains to argue that project delay is both complex and multifaceted. There is, almost universal agreement within the literature that ineffective project management is the main contributor to delay.

Elharare *et al* (2016) investigated the nature of project delay in Libya through analysis of survey responses gleaned from 300 construction professionals. Whilst the work suggested a combination of human, project and external factors induced delay, analysis revealed the client's misguided perception that procurement could deliver both cost reductions and increased quality lay at the heart of delays. With ineffective project management compounding these failings. Principally due to the appointment of inexperienced and un-qualified project managers (Assaff & Al-Hejji 2006, Tumi *et al* 2009, Abujnah 2010, Ghadar 2017). An interpretation contested by Abubaker *et al* (2008) and Ghadar (2017) instead espouse project managers are experienced but unfamiliar with modern construction methodologies and advances in project management due to a lack of training and international experience. These failings are further compounded by clients slow, ineffective decision making and poor payment practices (Tumi *et al* 2009, Ali & Arun 2012). Leading to further time and cost overrun as projects are abandoned until payments are received (Tumi *et al* 2009, Abujnah 2010, Mohamed 2010) or instigate lengthy legal disputes (Assaff & Al-Hejji 2006)

Even with robust arguments suggesting poor project management and client failings remain at the core of poor project outcomes. El-Hasia (2005) narrated that Libyan national procurement policy sits at the core of project failure. With policy often identified as vague and unsupportive of modern procurement. Ghadamsi (2016) contested the imposition of a top down procurement policy resulted in a one size fits all approach. Whereby 92% of projects adopt traditional design-bid-build accompanied by the Libyan standard form of contract regardless of suitability. This alongside a disregard for contractor selection (Elsayah 2016) and imposition of unrealistic timescales suggests projects are doomed to fail before they have begun.

Yet the challenges Libya presents as it struggles to recover from the conflict in 2011 with major security issues, a deregulated market, vulnerable legal framework and lack of central governing power has led to major shortages of skilled labour, materials and equipment (Shebob *et al* 2012). Triggering extended periods of delay whilst materials are sourced, labour recruited and extensive re-work undertaken. Even though the impact of wider contractor-oriented delay on cost and time does not dominate the literature, a small number of studies narrate similar assertions. Tumi *et al* (2009) observed endemic materials shortages on projects clustered around Benghazi City. Similarly, Abujnah (2010) suggests contractor induced delay makes a significant

contribution to project overrun. With materials shortages, lack of experience and challenges of sourcing skilled labour negatively impacting on project delivery.

Extant literature is already replete with factors that engender cost and time overruns. International literature advocates risk related to project overrun can be hierarchically categorised using eight themes: management, financial, communication, materials, organisational, project, psychological and weather. However, Libyan literature does not replicate these assertions. Albeit the Libyan literature, due to the dominance of quantitative design, fails to satisfactorily explore the root causes of project failure. The work nevertheless presents a far narrower perspective of the causes of project delay and cost overrun. It must be acknowledged the number of studies looking at time delay and financial overrun are limited, with an exhaustive review literature identifying only 26 studies, 10 of which are doctoral thesis. Furthermore, the majority are over 10 years old. For the most part this body of work fails to reflect the significant changes following the first Libyan Civil War. Aziz (2013) exploration of post-conflict Egypt emphasises the importance of exploring how conflict and regime change impacts on the root cause of project delay.

RESEARCH DESIGN

As narrated earlier, the majority of Libyan research focused on risk associated with project overrun routinely adopts a realist, post-positivist design, using large scale surveys to gather rigidly framed opinion data from random samples of construction professionals (Tumi *et al* 2009). Providing a national perspective of the risks leading to delay and cost overrun. Rather than considering specific nuances identifiable within individual projects (Fang *et al* 2004, Adam *et al* 2017). Survey designs are influenced by the most common causes of delay or cost overrun identified in the literature. Thus introducing bias by limiting the response options available. The need to ascertain the nature of delay and cost overrun within the context of a project without the constraints seen as a major limitation within extant literature called for the adoption of a qualitative research design. Through which delay and overrun could be comprehensively explored. Consequently, a phenomenological approach, making use of an inductive research strategy (Creswell 2015) was adopted to explore key themes, understandings and attitudes of those who work within the project environment on a daily basis (Flick 2009).

Data Collection and Analysis

The research presents the findings of detailed interviews with a range of construction professionals, drawn from 23 public housing projects, executed by 15 different contractors in the Libyan cities of Subrata and Surman. Galvin (2015) espouses interviews sample sizes of between 8 and 17 reflect the norm for qualitative research. It was therefore resolved to adopt a discriminate sample of 16 participants (see table 2). Creswell (2015) advocates discriminate sampling as a way to maximise the opportunity of relevant data collection from a small sample.

Participants were invited to take part in a semi-structured interview, as this ensured the interviewee has sufficient space to offer new meanings to the research focus by drawing on the nuances of their individually constructed experiences (Denscombe 2014) held at their office and lasting approximately 45 minutes. The interviews sought to establish key thematic areas from which a broader research agenda can be established. To aid the interviews, the questions focused on an initial analysis of project delay and cost overrun to allow different actors to reflect on the triggers of the

established delay. The interviews were recorded with the consent of participants, fully transcribed and loaded into Nvivo qualitative analysis software before being thematically analysed. Open coding was used to identify sub-categories associated with the central themes outlined above. Once a large number of nodes were identified, axial coding revealed relationships between nodes and sub-nodes. As the analysis continued, each category was developed to reflect the content of the data collected and draw out more detailed categories. In developing this process, the data was repeatedly analysed.

Table 2: Research Participants

	Exp. (Years)	Stakeholder Group		Exp. (Years)	Stakeholder Group		Exp. (Years)	Stakeholder Group
R1	20	Consultant	R7	23	Contractor	R13	30	Client
R2	27	Consultant	R8	21	Contractor	R14	16	Client
R3	26	Consultant	R9	20	Contractor	R15	20	Client
R4	19	Consultant	R10	12	Contractor	R16	21	Client
R5	24	Contractor	R11	22	Contractor			
R6	26	Contractor	R12	18	Contractor			

FINDINGS

Familiarity with Management of Risk

The majority of professionals (15) portrayed a limited understanding of risk management, or indeed other approaches to the management of risk, though none used these specific terms. The approach in Libya was effectively captured by a consultant who suggested the management of uncertainty is typically based on lessons learnt: *“the common strategy used by all construction practitioners is to deal with risk management only by personal decisions based on previous experience rather than using proactive management approaches based on evaluating and assessing risk”* (R2). Indeed only one of the consultants expressed a familiarity with any form of risk management. Further admitting risk management is far from general practice in Libya: *“To a large extent, dealing with the principles and rules of construction risk management in Libyan construction field is very limited”* (R2).

Due to this lack of familiarity with risk management it was therefore resolved to explore how this translated into the management of construction projects, with a focus on how risk is considered and explored within their own organisations. Although all 16 interviewees agreed there was no formal approach whereby risks would be considered and systematically identified. It was apparent that some limited risk management did occur. Albeit this approach, as the consultants interviewed suggested, would typically involve allowing a contingency, as a single percentage, to allow for potential overrun. Suggesting a largely reactive approach to risk management whereby risk would be addressed when discovered with hope the contingency is sufficient: *“Dealing with risks just when they arise is the most common way used by owners and contractors to manage and control risks”* (R1),

Looking at how this approach to risk management impacts on construction projects, the interviewees were asked to reflect on the performance data provided based on the analysis of the 23 projects under review, this resulted in some rather surprising responses that suggested delays and overruns were both common place and expected:

“the majority of public sector housing projects have exceeded their scheduled time and cost by different percentages” (R2) a view reinforced by respondent 16 who confirmed: *“this is not exceptional the majority of public housing projects show significant delay and cost overruns”* (R16).

Factors contributing to delay and overrun

Management Risk

Management represented the most significant cause of the delay with 10 risks events identified by participants. The most significant related to frequent post contract change with clients failing to have: *“a clear view concerning the targeted design and specifications of the project, therefore change orders where frequently issued during the construction phase”* (R1). An observation reinforced by a number of contractors who suggested levels of post contract change diminished their ability to appropriately plan the project. Whilst the interviewees accept a small number of changes are often necessary to resolve unexpected design issues. It was contested the vast majority of change related to: *“the specification of materials [that] where unnecessary and could be avoided”* (R2) as they should have been resolved during the design phase.

Impact of change represented the second most significant cause of overrun, with 11 respondents identifying delays in decision making as major triggers of unnecessary and avoidable delay. It was suggested *“clients respond slowly to any queries or requests submitted either by contractors or consultants. Resulting in delays in project progress and in some circumstances complete stoppage of the work on site”* as a result: *“continuity of work was controlled by the clients response time not the programme developed”* (R10). When asked about the frequency of this situation, one contractor simply responded: *“they are very frequent”* (R5) but also contradicted the views put forward by consultants, suggesting they were equally indecisive.

Despite post-contract management failings dominating, a number of avoidable pre-contract problems were also identified as triggers for delay. For instance it was suggested clients employ: *“unqualified decision makers in [their] senior management [who] were taking decisions at the top of the clients organisation that normally led to undesirable situations”* (R4). When pressed on the nature of these undesirable situations respondent 13 suggested: *“unqualified decision makers push through crucial decisions without asking related departments to prepare detailed studies that would enable them to make appropriate decisions”* (R13).

This approach to decision making, it was suggested, occurred throughout the project. With impulsive decision-making identified as a fundamental risk by consultants: *“rash behaviour by the owners’ senior management in taking important decisions led to massive delays in project progress”* (R10). Yet it remains unclear how this correlates with slow decision-making identified earlier. Although its impacts are clear, with one client suggesting this: *“would often necessitate successive change orders”* (R15) thus triggering significant periods of delay. Furthermore, it was suggested this approach often resulted in unclear specifications, a lack of detailed ground investigations, incomplete drawings and poor project planning information.

Financial Risk

The interviews revealed a number of financial factors that led to project delay and cost overrun, although these seemed to differ between project and wider economic factors. Whilst there was consensus that poor project management by clients, resulted in poor financial planning: *“the volume of contracts signed each year for public housing projects is much larger than the available budget”* (R4). This in turn would lead to

poor payment practices, with contractors encountering: *“considerable delay by the owner in payment for performed work”* (R6) impacting: *“company cash flow and result in slow work progress at the site”* (R6). However, one contractor also confirmed: *“frequent delays in decision making increased the cost burden on the contractor due to the wages paid to labour during the work stoppage”* (R8).

Material Risk

A number of interviewees identifying high variances in materials prices throughout the contract period: *“the prices of materials where not fixed and faced a noticeable variations up and down during the contract”* (R9). Or at worse the unavailability of essential materials: *“due to increasing demand for construction materials . . .there was a shortage in the availability of materials in the local market”* (R5). This situation gave rise to material and equipment theft from site: *“theft of materials and equipment from the site happened several times during the previous years and caused stoppage of the work at the site many time as well”* (R8). Whilst respondent 3 suggested: *“due to the lack of security, project materials were stolen from the site from time to time”*(R8) as a result the contractor would: *“import materials in limited quantities to the site, resulting in additional time and cost”* (R3).

Political Risk

Although political risk was not as apparent at the start of the project, two Libyan civil wars have introduced a significant amount of risk to the project. These risks emerged as some of the most significant in terms of frequency of identification. The first, however, pre-dates the wars, relating to robust legislative control of procurement and the recruitment of labour, or more specifically the barriers to recruiting skilled labour internationally. Respondent 10 suggested: *there was difficulty in bringing in technical labour from abroad, due to complex government regulations”* (R10). A point reinforced by participant 3, who suggested if these procedures had been eased the project could have been delivered more efficiently as the: *“international workforce exhibited the essential skills needed that are severely lacking in Libya”* (R3). This problem is compounded by the lack of skilled labour available due to the: *“significant under-supply of labour caused by massive increases in project delivery”* (R14).

Unsurprisingly the majority of respondents alluded to the joint impact of post-conflict political instability and security failings as contributing to the delay and cost overruns encountered. *“Since 2011 up to November 20 2016 there is no political stability in the Libyan state”* (R1). A perspective reinforced by respondent 5 who observed: *“the changes in government over the last 6 years affected the political stability of the state”* (R5). When asked how this instability translated into project risk, Respondent 4 suggested it resulted in time being wasted: *“waiting for documents and approvals from political government agencies, with political instability also affecting project funding and frequent changes of decision makers at senior levels further delaying the project”* (R4). However, this lack of political stability also translated into an insecure work environment, further impacting on both labour recruitment and site security.

Procurement Risk

The majority of those interviewed identified procurement processes and legislation underpinning the process of public sector procurement as a major risk contributing to project overrun. The first factor identified, which is intrinsically linked to the financial risk, related to the over-procurement of public projects, as a result of poor client management and understanding of the procurement process. The participants

identified the procurement process itself to be highly flawed, with projects put to the market with incomplete and inaccurate information.

It also became clear that the problems experienced during the construction phase were exacerbated by poor tendering practices. Six interviewees identified the lack of contractor vetting as a major risk. Suggesting this resulted in inexperienced contractors being awarded contracts. Resulting in a situation whereby: “*some construction companies involved in this project were established recently and have no experience*” (R4). Giving rise to: “*poor performance during the construction stage resulting in massive delays in project delivery*” (R2).

It was suggested this failure to pre-qualify contractors also brought about financial challenges, as contractors were not always capable of sustaining the cash flow needed to deliver the project. Respondent 4 acknowledged: “*the weakness of the financial state of some companies involved in this project made those companies incapable of accommodating payment delay*” (R4). Whilst a government representative revealed this lack of financial robustness had: “*affected the continuity of the work progress in terms of company’s poor cash flow preventing them employing different package contractors to work concurrently*”

DISCUSSION

Risk and its translation into project failure through time and cost overrun has continued to present a fertile ground for research in the extant literature, however, literature exploring overrun in a Libyan context remains limited, in part due to the dominance of the adoption of large-scale quantitative surveys that seldom offer any deeper reflection from the participants on the context of risk, why these risk events occurred or how indeed they could be effectively managed. The Libyan literature espoused the dominance of three fundamental root causes: Management failure, overly perspective, top down procurement policy and wider economic impacts associated with post-conflict instability. Whilst not reaching any firm conclusions, the findings from the study suggest a significant disparity between previous quantitative studies undertaken in Libya and experiences of practitioners.

Whilst findings of this research reaffirm the significance of these factors, the interviews revealed an array of additional root causes for delay and overrun. Whilst also revealing risk in Libya is far more complex and interlinked than the extant literature suggested. Indeed, analysis of the qualitative data reveals the root causes of delay synthesised in Adam *et al*’s (2017) review of extant literature, shown in table 1, are closely replicated in the Libyan context. Clearly contradicting Amadi and Higham’s (2017) assertion that an extensive volume of the extant literature, contextualised within developing nations, fails to reflect the situation in developing nations. It can also be argued the findings only partially support Fang *et al*’s (2004) suggestion that country specific research is required to capture specific nuances of project delay. Although this does allow interpretation it is clear the eight root causes emerging from the extant literature are of universal relevance.

Given the majority of projects are highly impacted by delay and overrun, those interviewed accepted risk is poorly reactively managed and is often introduced through easily fixed failings in project management (PM). The study reaffirms the earlier view that PM failings are often at the core of delays. Moreover, the study reaffirms the argument that unqualified project managers are often engaged to oversee projects. (Assaff & Al-Hejji 2006, Tumi *et al* 2009, Abujnah 2010, Ghadar 2017).

However, unlike previous studies, the participants revealed failings in PM are not occurring within the professional team employed to deliver the project but are embedded at a senior level within client organisations. Leading to irrational, ineffective and slow decision making, reinforcing the assertions made by Tumi *et al* (2009) and Ali & Arun (2012). The findings further revealed those same senior professionals where also the primary decision maker for the client. Despite lacking expertise, they routinely failed to seek technical advice from consultants before providing instruction to the contractor. Resulting in legal disputes and extensive claims confirming the observations of Assaff & Al-Hejji (2006).

Despite the Libyan construction industry feeling the impact of on-going conflicts the situation observed by Aziz (2013) in post-conflict Egypt, is only partially replicated here. Although conflict has impacted on project and undoubtedly increased the propensity of delay, as a result of labour and material shortages, challenges to security and uncertainty in the funding of major projects. The majority of those interviewed did not feel the situation, in terms of ineffective project delivery had changed significantly due to the conflict.

CONCLUSIONS

The findings from this research raise questions about the Libyan construction industry's ability to reduce cost and time overrun successfully. The research findings suggest that whilst cost overrun and project delay are highly complex and multi-faceted construct. The professionals interviewed identified a number of key barriers to reducing and overcome project failure including: ineffective strategic management within the client organisation reinforced with inefficient management at project level, the complexity of state legislation that prevents the recruitment of international construction experts and also much needed site labour, the impact of the on-going conflict on project delivery due to security failings and uncertainty in the political environment and highly ineffective procurement processes and contractor vetting. Whilst the findings in Libya have not mapped against the emergent view of risk categorisation presented in the international literature, they have also dismissed the current three factor perspective argued in the limited Libyan literature providing for the first time, a phenomenological perspective on the complexity of project delay and overrun. However, it also become clear that a large majority of the identified project risks could be mitigated should Libyan professionals enhance their understanding of risk management and make a paradigm shift in practice from a reactive to a proactive approach to risk identification, evaluation and mitigation. The findings of this study are replete with manageable and ultimately avoidable risk that could significantly reduce project cost overrun and delay.

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