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A Study of the Factors Affecting Real-Time Completion of Construction Projects in Al-Haraba City, Libya

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Abstract

Timely completion of construction projects remains a critical challenge in developing and post-conflict environments such as Libya, where persistent delays negatively affect project performance and economic development. This study investigates the factors affecting the real-time completion of construction projects in Al-Haraba city, Libya, based on stakeholder perceptions. A structured questionnaire survey was administered to construction professionals (n = 68), and the Relative Im-portance Index (RII) method was used to rank delay factors at both individual and group levels. The findings indicate that scheduling and control issues ranked highest (average RII = 0.7735), followed by financial constraints and change-related conditions, while stakeholder-specific differences were also observed. The results provide context-relevant evidence to support practical delay mitigation strategies and improve project delivery in the Libyan construction sector.

Keywords: Construction delays; Project completion; Relative Importance Index (RII); Stakeholder perspectives; Libya.

1 Introduction

1.1 Construction Project Delays as a Global and National Challenge

Timely completion is widely recognized as a critical success factor in construction projects because it directly affects cost, quality, stakeholder satisfaction, and wider economic performance; however, con-struction projects remain inherently uncertain due to multiple stakeholders, dynamic site conditions, and interdependent activities that increase vulnerability to schedule disruption (Doloi et al., 2012; De Meyer et al., 2002).

Despite improvements in planning tools and project control techniques, time overruns remain persis-tent worldwide, particularly in projects characterized by coordination challenges, ambiguity, and supply-chain constraints (Assaf and Al-Hejji, 2006; Ward and Chapman, 2008).

In developing and post-conflict countries, delay risk is typically amplified by compounded financial, institutional, and operational constraints, including unstable funding, weak regulatory systems, adminis-trative inefficiency, labor shortages, and

disrupted material supply, which collectively contribute to cost escalation and disputes (Odeh and Battaineh, 2002; Mahamid, 2017).

1.2 The Construction Industry in Libya

The construction sector is a key non-oil contributor to Libya's economy and employment, and its per-formance is strongly linked to infrastructure recovery and service delivery; however, the sector faces uncertainty related to governance, market volatility, and project implementation capacity (Tumi et al., 2009; Alfakhri et al., 2017).

Libyan evidence indicates that delays are frequently driven by combined funding instability, contractor capability constraints, and administrative barriers, which highlights the need for localized evidence that can support practical mitigation strategies across different project environments (Salam, 2020; Shebob et al., 2011).

1.3 The Problem of Schedule Deviation and Time Overruns

Schedule deviation can be defined as the gap between planned duration and actual completion time, where positive deviation indicates time overrun; persistent overruns typically lead to cost escalation, inefficient resource utilization, and reduced productivity (González et al., 2014; Trauner et al., 2009).

Achieving timely completion requires balanced control of time, cost, and quality, supported by realistic early planning and robust schedule control; in Libya, empirical work shows that time overruns often arise from combined financial and managerial weaknesses together with institutional constraints influencing stakeholder interactions (Abubaker, 2008; Alfakhri et al., 2018).

In this study, the term "real-time completion" refers to the ability of construction projects to achieve completion within the originally planned or contractually approved schedule baseline, without significant time overruns arising during execution. The term is used to emphasize timely project delivery under actual implementation conditions rather than post hoc schedule assessment.

1.4 Stakeholder Perspectives and Consequences of Delays

Delays negatively affect all stakeholders: clients experience late utilization and potential revenue loss, contractors face extended overheads and cash-flow pressure, and consultants manage increased coordi-nation and approval burdens; these impacts increase dispute likelihood and undermine overall project performance (Alfakhri et al., 2018).

Field evidence from Libya shows that resource inefficiencies and administrative delays in approvals and permits can substantially influence construction timelines, particularly where external coordination is weak and decision cycles are prolonged (Tumi et al., 2009; Salam, 2020).

1.5 Research Objectives and Contribution

This study investigates factors affecting real-time completion of construction projects in Al-Haraba city, Libya, with three objectives: (i) identify the most influential delay factors from the perspectives of clients/owners, contractors, and consultants; (ii) categorize delay factors into major groups to prioritize improvement areas; and (iii) determine the most influential factor group affecting timely completion (Hraisha and Al Jorf, 2015).

Although several studies have examined construction delays in Libya, existing research

has largely focused on major cities or broad national-level assessments. Limited empirical evidence is available for smaller municipalities such as Al-Haraba, particularly using stakeholder-based comparative ranking. This study addresses this gap by providing city-specific, stakeholder-informed ranking of delay factors to support more context-sensitive mitigation strategies.

2 Literature Review

Construction delay research consistently reports that financial constraints, planning deficiencies, coor-dination failures, resource shortages, and external disruptions are central drivers of schedule overrun; moreover, studies emphasize that the relative importance of these drivers varies across contexts, making country-specific evidence essential for applicable recommendations (Doloi et al., 2012; Assaf and Al-Hejji, 2006).

In developing environments, delayed payments, inadequate cash flow, and poor planning and schedul-ing frequently emerge as dominant drivers of delay, alongside labor productivity issues and procurement disruption; external and regulatory factors such as approvals and political instability are also commonly reported (Aziz, 2013; Haseeb et al., 2011).

Libyan studies report similar patterns, often highlighting contractor performance, financial instability, resource constraints, and administrative approvals as key contributors, which supports the need for localized ranking and stakeholder-based comparisons in smaller Libyan cities (Tumi et al., 2009; Alfakhri et al., 2017).

2.1 Client- and Financial-Related Factors

Client and financial factors are repeatedly reported as major delay sources, especially where contrac-tors depend on interim payments to finance labor, equipment, and procurement; funding instability
and inefficient internal approval processes often extend payment cycles and trigger schedule disruption (Sambasivan and Soon, 2007; Odeh and Battaineh, 2002).

In volatile economies, inflation and currency fluctuation can increase construction costs and strain budgets, creating knock-on effects on procurement and contractor liquidity, while client-initiated changes and late decisions can further extend project duration through re-planning and additional financial demands (Aziz, 2013; Doloi et al., 2012).

2.2 Contractor- and Project Management-Related Factors

Contractor-related causes commonly include poor planning, inadequate site management, weak super-vision, and inefficient resource coordination; limited use of formal planning and control tools reduces corrective capacity and increases idle time and rework (Doloi et al., 2012).

Weak coordination across subcontractors and supply chains can propagate delays, especially when procurement and scheduling are not integrated and communication across stakeholders is ineffective (Odeh and Battaineh, 2002; Haseeb et al., 2011).

2.3 Consultant- and Design-Related Factors

Design and supervision deficiencies can delay construction through incomplete or conflicting drawings, errors, late responses to RFIs, and slow approvals for shop drawings, which frequently generate rework and disrupt sequencing (Sambasivan and Soon, 2007).

Where interdisciplinary coordination is limited, design-related uncertainty can create cumulative schedule impacts, supporting recommendations for early collaboration and improved design completeness (Zidane and Andersen, 2018).

2.4 Resource-Related Factors (Labor, Materials, and Equipment)

Resource constraints include labor shortages, low productivity, high turnover, material delivery delays, and equipment breakdowns; these factors directly reduce site productivity and can trigger cascading impacts across dependent activities (Haseeb et al., 2011; Doloi et al., 2012).

Proactive resource planning, robust procurement management, and preventive equipment mainte-nance are commonly recommended to reduce these delay drivers, particularly in supply-chain-constrained contexts (Aziz, 2013).

Based on the reviewed literature, delay factors were consolidated into six major groups reflecting financial, managerial, contractual, technical, and resource-related dimensions commonly reported across interna-tional and Libyan studies. This grouping framework enables structured comparison across stakeholder perspectives while maintaining consistency with established delay classification approaches.

3 Materials and Methods

A quantitative survey design was adopted to capture stakeholder perceptions and rank delay factors using the Relative Importance Index (RII), which is widely used in construction management research to prioritize factors based on standardized rating scales (Creswell and Creswell, 2018).

3.1 Study Area and Population

The study was conducted in Al-Haraba city, located in the Western Mountains (Nafusa Mountains), approximately 250 km southwest of Tripoli; the target population comprised construction professionals involved in building and infrastructure projects, including engineers, contractors, consultants, and site supervisors.

3.2 Questionnaire Design and Data Collection

The questionnaire contained two sections: respondent profile (role, experience, education, and project type) and delay factors grouped into six categories (scheduling/control, financial, change-related, con-tractual relationship, contract-related, and design/specification); a five-point Likert scale (1–5) was used to measure perceived importance (Joshi et al., 2015).

Questionnaires were distributed electronically, participation was voluntary and anonymous, and only complete responses from qualified participants were included in the analysis. The sample size achieved is comparable with similar questionnaire-based construction delay studies in developing and post-conflict contexts and is considered adequate for exploratory RII-based analysis

Data Analysis

RII was calculated and used to rank factors:

$$\text{RII}=\frac{\sum W}{AXN}\,(1) \qquad (1)$$

where W is the respondent weight (1–5), A is the maximum weight (5), and N is the number of respon-dents (Aibinu and Jagboro, 2002).

Descriptive statistics were used to summarize respondent characteristics, and reliability was evaluated using Cronbach's alpha (Field, 2013; Tavakol and Dennick, 2011). 1

4 . Results and Discussion

4.1 Demographic Characteristics

The demographic characteristics of the respondents are summarized in Table 1, showing that the sample was predominantly male, with the largest age group being 41–50 years, and with most respondents holding postgraduate qualifications and having more than 10 years of professional experience.

Table 1: Demographic characteristics of respondents (n = 68).

Demographic characteristics	Percentage (%)
Gender	
Male	91.2
Female	8.8
Age	
21–30 years	5.9
31–40 years	35.3
41–50 years	42.6
Above 50 years	16.2
Highest educational qualification	
Secondary / Preparatory	2.9
Bachelor's degree	41.2
Postgraduate degree	55.9
Work experience	
Below 2 years	4.4
2–5 years	20.6
6–10 years	19.1
Above 10 years	55.9
Type of respondent	
Client / Owner	11.8
Contractor	17.6

4.2 Overall Ranking of Delay Factors

The overall ranking indicates that delays in Al-Haraba are mainly associated with capacity and execu-tion constraints, especially resource shortages, financial pressure, and weak scheduling and control; this

1 Cronbach's alpha was $\alpha = 0.934$ (exact value: $\alpha = 0.9338$), indicating excellent internal consistency. A value ≥ 0.70 is typically considered acceptable for internal consistency

4.3 Ranking of the Six Major Delay Factor Groups

The grouped results are presented in Table 2, which shows that scheduling and control issues ranked first, followed by financial issues and change-related issues, while contract-related and design/specification issues ranked lower.

Table 2: Ranking of the six major delay factor groups.

Factor Group	Average RII	Rank
Scheduling and Control Issues	0.7735	1
Financial Issues	0.7403	2
Change-Related Issues	0.7207	3
Contractual Relationship Issues	0.6967	4
Contract-Related Issues	0.6824	5
Design and Specification Issues	0.6738	6

The dominance of scheduling and control issues suggests that limited use of advanced planning tools, weak progress tracking, and insufficient corrective actions during execution may be central drivers of delay in Al-Haraba. Similar patterns have been reported in Libyan and regional contexts where man-agerial and planning capacity constraints frequently outweigh purely technical causes (Tumi et al., 2009; Alfakhri et al., 2017). The high ranking of financial issues further indicates that payment cycles, cash-flow instability, and procurement funding constraints likely interact with schedule control weaknesses, producing compounded time impacts.

To visually support Table 2, Figure 1 presents a bar chart of the average RII values across factor groups, confirming the dominance of scheduling/control and financial pressures in the study area.

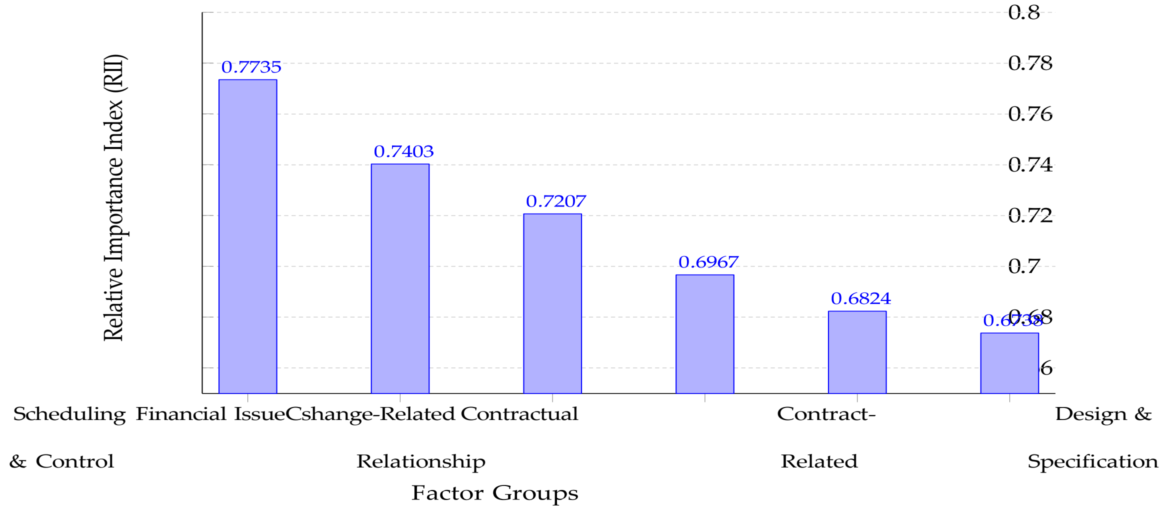

Figure 1: Average RII values for the six delay factor groups.

4.4 Results by Type of Respondent

Stakeholder perspectives are compared in Table 3, showing that clients/owners placed higher priority on financial stability and approvals, contractors emphasized scheduling and operational execution, and consultants emphasized coordination and relationship-related challenges consistent with their supervision role.

Table 3: Ranking of factor groups by type of respondent.

Factor Group	Clients / Owners	Contractors	Consultants
Scheduling and Control Issues	2	1	3
Financial Issues	1	2	4
Change-Related Issues	3	4	2
Contractual Relationship Issues	4	3	1
Contract-Related Issues	5	5	5
Design and Specification Issues	6	6	4

4.5 Qualitative Analysis Based on Open-Ended Responses

The open-ended responses reinforced the quantitative results and highlighted three recurring themes. First, respondents emphasized weak contractor planning and site execution capacity, including insufficient progress monitoring and delayed corrective actions, which aligns with the high ranking of scheduling and control issues. Second, shortages in skilled labor and subcontractor availability were frequently linked to productivity losses and disrupted sequencing, supporting the broader interpretation of execution constraints. Third, political/regulatory uncertainty and slow approvals were described as amplifying delays by extending decision cycles and disrupting procurement and mobilization.

Overall, these qualitative themes provide practical context for the RII-based rankings and are consistent with Libyan evidence reporting similar delay narratives (Salam, 2020; Shebob et al., 2011).

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References

Abubaker, A. Early-stage planning and scheduling accuracy in project delivery. *Proc. Inst. Civ. Eng.* 2008, *161*, 1–10.

Aibinu, A.A.; Jagboro, G.O. The effects of construction delays on project delivery in Nigeria. *Int. J. Proj. Manag.* 2002, *20*, 593–599.

Alfakhri, A.; Rashid, K.; Kaka, A. Causes of delay in Libyan construction projects: Stakeholder per-spectives. *Int. J. Constr. Manag.* 2017, *17*, 1–12.

Alfakhri, A.; Rashid, K.; Kaka, A. Impacts of delays on construction stakeholders in Libya. *Built Environ. Proj. Asset Manag.* 2018, *8*, 1–15.

Assaf, S.A.; Al-Hejji, S. Causes of delay in large construction projects in Saudi Arabia. *Int. J. Proj. Manag.* 2006, *24*, 349–357.

Aziz, R.F. Ranking of delay factors in construction projects (evidence from developing context). *Alexan-dria Eng. J.* 2013, *52*, 387–406.

Creswell, J.W.; Creswell, J.D. *Research Design: Qualitative, Quantitative, and Mixed Methods Ap-proaches*, 5th ed.; SAGE: Thousand Oaks, CA, USA, 2018.

Pich, M.T.; Loch, C.H.; De Meyer, A. On uncertainty, ambiguity, and complexity in project management. *Manag. Sci.* 2002, *48*, 1008–1023.

Doloi, H.; Sawhney, A.; Iyer, K.C.; Rentala, S. Analysing factors affecting delays in Indian construction projects. *Int. J. Proj. Manag.* 2012, *30*, 479–489.

Field, A. *Discovering Statistics Using IBM SPSS Statistics*, 4th ed.; SAGE: London, UK, 2013.

González, P.; González, V.; Molenaar, K.; Orozco, F. Analysis of causes of delay and time overrun in construction projects. *J. Constr. Eng. Manag.* 2014, *140*, 04013027.

Haseeb, M.; Xinhai-Lu; Bibi, A.; Dyian, M. Problems of projects and effects of delays in the construction industry of Pakistan. *Aust. J. Bus. Manag. Res.* 2011, *1*, 41–50.

Hraisha, M.; Al Jorf, S. Developing a knowledge base for construction delay mitigation. *J. Constr. Dev. Ctries.* 2015, *20*, 1–18.

Joshi, A.; Kale, S.; Chandel, S.; Pal, D.K. Likert scale: Explored and explained. *Br. J. Appl. Sci. Technol.* 2015, *7*, 396–403.

Mahamid, I. Schedule delay in construction projects: Review and contextual evidence. *J. Eng. Proj. Prod. Manag.* 2017, *7*, 1–12.

Odeh, A.M.; Battaineh, H.T. Causes of construction delay: Traditional contracts. *Int. J. Proj. Manag.* 2002, *20*, 67–73.

Salam, H.A.A. The most important causes of delays in highway construction projects (Libya). *Sabha University Scientific Journal* 2020.

Sambasivan, M.; Soon, Y.W. Causes and effects of delays in Malaysian construction industry. *Int. J. Proj. Manag.* 2007, *25*, 517–526.

Shebob, A.; Dawood, N.; Xu, Q. Analyzing construction delay factors: A case study of a building construction project in Libya. In *Proceedings of the 27th Annual ARCOM Conference*; Bristol, UK, 5–7 September 2011; pp. 1005–1012.

Tavakol, M.; Dennick, R. Making sense of Cronbach's alpha. *Int. J. Med. Educ.* 2011, *2*, 53–55. Trauner, T.J.; Manginelli, W.A.; Lowe, J.S.; Nagata, M.F.; Furniss, B.J. *Construction Delays: Under-standing Them Clearly, Analyzing Them Correctly*; Butterworth-Heinemann: Burlington, MA, USA, 2009.

Tumi, S.A.H.; Omran, A.; Pakir, A.H.K. Causes of delay in construction industry in Libya. *The Int. Conf. on Econ. and Admin. Sci.* 2009, 265–272.

Ward, S.; Chapman, C. Stakeholders and uncertainty in projects (implications for delay risk). *Int. J. Proj. Manag.* 2008, *26*, 1–10.

Zidane, Y.J.T.; Andersen, B. The top 10 universal delay factors in construction projects. *Int. J. Manag. Proj. Bus.* 2018, *11*, 650–672.