Construction Planning Practices in Dubai, U.A.E.: A Study of Contractor Strategies and Regulatory Compliance

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Abstract

Dubai, renowned for its skyscrapers and engineering achievements, serves as a global benchmark for modern construction. This study highlights the critical role of effective construction planning in ensuring timely and successful project delivery within the United Arab Emirates. A structured questionnaire was administered to key stakeholders and industry experts with extensive construction experience to assess prevailing project planning practices in the region. The research categorizes contractors based on their planning effort during both pre-contract and post-contract stages and examines how planning inputs vary with contract value. Additionally, it identifies project team members and their respective roles in planning activities, and investigates the techniques employed by contractors for risk management. To support practitioners, an authority flowchart has been developed, providing a practical guide to streamline the planning process and enhance coordination among stakeholders.

Keywords: Construction, Planning, Project Management, Dubai

1 Introduction

The construction industry is one of the largest sectors driving the global economy, accounting for approximately 13% of the world's GDP, and is forecasted to reach US$15.2 trillion by the end of 2030 [1]. It plays a vital role in economic growth and has a significant impact on the development of other industries. A construction project is dynamic in nature, characterized by specific goals, defined resources, and a limited timeframe. It is temporary in nature and concludes upon the successful delivery of its intended outputs. The scope of a project is typically constrained by three key factors: time, cost, and quality.

Project management plays a crucial role in ensuring that a project is delivered within the specified timeframe, budget, and required performance standards. In the past, project success was primarily measured by completing the project within budget and on time. However, in contemporary practice, achieving milestone completion on scheduled dates and maintaining a high client satisfaction index are considered equally important indicators of success.

Construction planning is an iterative process involving the preparation of a comprehensive project plan aimed at guiding project execution from initiation to closure. It plays a vital role in fulfilling the project's goals and objectives. Planning, coordination, and control processes are integral components of project management [2]. The effective implementation of these processes contributes to achieving project objectives, whereas failure to do so often leads to project underperformance or failure [3].

As noted by [4], planning practices in construction projects often receive less attention than they

deserve. Project performance largely depends on the level of effort devoted to project planning, as key issues can be identified and addressed during this phase [5]. Planning serves as a reliable tool for stakeholders to ensure project success [6]. A technical report by [7] claims that poor management practices account for the loss of more than half of the productive time in construction. Further research by the Bureau of Labor Statistics [8] confirms that "at least 30% of wasted resources are caused by entrenched attitudes in project management."

The triple constraint—time, cost, and quality—serves as a fundamental principle of construction project management. Overemphasis on one of these elements inevitably impacts the others. Consequently, the success or failure of a project is also highly dependent on effective resource planning [9].

2 Significance of Study

According to Mordor Intelligence, the United Arab Emirates (UAE) construction market is estimated to be valued at USD 40.88 billion in 2024 and is projected to grow at an annual rate of 4.85% [10]. Dubai, one of the seven emirates of the UAE, is globally renowned for its remarkable urban and infrastructural development. As reported by the Dubai Statistics Centre, the construction and real estate sectors collectively contributed 14.4% to the Emirate's GDP during the first quarter of 2023 [11]. With more than one thousand construction companies operating within Dubai, their contribution to the Emirate's economic growth remains highly significant.

Project success does not occur by chance; it is the result of systematic and well-formulated planning. Effective planning plays a crucial role in mitigating project risks and achieving desired project outcomes [12]. In contrast, the absence of planning or the presence of inadequate planning often leads to budget and schedule overruns.

This study aims to document the planning norms and practices currently followed by contractors in Dubai's construction industry. By doing so, it seeks to provide valuable insights that can assist other contractors in understanding established planning procedures and adopting effective techniques for achieving project success. Notably, research on construction planning practices within this regional context remains limited, making this study particularly significant. Furthermore, despite the critical role of planning in determining project success, the authority processes governing construction activities in Dubai have not been clearly identified. This gap in procedural understanding has contributed to a knowledge disparity among contractors. To address this issue, the present paper offers a structured perspective that may serve as a useful reference for both contractors and other industry stakeholders.

3 Methodology

Several qualitative data collection methods—such as observation, note-taking, interviews, focus groups, document analysis, and image review—are recognized as effective tools for gathering in-depth information [13]. Written surveys and qualitative interviews enable a higher degree of interpersonal interaction, allowing respondents to share their inner knowledge and experience more freely [14]. The Delphi technique is a systematic and interactive forecasting method that relies on the opinions of a panel of experts [15]. Through this method, expert consensus can be achieved to develop professional guidelines and frameworks [16]. Additionally, [17] highlights the value of the case study approach for qualitative research due to its emphasis on depth, detail, and contextual understanding.

In this study, the Delphi technique was employed to collect qualitative information regarding Project Planning Practices in Dubai. The process began with semi-structured, open-ended interviews designed to collect primary data and support the attainment of the research objectives. Based on the insights gained from this initial phase, a structured questionnaire was developed, and a second round of interviews was conducted to obtain further elaboration on the findings. Expert opinions concerning the evolution of planning practices were also collected and are considered a critical foundation for the recommendations presented in this paper.

The structured questionnaire was distributed to participants either through email or in printed form. For those contacted electronically, Google

Forms was utilized to facilitate response collection. Physical responses were later retrieved manually from participants who opted for paper submissions. The online survey proved particularly effective due to its convenience, as respondents could complete it at their own pace without immediate time constraints. A response-recording system was enabled, allowing participants to submit partial answers and return to complete the survey later. Respondents were given three weeks to complete the questionnaire, after which the data were automatically compiled into a spreadsheet for analysis.

The author's professional background in the construction industry, with experience in successfully delivering multiple projects, provided a distinct advantage in this research. This professional network enabled direct engagement with industry experts and facilitated the use of the Delphi technique effectively. Furthermore, the Delphi method not only guided the structured development of the questionnaire but also supported the systematic interpretation of expert feedback and the rationale behind the resulting findings.

3.1 Data Collection

Planning itself is a complex and multifaceted process. It was not feasible to identify the detailed planning procedures through a purely quantitative approach; therefore, the Delphi technique, a qualitative method, was also adopted in this study. A total of 22 experts were contacted, of which 17 responded, and 12 were available for in-depth interviews. Each interview session lasted approximately 20–30 minutes and was conducted individually with the participants (Table 1).

The professionals invited for interviews were experts working in building, mechanical–electrical–plumbing (MEP), and infrastructure sectors across the United Arab Emirates, each with more than ten years of industry experience. The interviews were held at the participants' respective project offices, and the author personally visited each location to conduct the sessions. Their extensive experience and in-depth knowledge of project planning made them ideal contributors for the Delphi study.

This phase aimed to document the sequence of steps followed during project planning, the challenges encountered, the methods adopted to resolve these challenges, and the strategies used for project risk mitigation through effective planning. The outcomes derived from these interviews are primarily graphical rather than numerical, as the information provided by experts elucidated the planning processes rather than generating quantitative data.

Table 1 Participants in the Interview

Description	Number
Project Manager	2
Construction Manager	2
Planning Manager	1
Planning Engineer	2
Total	**7**

A structured questionnaire comprising six sections was distributed to 145 contractors engaged in building and infrastructure projects in Dubai. These questionnaires were delivered either directly to planning teams or indirectly through company representatives. The survey specifically targeted senior project personnel involved in project management, including project managers, planning managers, planning engineers, construction managers, and senior engineers. Responses were collected primarily through Google Forms, which significantly reduced the content delivery and response time.

The online format provided greater flexibility, allowing respondents to answer the questions at their convenience without immediate time constraints. A response-recording feature was enabled, allowing participants to save partial responses and complete the survey later. Respondents were given three weeks to submit their answers, after which the data were automatically compiled into a spreadsheet for further analysis. The distribution and return rate of questionnaires are summarized in Table 2.

3.1.1 Reliability of Data Collected

The reliability of the data collected was assessed using two statistical measures. The use of the finite population correction (FPC) factor to determine sample size is recommended in biostatistical literature [18]. The required sample size was calculated as follows:

Table 2 Questionnaires Sent, Returned, and Valid Responses

Description	Number / Percentage
Total Questionnaires Sent	145
Total Responses Received	52 (35.86%)
Percentage of Return	35.86%
Total Valid Responses	50
Percentage of Valid Responses	34.48%

$$n = \frac{n_0 \times N}{n_0 + (N+1)} \tag{1}$$

$$n_0 = \frac{z^2}{e^2} \times P(1-P) \tag{2}$$

Where:
Z = Z-value (for 90% confidence level, $Z = 1.645$)
P = Probability of response
e = Margin of error
n_0 = Sample size without considering (FPCF)
N = Population size
n = Required sample size

Assuming $P = 70\%$, $e = 0.09$, $Z = 1.645$ (for 90% confidence level), and a population size of $N = 145$, the calculations are as follows:

$$n_0 = \frac{1.645^2 \times 0.7(1-0.7)}{0.092^2}$$

$$n_0 = 70.15$$

$$n = \frac{70.15 \times 145}{70.15 + (145+1)}$$

$$n = 47.06 \approx 48 \text{ responses required.}$$

Since the number of valid responses (50) exceeded the minimum required sample size (48), the survey data can be considered reliable in terms of sample adequacy. The case processing summary and reliability statistics are presented in Tables 3 and 4, respectively.

Table 3 Case Processing Summary

Cases	N	%
Valid	50	100.0
Excluded[a]	0	0.0
Total	50	100.0

[a] Listwise deletion based on all variables in the procedure.

Table 4 Reliability Statistics

Cronbach's Alpha	N of Items
0.949	50

The analysis in Table 4 indicates a Cronbach's Alpha value of 0.949, which exceeds the commonly accepted threshold of 0.70. Therefore, the data collected are considered both reliable and internally consistent for subsequent analysis.

4 Results

4.1 Characteristics of Participants

Top-level management representatives from infrastructure and building contracting organizations participated in the survey. Further details regarding participant classification are provided in the subsequent section.

4.1.1 Contractors Classification

Results indicate that 78.6%, 14.3%, and 7.1% of the contractors participating in the survey belong to Grade 1, Grade 2, and Grade 3 categories, respectively. Furthermore, 94.7% of the participating contractors reported an annual turnover exceeding AED 100 million, while 5.3% reported an annual turnover between AED 10 million and AED 100 million. These figures suggest that the survey respondents represent highly experienced professionals from leading contracting firms, thereby enhancing the credibility and reliability of the collected data.

4.1.2 Responder's Designation

A total of 47.4% of the respondents identified their current designation as *Planning Engineer*, while 21% are employed as *Planning Managers*. Additionally, 15.9% of the respondents hold top-level managerial positions within their organizations, 10.5% serve as *Project Managers*, and the remaining respondents are *Senior Engineers*. Regarding professional experience, 57.9% of the respondents have more than 10 years of experience, 36.8% have between 5 and 10 years, and 5.3% have less than 5 years of experience. The overall professional background of the respondents indicates that the data collected through the survey is both authentic and reliable.

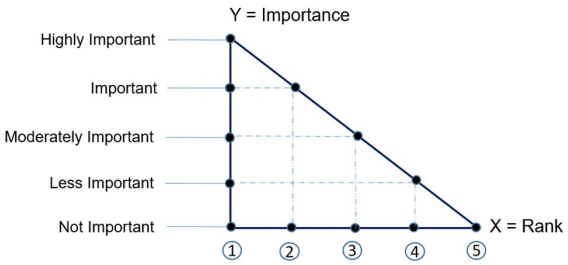

Fig. 1 Rank vs Importance

4.2 Planning Process in the Organization

This section presents the planning processes followed by contractors in Dubai, aiming to evaluate the organizations' efforts in project planning. Participants were provided with a structured questionnaire containing objective-response questions and were asked to rank the importance of various aspects of planning. As illustrated in Fig. 1, the ranking scale ranges from 1 to 5, where 1 indicates *highly important* and 5 indicates *not important*.

4.2.1 Pre-contract Planning

A total of 42.1% of the respondents indicated that pre-contract planning is considered highly important by contractors. The overall mean score for this aspect was 2.052, as illustrated in Fig. 2, reflecting the relative emphasis placed on pre-contract planning.

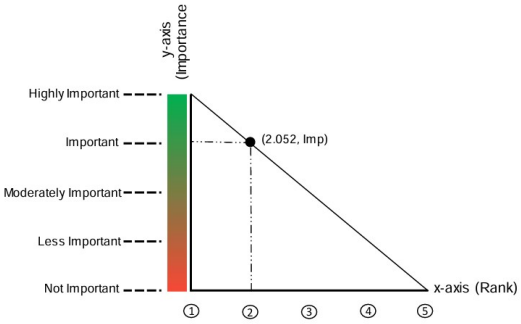

Fig. 2 Importance Assigned to Pre-Contract Planning by Contractors

Experts emphasized that clients play a central role in pre-contract planning, as project goals, milestones, budgets, and durations are established during this phase. Contractors are required to align with the milestones specified in the tender documents and to develop a high-level construction programme. Resource planning was highlighted as a critical aspect, particularly because companies often need to recruit new employees for the project, which involves issuing work permits and visas. Experts also noted that UAE labor laws are periodically amended, necessitating contractor awareness of recruitment and compliance procedures. Material planning is equally important, as contractors must adhere to client-approved vendor lists for procurement. According to expert opinion, approximately 60–65% of long-lead items used in construction projects are imported, requiring contractors to develop effective procurement strategies to ensure timely availability of these critical materials.

4.2.2 Post Contract Planning

A total of 80.5% of the respondents indicated that post-contract planning is highly important for construction projects in Dubai. The average score of 1.26 reflects that the significance of post-contract planning is well recognized and actively implemented by contractors in the region.

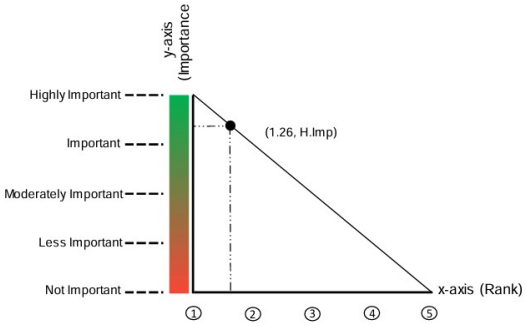

Fig. 3 Importance Assigned to Post-Contract Planning by Contractors

As illustrated in Fig. 3, post-contract planning is regarded as the core stage of project planning, taking effect immediately after the contract is signed between the client and the contractor. Contract documents typically include key project details such as the commencement date,

intended completion date, budgets, and issued-for-construction (IFC) drawings, which form the foundation for project planning. Depending on contract requirements, the main contractor is obligated to submit a baseline programme within a specified timeframe.

Experts considered post-contract planning to be the most critical phase, as all execution activities are guided by the programme developed during this stage. Managers from various divisions collaborate to prepare a comprehensive project plan encompassing Resource (Manpower) Planning, Material Planning, Engineering Planning, Financial Planning, and Builders Planning under a unified framework. The organization establishes an Organizational Breakdown Structure (OBS), assigning responsible managers for each stream. The project is further divided into several Work Breakdown Structures (WBS) with detailed activities and interrelationships, ensuring alignment with client-defined milestones. Unlike conventional linear approaches, planning in this phase follows an iterative process to accommodate dynamic project requirements.

4.2.3 Planning input based on Contract Amount

The questionnaire also included questions regarding the level of effort applied by organizations in project planning based on the contract amount, which serves as a representation of project size. This section aims to understand contractors' perspectives on how planning effort varies with project scale.

Table 5 Ranking of Planning Effort Based on Contract Amount

Contract Amount	Mean Rank
Less than AED 1 million	2.68
Between AED 1 million & 10 million	2.31
Between AED 10 million & 100 million	1.52
Greater than AED 100 million	1.10

Data from Table 5 indicate that the contract amount significantly influences the contractor's effort in planning.

As illustrated in Fig. 4, contractors' planning effort is directly proportional to the contract amount. This suggests that smaller projects typically receive less emphasis on detailed planning compared to larger projects.

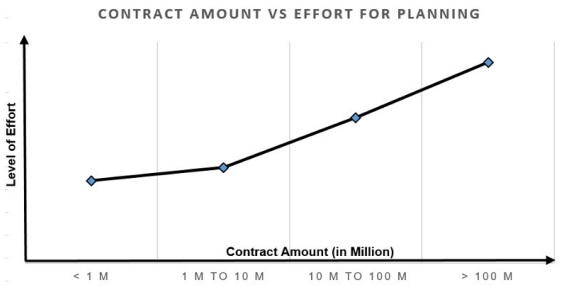

Fig. 4 Relationship Between Contract Amount and Contractor's Planning Effort

4.2.4 Function of Planning Department

Table 6 indicates that *Project Planning* is the primary function of the planning department, with all project planning-related tasks managed by the planning team. *Project Monitoring*, also referred to as active planning, and *Project Control*, known as reactive planning, are also key functions of the planning department. While some critics consider planning to be a static process, in Dubai, project planning is recognized as a dynamic and iterative process.

Table 6 Ranking of Functions of the Planning Department

Function of Planning Department	Mean Rank
Project Planning	1.10
Project Monitoring & Control	1.21
Organization Strategic Planning	1.47
Quality Control	2.26
Operation Management	1.78
Resource Management	2.05
Risk Management	1.52

Quality control is not considered a primary function of the planning department, as experts clarified that quality assurance and control are the responsibility of the Quality Department. However, certain important WBS elements—such as method statements, testing and commissioning, and quality-related activities—are embedded

within the baseline programme, indicating that the planning department has a partial role in quality management. Approvals of materials and work are critical drivers of construction progress; thus, quality considerations are indirectly incorporated during planning.

Experts also emphasized the involvement of the planning team in organizational strategic planning. Planning engineers serve as the central data hub for the organization, tracking ongoing projects and forecasting upcoming events. Based on real-time data, planners provide insights that assist top management in formulating strategies.

Operation management is another important function of the planning department. It encompasses day-to-day construction activities, material and manpower allocation, and work-front management. The planning team plays a key role in guiding project teams by providing look-ahead programmes to facilitate effective execution.

4.2.5 Effort for planning based on Designation

Employees with diverse designations are involved in project planning, depending on the organizational structure. This section aims to understand the participation of top- to mid-level personnel in construction planning.

Table 7 Effort for Planning Based on Designation

Designation	Mean Rank
General Manager	1.63
Operation Manager	1.21
Planning Manager	1.21
Project Manager	1.15
Construction Manager	1.89
Planning Engineer	1.36
Planner/Scheduler	1.47
HR Manager	2.21
Finance Manager	2.26
Engineering & Procurement Manager	1.63
Site Engineer	2.00
Supervisors	2.68

Table 7 indicates that the Project Manager plays a central role in project planning, with significant involvement in both planning and execution. Fig. 5 shows that the Operation Manager and Project Manager also bear a high level of responsibility for planning. Additionally, Planning Engineers and Planners/Schedulers contribute substantially to construction planning, reflecting a collaborative effort across multiple roles.

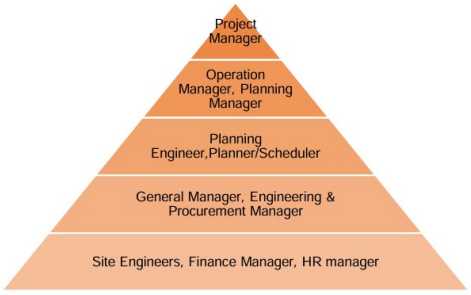

Fig. 5 Effort for Planning Based on Designation

4.3 Inputs for Project Planning

4.3.1 Importance of Project Constraints on Planning

Project constraints were presented to the participants to evaluate their impact on project planning. Respondents were asked to assess the relative importance of each constraint in the context of construction planning.

Table 8 Ranking of Importance of Project Constraints

Project Constraint	Mean Rank
Scope of Work	1.15
Project Duration	1.15
Quality of Work	2.26
Project Budget	2.05

Table 8 indicates that *Scope of Work* is of highest importance, serving as a primary driver for project planning. According to expert opinions, the scope of work defines the project deliverables and the processes that the organization must follow to achieve the intended outcomes.

Project Duration is another critical constraint, as contractors are required to prepare a baseline programme within the stipulated timeframe. The interplay between scope of work and project

duration informs activity scheduling and resource allocation.

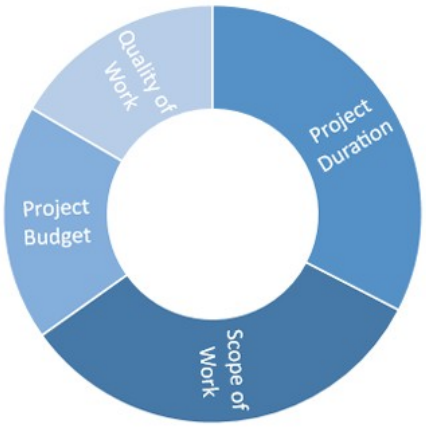

Fig. 6 Importance of Project Constraints in Planning

Project Budget is also an important factor influencing planning, with larger budgets typically requiring more detailed planning. Fig.6 further illustrates that the importance of project planning is influenced by project size. *Quality of Work* is recognized as a constraint, though its impact on planning is moderate relative to other factors.

4.3.2 Factor affecting Project Planning

Data presented in Tables 8 and 9 are correlated, as *Clarity of Scope* is identified as a highly important factor for project planning in both tables. A proficient and competitive project team is also considered crucial for achieving positive project outcomes. Moreover, proficiency should extend beyond the immediate project team and be distributed across the organization.

Performance benchmarks are another significant factor influencing project planning. Clear definition of project milestones within the project plan ensures alignment with the overall objectives.

Table 9 Ranking of Factors Affecting Project Planning

Factor Affecting Project Planning	Mean Rank
Clarity of Scope	1.05
Clarity of Performance Benchmark	1.42
Proficiency of Project Team	1.36
Contractor Selection (Pre-Qualification)	1.63
Clarity of Role Matrix	1.52

The data suggest that a well-defined role matrix positively impacts project planning. Assigning responsibilities to managers and individuals for specific tasks or WBS elements enhances coordination, communication, and productivity. Large projects typically require diverse expertise, necessitating the involvement of multiple contractors or subcontractors. Table 9 highlights that contractor selection significantly affects project outcomes. It is essential that subcontractors align their planning with the main contractor's plan to ensure cohesive project execution.

4.3.3 Reference Documents for Planning

Contractors highlighted the importance of various documents referred to in planning practices in Dubai, as summarized in Table 10.

Table 10 Documents Referred for Planning in Dubai

Reference Documents for Planning	Mean Rank
AGC's "Construction Planning and Scheduling"	2.78
FIDIC Red Book	1.68
Project Contract Documents	1.05
PMI's PMBOK	2.84
CSI"Master Format"	3.15
Authorities Manuals and Guides	1.21

The responses indicate a strong consensus regarding the documents referred to for planning in Dubai. All participants emphasized that project contract documents serve as the primary reference for planning, containing the core information necessary for project execution. Manuals and guides issued by local authorities (DEWA, DM, DDA, DCD) are also considered highly important and must be consulted during project planning. Experts highlighted the use of an *Authority Tracker*, which outlines the sequence of processes to obtain approvals before, during, and after construction, as a mandatory reference document for all clients and contractors.

FIDIC Red Book clauses are commonly incorporated into contract documents, obligating contractors to prepare, submit, and obtain approval for their project plans in compliance with client requirements. AGC's "Construction Planning and Scheduling" manual is often used as a supportive

reference when preparing the baseline programme. Experts noted that other international manuals can also be referenced, as the underlying principles of scheduling are generally similar.

PMBOK is also recognized as a planning reference, whereas CSI's "Master Format," widely used in the USA, Canada, and KSA, has not been widely adopted for project planning in Dubai.

4.3.4 Contract Documents for Planning

Contract documents play a critical role in guiding project planning. This section identifies the contract documents that are considered essential for effective project planning.

Table 11 Importance of Contract Documents for Planning

Contract Document	Mean Rank
Bill of Quantity (BOQ)	1.21
IFC Drawings	1.26
Project Specification	1.47
Architectural Drawings	1.94
Scope Matrix	1.21
Letter of Intent (LOI)	1.57

Table 11 indicates that BOQ is regarded as the most important document for planning, as it provides detailed information about the types and quantities of work. The Scope Matrix is also identified as highly important, assisting planners in preparing sub-WBS elements for procurement and construction activities.

IFC drawings are recognized as a key planning document because they provide detailed information about construction activities associated with the project. Project specifications are also considered important, as they define international standards for materials, construction processes, and installation procedures.

The LOI is highlighted as a significant document because it formalizes the contractual agreement between the client and contractor. Experts noted that the LOI enables contractors to align the project baseline programme with the specified commencement and completion dates.

Architectural drawings are also referred to by planning engineers during project planning. These drawings contain detailed elevation and interior information, which is incorporated into the final fix activities within the baseline programme.

4.4 Planning Techniques

This section aims to understand the techniques adopted by contractors in Dubai for preparing the project plan.

Table 12 Techniques Followed for Preparing the Project Planning Programme

Planning Technique	Mean Rank
Critical Path Method (CPM)	1.00
Program Evaluation and Review Technique (PERT)	3.05

Table 12 indicates that the CPM is the predominant technique used for scheduling construction programmes. Software tools such as Primavera P6 and MS Project are programmed to follow the CPM methodology. Experts emphasized that activities on the critical path are closely monitored and controlled, as any delay in these activities can have a significant impact on overall project completion.

The results also indicate that the PERT is considered a less important scheduling technique among the contractors surveyed.

4.4.1 Project Calendar

Calendar is considered an important tool for project planning as the timescale of activities is governed by the number of working days. This information was obtained through the Delphi technique. According to experts, project planning in Dubai typically incorporates three types of calendars:

5-Working Day Calendar

As per UAE law, government entities observe a 5-working day week, from Monday to Friday. Activities in the programme related to authorities, such as:

- Application for inspection
- Approval from authorities
- Estimation by authorities for payment
- Work inspection by authorities
- Connection of services

should be scheduled according to the 5-working day calendar.

6-Working Day Calendar
According to Article 21 of the UAE Labour Law, private sector employees are entitled to at least one day of paid rest per week, as specified in their employment contract or company regulations. In Dubai, depending on company policy or client requirements, the rest day may fall on either Saturday or Sunday. While preparing the baseline programme, the planning engineer must account for a 6-working day calendar for the relevant activities.

7-Working Day Calendar
This calendar is applied to procurement-related WBS activities, as material ordering and delivery (under shipping) are not affected by holidays. Activities under the procurement WBS are therefore assigned a 7-day calendar with no holidays, which facilitates early delivery of materials.

4.4.2 Methods of Project Recovery

There are several factors that affect project progress. While delays in some activities may be tolerable, delays in critical path activities or slippage of milestones can have catastrophic consequences. In such scenarios, the contractor is required to prepare a recovery plan. This section aims to understand the techniques followed by contractors in Dubai for developing a project recovery plan.

Table 13 Techniques for Preparation of Recovery Plan

Project Recovery Technique	Mean Rank
Crashing	1.31
Fast Tracking	1.10
Crushing	2.84
Critical Path Method (CPM)	1.47
Critical Chain Management (CCM)	2.47

As shown in Table (13), contractors consider fast tracking as the most efficient technique for project recovery. In this method, critical activities that can be performed in parallel are identified and scheduled to execute simultaneously.

Crashing is also considered an important technique for developing a recovery programme. In this method, additional resources are allocated to specific tasks or activities to complete delayed or potentially delayed work. Experts noted that crashing often requires higher resources and increases overall costs, which is why fast tracking is generally prioritized.

The CPM is recognized as an important technique for recovery planning, as it allows precise monitoring of all activities along the critical path. CCM is an optimized version of CPM and is considered moderately important for recovery.

Finally, crushing is regarded as the least important technique, as the primary objective of a recovery plan is to regain schedule without reducing the scope of work, which is the hallmark of crushing.

4.4.3 Plan for variation of work

Whenever the client assigns the contractor an additional scope of work, the contractor is required to prepare a plan for the extra work. This section aims to identify the techniques adopted by contractors to prepare project plans for additional scope of work.

Table 14 Ranking of Planning Techniques for Additional Scope of Work

Planning Technique for Additional Work	Mean Rank
Acceleration	2.73
Fast Tracking	2.57
Re-sequencing	1.94
Extension of Time	1.21

As illustrated in Table (14), contractors primarily prefer to request or claim an Extension of Time (EOT) for any additional scope of work not included in the initial contract. This approach allows contractors to prepare the necessary plan and manage resources for the extra work while ensuring that the original project schedule is minimally affected.

Re-sequencing is considered another important technique for planning additional work. In this method, activities with higher priority or earlier delivery dates are scheduled first, while other activities are back-scheduled accordingly.

The fast tracking technique can be adopted if the additional work can be executed in parallel and independently alongside the main programme. Finally, acceleration is given the least

preference by contractors for additional scope of work, as it often involves significant resource intensification and cost implications.

4.4.4 Authority Flowchart

DEWA Electrical Division

The process for obtaining DEWA power involves several sequential steps coordinated by the MEP contractor and the client. As illustrated in fig. 7, the MEP contractor submits the Low Voltage (LV) Single Line Diagram (SLD) drawings to DEWA for approval. Once approved, DEWA provides an estimation, and the client makes the required payment. Following this payment, High Voltage(HV) equipment delivery and installation take place, which is essential for obtaining DEWA LV approval. The MEP and civil contractors then complete the electrical works.

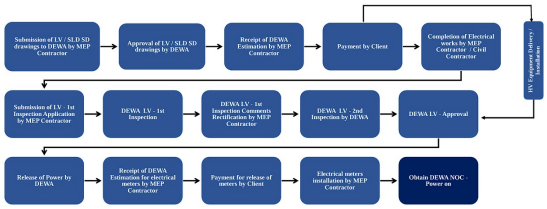

Fig. 7 DEWA Electrical Division Flowchart

DEWA Water Division

Fig. 8 presents process for DEWA Water approval process; the MEP contractor submits an application for the DEWA LV first inspection. DEWA conducts the inspection and provides comments, which are addressed by the MEP contractor. Following rectification, DEWA performs a final inspection and grants LV approval. DEWA then releases the power, after which the MEP contractor obtains the DEWA estimation for electrical meters. Upon client payment, the MEP contractor installs the meters. Finally, the DEWA No Objection Certificate (NOC) is obtained, and power is officially activated.

The DEWA water connection process is coordinated by the MEP contractor, main contractor, and the client, following a sequence of approvals and works. First, the MEP contractor submits the Water Supply SD drawings to DEWA for approval. Upon approval, the MEP contractor completes the water supply network along with flushing. The MEP contractor then submits an application for the first inspection for Intelligent Metering System (IMS). DEWA conducts the first inspection, provides comments, and the MEP contractor rectifies any issues. A second inspection for IMS follows, leading to IMS approval.

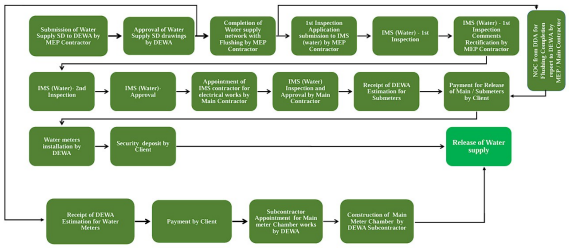

Fig. 8 DEWA Water Approval Flowchart

Following IMS approval, the main contractor appoints an IMS contractor for electrical works, which is then inspected and approved by the main contractor. The DEWA estimation for submeters is then issued, and client payment for the release of main and submeters is required. It is important to note that the NOC from DDA for the flushing completion report, submitted by the MEP or main contractor, is mandatory for DEWA to process this payment. Additional requirements for water supply release include receipt of DEWA estimation for water meters, appointment of a subcontractor for main meter chamber works, and construction of the main meter chamber by the DEWA subcontractor.

After these steps are completed and the security deposit is submitted by the client, the water supply is officially released, and water meters are installed by DEWA.

Dubai Civil Defence (DCD)

The process for fire protection system approval is coordinated by the MEP contractor and the main contractor and involves multiple inspections and approvals by the DCD. As drawn in Fig. 9, the MEP contractor submits the fire protection system shop drawings to DCD for approval. Once approved, the contractors collect and prepare documents related to the breeching inlet, followed by its installation and any necessary civil works. The

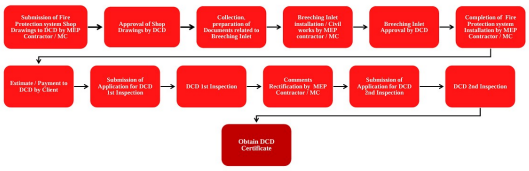

Fig. 9 Dubai Civil Defense Flowchart

breeching inlet is then inspected and approved by DCD.

Subsequently, the MEP contractor completes the fire protection system installation, including fire fighting and fire alarm systems. An estimate is issued by DCD, and the client makes the required payment. The MEP contractor then submits an application for the first DCD inspection, after which DCD conducts the inspection and provides comments. The contractor addresses any comments, submits for the second inspection, and finally obtains the DCD certificate.

It is important to note that DCD approval is considered the most critical approval, as it serves as a gateway to other authority inspections. DCD is responsible for ensuring life safety, fire fighting systems, and fire alarm system compliance, making this approval essential before progressing to subsequent project milestones.

Etisalat / DU

The process for structural cabling system approval is coordinated by the MEP contractor and involves inspections by ETI/DU. As illustrated in Fig.10, the MEP contractor submits the shop drawings for the cabling system to ETI/DU for approval. Once approved, the MEP contractor completes the installation of the data system, followed by pre-testing (fluke test) of all data cables by the MEP contractor.

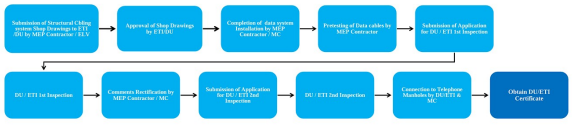

Fig. 10 Etisalat/DU Flowchart

The MEP contractor then submits an application for the first inspection by DU/ETI. DU/ETI conducts the first inspection and provides comments, which are rectified by the contractor. After addressing the comments, an application is submitted for the second inspection. DU/ETI conducts the second inspection, followed by the connection of the system to telephone manholes by DU/ETI and the main contractor. Finally, the DU/ETI certificate is issued, confirming compliance and approval of the structural cabling system.

District Cooling System (DCS)

The process for Chilled Water (CHW) system involves multiple steps coordinated by the MEP contractor, main contractor, and Empower/DCS authorities. As illustrated in Fig. 11, first the MEP contractor submits the chilled water system shop drawings to Empower/DCS for approval. Once approved, the main contractor obtains the construction NOC.

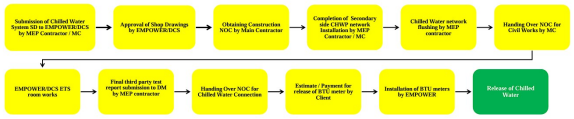

Fig. 11 Empower District Cooling System

The MEP contractor then completes the installation of the secondary side CHW network, followed by flushing of the CHW network. The main contractor hands over the ETS room to DCS, primary side works are completed by Empower.

Empower issues an estimate for the release of the BTU meter, and upon client payment, the BTU meters are installed by Empower. Finally, the CHW supply is officially released.

Security Industry Regulatory Agency (SIRA)

The approval process for the security system is coordinated by the MEP contractor and involves inspections by Dubai Police Service (DPS) or SIRA. First, the MEP contractor submits the security system shop drawings to DPS/SIRA for approval. Upon approval, the MEP contractor completes the installation of the security system, including all active components, the security control room, and the server room. As illustrated in

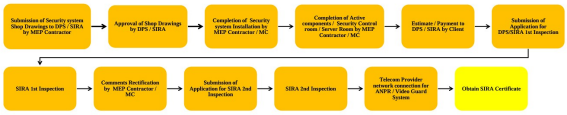

Fig. 12 SIRA Flowchart

figure. 12, following installation, the client makes the required payment to DPS/SIRA. The MEP contractor then submits an application for the first SIRA inspection. SIRA conducts the inspection and provides comments, which are addressed by the contractor. After rectification, the MEP contractor submits for the second SIRA inspection. SIRA conducts the second inspection, and the telecom provider connects the system to the network for ANPR and Video Guard systems.
It is important to note that SIRA testing can only be initiated after internet connectivity is available in the system, which requires a connection from Etisalat or DU. Upon successful testing and inspection, the SIRA certificate is obtained, marking formal approval of the security system.

DCD - LPG

As shown in figure. 13, the approval process for the LPG system is coordinated by the MEP contractor and involves inspections by the Dubai Civil Defence (DCD). First, the MEP contractor submits the LPG system shop drawings to DCD for approval. Upon approval, the MEP contractor completes the installation of the LPG system. Relevant documents—including the LPG license approved by DCD, installation certificates, warranties for LPG equipment, DCD completion certificates, and AMC documents—are then submitted. The client makes the required payment to DCD.

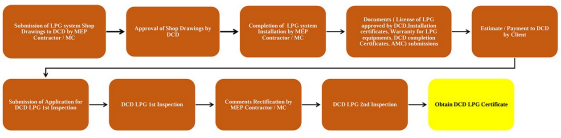

Fig. 13 DCD - LPG Flowchart

The MEP contractor subsequently submits an application for the first DCD LPG inspection. DCD conducts the first inspection and provides comments, which are rectified by the contractor. A second inspection follows, and upon successful completion, the DCD LPG certificate is issued.
It is important to note that DCD LPG inspections are separate from fire, life, and safety inspections. This approval is an additional requirement specifically for the LPG network or LPG tank installation. Since it is generally independent of other authority approvals, many contractors schedule LPG work toward the end of the project. This is practical because LPG tanks and their safety features are often installed on the roof after other finishing works are completed, minimizing disruption and ensuring safe installation.

Building Completion Certificate (BCC)

The BCC inspection is conducted to verify overall project completion, encompassing structural, MEP, and architectural works. The BCC process is coordinated as a unified inspection, where multiple authorities—including DCD, ETC/DU, and Dubai Municipality or Dubai Development Authority inspect the construction site simultaneously.
The BCC is managed through a unified portal, allowing all authorities to submit their comments after inspection. Both the first and final inspections are conducted in a coordinated manner to ensure that no outstanding comments remain from any authority before the BCC is issued.
The BCC represents a key project milestone and is often celebrated by both the client and the contractor. Approval of the BCC requires that all utilities are already available at least up to the primary side, ensuring the building is fully operational and compliant with all regulatory requirements.

It has been found that construction planning in Dubai is systematic and highly structured, with contractor effort aligned to contract value and coordinated across multiple departments to ensure compliance with authority approvals and efficient project execution.

5 Conclusion

Planning is recognized as a crucial phase in the project development life cycle. This study highlights that construction planning in Dubai is not merely a procedural task but a comprehensive mechanism to plan, execute, monitor, and control the overall processes and parameters of a project. Two modes of planning—*active* and *reactive*—have been identified, which help contractors maintain project progress effectively.

The research also investigated the relationship between contract value and planning effort, finding a direct proportionality between the two. Planning practices in Dubai have been observed to be systematic, with highly structured processes followed by contractors. The key functions of planning departments include project planning, project monitoring, strategic organizational planning, and risk management. Construction planning is inherently a collective effort, requiring contributions from multiple departments, sharing of expertise, and integration of necessary inputs.

High-level inputs to project planning include project cost, scope of work, overall duration, intermediate milestones, engineering logs, national calendar, available resources, and execution techniques. Planning engineers develop sub-WBS within a common WBS template used by contractors in Dubai. Using IFC drawings, BOQ, architectural drawings, and the scope matrix, planning engineers define project activities, assign durations, and establish dependencies between tasks. Manpower resources, calculated in manhours, are allocated to dependent activities based on productivity charts.

The planner prepares a cost- and resource-loaded program, commonly referred to as the *baseline program*, which serves as the foundational document for planning, monitoring, and control. Oracle Primavera P6 is identified as the most widely used software tool for project planning in Dubai. Construction activities are subject to multiple authority approvals, and all planning processes are aligned with these requirements. Major authorities involved include:

- **DEWA** – overseeing electrical and water connections, requiring multiple inspections, approvals, and NOCs for power and water release.
- **Dubai Civil Defence** – approving fire protection systems, fire alarm systems, and life safety compliance, considered a gateway for other authority inspections.
- **DU/ETI** – managing structural cabling and ELV system approvals, including pre-testing, inspections, and manhole connections.
- **Empower/DCS** – overseeing district cooling systems, including chilled water network installation, flushing, third-party testing, and BTU meter release.

Achieving construction completion, obtaining authority approvals, and connecting services have been recognized as ultimate project goals, guiding the planning team in aligning their plans. Techniques such as submission for EOT, fast-tracking, and crashing are used to mitigate risks and ensure schedule adherence.

In summary, large construction companies in Dubai recognize the critical importance of planning both during the tendering phase and post-contract execution. Reference documents, authority manuals, and standardized procedures are readily available, and planning involves top-level managers and highly skilled personnel, highlighting the significant effort dedicated by contractors to construction planning and implementation. This study successfully identifies the planning practices employed by contractors in Dubai and concludes that project plans are meticulously designed to achieve authority approvals, which serve as key milestones in project execution. These structured practices collectively ensure efficient project delivery, risk mitigation, and compliance with life safety, utility, and regulatory requirements, reflecting a high level of professionalism in Dubai's construction sector.

Future Scope of Work

This study focuses on construction planning practices. Future research is recommended to investigate the impact of planning on overall project success, including schedule, cost, and quality performance, as well as its influence on client satisfaction. Such studies could provide further insights into the effectiveness of planning strategies and help optimize project management practices in the construction industry.

References

[1] Oxford Economics. Future of Construction. Oxford Economics; 2021. Forecasts global construction output to 2030. Available from: https://www.oxfordeconomics.com/resource/future-of-construction/.

[2] Zwikael O, Globerson S. From critical success factors to critical success processes. International journal of production research. 2006;44(17):3433–3449.

[3] Packendorff J. Inquiring into the temporary organization: new directions for project management research. Scandinavian journal of management. 1995;11(4):319–333.

[4] Winch GM, Kelsey J. What do construction project planners do? International journal of project management. 2005;23(2):141–149.

[5] Whittaker B. What went wrong? Unsuccessful information technology projects. Information Management & Computer Security. 1999;7(1):23–30.

[6] Naoum S, Fong D, Walker G. Critical success factors of project management. In: International symposium on globalization and construction; 2004. p. 827–838.

[7] Construction Industry Cost Effectiveness Project. Report B-1: Integrating Construction Resources and Technology Into Engineering. New York, NY: The Business Roundtable; 1983. Construction Industry Cost Effectiveness Project.

[8] Forbes LH, Ahmed SM. Modern Construction: Lean Project Delivery and Integrated Practices. Boca Raton, FL: CRC Press; 2010.

[9] Besner C, Hobbs B. Contextualized project management practice: A cluster analysis of practices and best practices. Project Management Journal. 2013;44(1):17–34.

[10] Mordor Intelligence.: UAE Construction Market. Accessed: 2025-08-11. https://www.mordorintelligence.com/industry-reports/uae-construction-market.

[11] Investment Corporation of Dubai.: Economic Environment. Accessed: 2025-08-11. https://reporting.icd.gov.ae/2024/economic-enviornment.html.

[12] Zwikael O, Pathak RD, Singh G, Ahmed S. The moderating effect of risk on the relationship between planning and success. International Journal of Project Management. 2014;32(3):435–441.

[13] Marshall C, Rossman GB. Designing qualitative research. Sage publications; 2014.

[14] Seidman I. Interviewing as qualitative research: A guide for researchers in education and the social sciences. Teachers college press; 2006.

[15] Dalkey N, Helmer O. An experimental application of the Delphi method to the use of experts. Management science. 1963;9(3):458–467.

[16] Taylor E. We agree, don't we? The Delphi method for health environments research. HERD: Health Environments Research & Design Journal. 2020;13(1):11–23.

[17] Given LM. The Sage encyclopedia of qualitative research methods. Sage publications; 2008.

[18] Daniel WW. BIOSTATISTICS A Foundation for Analysis in the Health Sciences 9TH ED. Wiley; 2009.