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A STUDY INTO TIME MANAGEMENT IN THE LIBYAN CONSTRUCTION INDUSTRY FROM CONTRACTORS' POINT OF VIEW

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Abstract

Many building projects performed poorly because they took longer than expected to complete; time management is, therefore, crucial for achieving the program objectives. This study examines time management in the Libyan construction sector from the perspective of the contractors. A postal questionnaire survey was sent to construction enterprises in Benghazi, and data was gathered from 53 respondents who were chosen through purposive sampling. The relative important index (RII) was adopted as the research methodology. As a consequence, it was discovered that the majority of respondents concur that creating a clear and adequate time management policy is critical for meeting project deadlines because doing so at the outset will guarantee the success of any project. Therefore, the majority of construction companies undertake management reviews on time management of the administration as an effective and useful tool for time management. A closer look at the 8 categories used to categorize the variables causing delays in Libyan building projects reveals that one of the main causes of delays is financial issues. It is advised to keep an eye on the time management aspect of building projects in Libya by using certain effective tactics like the Just-in-Time (JIT) approach and the precedence requirement.

Keywords: Time management, Construction, Contractor, Perspective, Libya

1. INTRODUCTION

Hancher and Rowings [1] described a successful construction project as one that has been completed within the budgeted amount and time frame. However, many projects encounter significant delays that significantly increase their cost and completion time. Time, money, and quality are the three pillars of successful project management in the construction sector. Any project has three essential elements that cannot be disputed: time, money, and quality; in some ways, they are all connected [2]. To deliver projects on schedule and satisfy the needs of both customers and the market, project managers need to implement a structured time management system. Cost control is therefore as crucial in the building sector. Cost management aims to save costs while bolstering the strategic position [3]. Cost management includes cost monitoring, cost control,

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estimations made during the design phase, and more. This process is repeated for the entire lifetime of the project. Although "most projects are eventually finished more or less to specification," clients frequently assert that these projects are rarely completed on schedule and within budget [4], 1997). Success in cost management may increase the likelihood that the project will be successful. In most cases, budget and timeline are met at the expense of quality. Wright [4] asserts that a decent rule of thumb is to increase every time and budget estimate by at least 50%. Construction projects are getting bigger, more complicated, and more specialized these days. Hence, time management during construction projects has become a very difficult task. Construction project scheduling is mostly dependent on uncertainties. Time overruns for projects can range from a few days or weeks to years. Therefore, the contractor must implement a structured time management strategy and apply all their skills or resources to the construction project. The majority of failures recorded in the building sector, as per a 2006 report by the Ministry of Housing and Local Government, are caused by poor cost and time management. To ensure the project is effectively completed, time, cost, and quality must be balanced. Without effective management, building projects will run late or over budget. This paper's implications include indicators for improving the guidance in choosing the best time management strategy for building projects.

Libya is not an exception to the global phenomenon of construction sector delays. In Libya, the construction industry contributes significantly to the country's economy both on its own and in conjunction with all other sectors of the economy. Regrettably, the Libyan construction industry has a terrible reputation due to abandoned projects, delayed projects, and cost overruns. No construction project proceeds without hitches; some of the variables influencing cost overruns, according to Kaming et al. [5] (1997), include an increase in material costs, incorrect material estimates, and degree of complexity. On the other side, factors such as modifications to the design, low labor productivity, inadequate planning, and a lack of resources, contribute to time overrun. As a result, this study examines how contractors manage their time during a construction project. Customers and clients are not only interested in projects with low costs and appropriate functional performance; they are also looking for projects that can be completed as cheaply and quickly as possible. Hence, the contractor or subcontractor must give time management in the project top priority. Nowadays, a lot of construction projects perform poorly because they take longer than originally anticipated. Time management is therefore crucial to achieving the program objectives. This essay aims to look into how contractors manage their time during construction projects in Libya. For the contractor to deliver the project on time, time management is crucial as it will prevent the menace of abandoned projects.

2. CAUSE OF CONSTRUCTION DELAY ABROAD: LEARNED LESSONS

Numerous circumstances have caused construction projects to be delayed. These span from factors coming from the social, physical, and economic environments to those inherent in the technology and its administration. A study was conducted by Sunjka and Jacob [6] from the viewpoint of the Nigerian construction sector; they pinpointed the key reasons for delays and their possible impact on the success of the

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project. Ogunlana et al. [7] used Thailand's construction delays as a model for developing economies and observed that the problems faced by the construction sector in most emerging economies can be categorized into 3: issues with resource availability, problems brought on by clients and consultants, and issues brought on by contractor ineptitude. Mezher and Tawil [8] examined the factors that contribute to delays in Lebanon's construction sector from the perspectives of owners, contractors, and architectural and engineering firms. It was discovered that owners were more concerned about financial matters, contractors prioritized contractual relationships, and consultants thought project management issues were the main reasons for delays. In another study, the factors influencing productivity were studied by Chan and Kumaraswamy [9] while surveying the reasons for building delays in Hong Kong as seen by clients, contractors, and consultants. The findings of their study show that poor site management and supervision, unanticipated ground conditions, slow decision-making involving the entire project team, necessary variation of activities, and client-initiated changes are the five main and common reasons for delays. By interviewing thirty (30) specialists, Soliman [10] conducted a study in the Kuwaiti construction industry to ascertain the reasons behind delays and the severity of their impact. The study demonstrated that the financial and design causes are the most significant and frequent delay causes, with twenty-nine (29) causes picked and separated into six (6) types of delay. In their 1998 study, Abd. Majid and McCaffer [11] examined the influences that non-excusable delays have on contractors' performance. They categorized the primary reasons for non-excusable delays in consideration of the origin of the occurrence before determining the components that contributed to those causes. The clients are assumed to have more control over the compensable delays and can act to keep them away. On the other hand, the contractor is expected to be in charge of the unacceptable delays and, ideally, take additional steps to avoid them. They divided the factors causing non-excusable delays into 12 categories: material-related delays, equipment-related delays, labor-related delays, subcontractor delays, financial-related delays, lack of control delays, inadequate supervision delays, improper planning delays, poor coordination delays, improper construction techniques delays, communications delays, and technical personnel shortages delays. Additionally, it has been suggested to create a thorough description of the reasons for building delays [11]. They divided the factors that contributed to avoidable delays into twelve categories: inappropriate planning, lack of control, poor coordination, insufficient supervision, incorrect subcontractor management, improper construction techniques, technical staff shortages, and bad communication. In Jordan, the causes of construction delays were examined by Odeh and Battaineh [12]. They identified the most significant issues as owner intervention, funding and payments, limited contractor expertise, labor productivity, poor planning, sluggish decision-making, and subcontractors. Long et al. [13] conducted research on Vietnam's significant building project problems and identified five main causes of the issue as poor skilled contractors or designers, inadequate estimation and change management, technological and social problems, site-related issues, and ineffective methodologies and tools.

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Assaf and Al-Hejji [14] examined the timeliness of various construction projects in Saudi Arabia to identify the reasons for delays and their significance as perceived by the owner, consultant, and contractor. The three parties agree that "change orders" are the most frequent reason for delays. Contractors report that owner delays in progress payments, owner work suspensions, owner late reviews and approvals of design documents, late material purchases, owner change orders during construction, mistakes and discrepancies in design documents, contractor funding challenges, delays in producing design documents, consultant late reviews and approvals of design documents, and consultant slowness are among the most common causes of delays. In Ghana groundwater building projects, Frimpong et al. [15] identified the important elements that contributed to delays and cost overruns as problems with agencies' monthly payments, poor contractor management, the purchase of materials, subpar technical performances, and an increase in material prices. Ayman [16] surveyed 130 public projects in Jordan to ascertain the causes of delays. Residential, office, and administrative buildings, school structures, medical facilities, and communication infrastructure were all included in the projects. The findings showed that designers, user changes, weather, site conditions, late delivery, economic conditions, and an increase in quantity are the main reasons for delays in the development of public projects. According to Alaghbari et al. [17], clients, contractors, and consultants concurred that financial issues were the primary causes of delays in construction projects in Malaysia, with coordination issues coming in as a close second. Another intriguing study by Sweis et al. [18] examined the factors that contribute to building delays in residential projects in Jordan and concluded that the contractor's financial challenges and the owner's excessive demand for change orders are the main culprits. Similarly, Abd El-Razek et al. [19] observed that in Egypt, failure to use professional construction/contractual management and financing by the contractor during construction are the main reasons for delays, along with design changes and payment delays by the owners. A survey was conducted by Tumi et al. [20] to determine some of the major reasons why construction projects in Libya are delayed. The six main causes include poor planning, poor communication, poor design, and lack of supply (such as steel, concrete, etc.), sluggish decision-making, and financial problems. Fugar and Agyakwah-Baah [21] focused on the identification of the most significant delays in building construction projects in Ghana as reported by the key project participants. All significant parties concurred that the following ten issues account for the majority of delays in Ghana: failure to respect payment certificates on time, underestimated project costs and complexity, trouble obtaining bank credit, subpar oversight, project completion time underestimation by contractors, unavailability of materials, poor professional management, the rising cost of materials, and inefficient site management. In 2005, Wiguna and Scott conducted research on the factors influencing cost overruns and construction delays in building projects in Surabaya and Denpasar, Indonesia. The building contractors identified high inflation/increased material prices, owner design changes, poor designs, weather conditions, late payments on contracts, and subpar construction work as the most significant risks causing cost overrun and delay. A case study from Vietnam was used by Long et al. [13] to explore the issues with massive construction projects in emerging

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nations. They showed that the challenges might be categorized into five main categories: bad designers or contractors; inadequate estimating and change management; social and technological concerns; problems with the site; and poor procedures and tools. Afshari et al. [22] made an effort to pinpoint the reasons behind building projects' inexplicable delays. Their research primarily focused on identifying executive companies of the Mapna Group's non-excusable delays to better manage these causes and improve project completion time. The investigation covered all the completed or ongoing utility, steam, and power projects by these associated companies, as well as thermal power plant developments. They used a Delphi questionnaire survey and the Mean Rank approach to identify the top 20 causes of unjustifiable delays in construction projects. A test of the hypothesis was designed and a considerable degree of agreement among the experts was verified to see if there was any degree of agreement among the panel of experts regarding their ranking of the causes of non-excusable construction delays. The most significant factor contributing to unacceptable construction delays was determined to be "not hiring competent subcontractors." Fifty-six (56) primary reasons for delays in Saudi Arabia's large building construction projects were identified by Sadi et al. [23], along with their relative importance. According to the surveyed contractors, the major causes of delay are the delays in the contractor's progress, the creation and approval of shop drawings, owners' payment, and design revisions. For the architects and engineers, the main causes of delay were problems with cash flow throughout the project, relationships between subcontractors, and the owner's slow making of decisions. However, the owners acknowledged that design flaws, a labor shortage, and a lack of skilled labor were significant delay causes. To identify and evaluate the relative significance of the key elements that contribute to delays in the building sector in Hong Kong, Daniel et al. [24] conducted a survey that involved the parties in the local construction sector (clients, consultants, or contractors; they studied the nature of the projects, ranked, and categorized the major causes of project delays into two groups. The reasons for the cost-time performance of public housing projects in Nigeria were examined by Okuwoga [25]; they divided the reasons for the delays into two categories: project participants and external variables. Delays caused by clients included inconsistent orders, sluggish decision-making, and cash flow issues. Delays attributed to contractors were financial difficulties, planning and scheduling problems, material management problems, inadequate site inspection, shortage of manpower, and equipment management problems. The identified extraneous causes of delay were bad weather, natural disasters, labor issues, and strikes.

The study by Arditi & Pattanakitchamroon [26] discussed the selection of a good delay analysis method and concluded that the best analysis method is reliant on the information provided, the amount of time and resources allotted for the study, as well as the method's capabilities. They talked about the effect as-planned approach, the collapsed as-built method, the as-planned vs. as-built method, and the time impact method. Except for the time impact method, all the discussed methodologies are considered static, which offers less supporting data for delay claim management compared to the dynamic approaches that systematically and impartially analyze delay

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events for both contract parties. Additionally, Arditi & Pattanakitchamroon's [26] comparisons still fall short of the requirement to choose an appropriate analysis approach based on a more thorough assessment of process changes that affect delay analysis accuracy. A proper way of choosing between the as-planned method, the as-built method, and the modified as-built method has been provided by Bubshait & Cunningham [27]. The method relies on the use of four scenarios, each with different approved timetables (network or bar charts) and a range of supporting data and progress reports. They concluded that the choice of method is dependent on the amount of time and resources available, as well as the availability of project control documents. Arditi & Pattanakitchamroon [26] created a guide for the selection between the as-planned vs. as-built method, the impact as-planned method, the collapsed as-built method, and the time impact method; the proposed guide comprised of a tabular checklist with schedule type (as planned, as-built, updated, adjusted, and fragnets) and information type (progress report, approved network, bar chart, and updated approved network). The findings of the studies by Bubshait & Cunningham [27] and Arditi and Pattanakitchamroon [26] showed that various delay analysis techniques call for various documents and use various amounts of resources. When Gebrehiweta & Luob [28] examined the effects of delays in Ethiopian construction projects, they discovered that the top most significant causes of delays were corruption, on-site lack of utilities, inflation or changes in the price of materials, late design and design documents, slow delivery of materials, lack of quality materials, subpar site management, a delay in the approval and reception of the entirety of the project work, ineffective project management, and a late release of funds, Yap et al. [29] analyzed the crucial delay reasons for Malaysian construction projects. They discovered that the five main causes were improper planning and scheduling, an excessive number of client modification orders, ineffective site management and supervision, ineffective subcontractors, and contractor financial difficulties. The study by Bajjou & Chafi [30] relied on 9 criteria to categorize the causes of project delays in Morocco, with the top three being delayed progress payments, inadequate training and competency of project staff, and a subpar waste management strategy. Ten delay analysis strategies were addressed by Mohan and Al-Gahtani [31], who also compared how well they handled real-time, concurrent, and pacing delays. Mohan & Al-Gahtani [31] developed an ideal system of delay analysis with 11 criteria, such as the need for daily updates to the project schedule that account for all delays and adjustments to total floats. It is evidently difficult to compile comprehensive timetable data about actual instances of construction schedule delays. To provide a feasible aim for the majority of delay analysts in their real-world studies, the goal of this study is to discriminate between the current delay analysis methodologies using general schedule-related documents and distinct analysis processes. A study by Pourrostam & Ismail [32] aimed at determining the primary reasons for and effects of delays in Iranian construction projects. To get the opinions of consultants and contractors on the reasons for and effects of delays, the study employed a questionnaire survey for data collection. From a list of 27 potential causes of delay and 6 different impacts, this study determined the 10 most significant reasons for delay to include poor site supervision and management, change orders by owners

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during construction, delay in progress payment by owners, contractors' inability to plan and schedule the project, financial problems on the side of the contractor, slow decision-making by the owner, delays in the provision of design documents, delayed review, and approval of design papers by the owners, poor management of contract by the consultant, and issues with sub-contractors. The findings demonstrated that delays can have a variety of detrimental consequences, including time and cost overruns, disagreements, arbitration, complete abandonment, and litigation. The report makes some predictions for the future and offers a few areas for future construction project research to concentrate on. Even though the study is focused on Iran's specific situation, it turns out that emerging nations generally have issues with building management. According to Shi et al. [33], delays can happen in all activities, and these delays might happen at the same time as or in addition to delaying the project's completion. This implies that a project delay is the manifestation of accumulated delays in different aspects of the project. Delays can result in lost productivity, delayed project completion, higher time-related costs, contract termination/abandonment, and third-party claims. Time and overrun are the two most frequent consequences of delays in Ethiopian construction projects, according to Gebrehiweta & Luob [28]. The consequences of construction delays on project delivery in the Nigerian construction industry were researched by Aibinu & Jagboro [34]. Time and cost overrun, dispute, complete abandonment, arbitration, and lawsuit were the six repercussions of delay that were noted. In the construction industry, cost overruns are a typical issue as construction projects are projected to have an average cost increase of roughly 33 % [35].

3. RESEARCH METHOD

Data was collected and self-administered using the questionnaires. Altogether, 60 contractors' companies were selected, using the questionnaires prepared were conducted. Of these, 53 questionnaires were returned and analyzed, yielding a response rate 88%. All data was analyzed using the SPSS software (Version 22.0), which was widely utilized in the social and business research. Relative importance index (RII) is used to determine the effectiveness of those influential factors. The 5-point Likert scale is converted to relative importance index for each factor, which makes it possible to cross-compare the relative importance of each factor that the respondents perceive. The RII is generated using the statistical formula below [36]:

$$RII = \frac{4n1+3n2+2n3+1n4+0n5}{4N}$$

$$(0 \leq RII \geq 1)$$

Where N=Total number of respondents; 4=highest weighted score (0, 1, 2, 3, 4) on scale of agreement; n1=number of respondents for 'never & strongly disagree'; n2=number of respondents for 'seldom & disagree'; n3=number of respondents for 'not sure & neutral'; n4=number of respondents for 'sometimes & agree'; n5=number of respondents for 'always & strongly agree'.

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4. ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Designation of respondents in their companies

Table (1) shows how the respondents were distributed based on their professional backgrounds; 12 respondents (22.6%) hold director positions, whereas 33 respondents (62.3%) hold manager positions. Eight of the respondents (15.1%) work as executives. This suggests that the majority of responders hold the most senior positions within their companies. According to the data, 56.6% of the participants work for organizations that have been around for between 11 and 15 years in the construction business. 37.7% of businesses that have been operating for more than 20 years come next. As can be seen from the data, the bulk of the enterprises (50.9) were engaged in the construction of civil engineering projects, which was followed by those involved in residential and non-residential building projects (34%). Regarding age, 45.3% of the participants are older than 40 years old, while 54.7% of the participants are between the ages of 30 and 40. The analysis of the income of the companies showed that 37.7% of the participants earn between 31,000 and 40,000 LYD and 30.2% earn between 20,000 and 30,000 LYD. In addition, 28.3% of the participants reported incomes between 10,000 and 19,000 LYD.

Table 1: Summaries the Respondents' Background

Respondents' designation	**Percentage**
Manager	62%
Director	23%
Executive	15%
Years	**Percentage**
1-5 years	-
6-10 years	5.7%
11-15 years	30%
More than 20 years	20%
Type of work	**Percentage**
Civil engineering construction (infrastructure)	50.9%
Residential & non-residential construction (building)	34%
Mechanical & electrical work	15.1%
Others	-
Company' income	
41000 - 50000 LYD	3.8%
31000 - 40000 LYD	37.7%
20000 – 30000 LYD	30.2%
10000 – 19000 lYD	28.3%

4.2 Analysis of Time Management in the Organization

The three factors discussed in this section current time management policy, time management practices used, and effectiveness of time management are examined and given separately in the following sub-sections.

4.2.1 Current Time Management Policy

According to Table (2), the majority of local construction enterprises have a clear time management strategy in place (RII = 0.994), followed by a timeliness policy that is

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suitable for their industry (RII = 0.989), and a time policy that is suitable for their business (RII = 0.964). Being ranked highest, it goes without saying that creating a clear and adequate time management policy is essential for meeting project deadlines because doing so will ensure the project runs smoothly. It is necessary to first identify the time objectives before establishing such a policy. Typically, the private sector serves as the main contractor and assigns specific projects to various subcontractors with varying specialties. The main contractor and each subcontractor will collectively develop the statement of work, with each subcontractor accepting responsibility for the deliverables and services specified in its respective areas of responsibility. The subcontractors have a clear understanding of the value of putting time management policies into practice, and they set time goals for completing the various assignments they have been given to meet the client completion deadline and avoid incurring any needless penalty cost.

Table 2: Current Time Management Policy

Item	Mean	RII
Company has an established management policy	4.79	0.994
Company establishes time objectives	4.73	0.938
Company meets the timelines in all projects	4.77	0.989
The time management policy in your company appropriate for the purpose of the business	4.87	0.964
The time management policy in your organization includes commitment to comply with the requirements to continually improve the effectiveness of your organization	4.67	0.919
The time management policy in your organization is understood and communicated within the company	4.63	0.900
Company reviews the time management policy from time to time to ensure its suitability	4.63	0.900

4.2.2 Identifying the Time Management Adopted By the Company

With the highest mean value of 4.90 (RII = 0.976), Table 3 shows that the majority of organizations undertake management reviews on time management of the administration as a valuable tool for time management. According to the respondents' perceptions, establishing quality objectives, which showed a mean value of 4.81 (RII = 0.951), and continued improvements in the effectiveness of finishing projects on time, which showed a mean of 4.84 (RII = 0.952), are also crucial time management approaches. "Activity duration estimation in planning" is not highlighted as a technique employed by regional construction firms among the ten strategies. The majority of construction firms have implemented practical and efficient time management techniques. To calculate work schedules and give a method for controlling project time as the work proceeds, the "Critical Path Method" is one of the time management tools that is frequently used in project planning. Setting quality time goals is crucial before the creation of CPM. To find any deviation from the planned timeframe, an organization must also undertake management reviews on the administration's time management. Resource management (manpower, equipment, and materials) is essential for a project to be completed successfully and as quickly and cheaply as possible. The supply and

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support of the field activities, as well as adherence to the agreed timeframe, requires effective resource allocation.

Table 3: Time Management Adopted by the Organization

Items	Mean	RII
Company conducts management review on time management of the administration for your company.	4.90	0.976
Quality objectives are needed to ensure that the projects' requirements are met.	4.81	0.951
Quality objectives are established at all levels and functions in your organizations.	4.75	0.938
Company practice "ascertainment of the sequential relationship among activities" in planning a project.	4.71	0.929
Company practise "activity duration estimating" in planning a project.	4.64	0.910
Company practise "critical path method" in planning a project.	4.71	0.929
Company practise "resource management" in planning a project.	4.56	0.891
Company ensures that the time management objectives and requirements for the execution of projects are appropriate.	4.69	0.924
Company determines the monitoring and measurement of projects to be undertaken.	4.79	0.948
Company continually improves on effectiveness on completing project on time.	4.84	0.952

4.3 Determining the Effectiveness of Time Management

The effectiveness of time management in specific areas is shown in Table (4). According to the participants, it is evident that reviewing the recommendations for enhancing the performance of the organization is essential among other factors (RII = 0.889) for successful time management. On the other hand, the respondents noted that an essential component in evaluating the success of time management which is ranked second (RII = 0.885) is ensuring that the acquisition of items conforms to the specifications indicated in the projects' agreement. Additionally, systematic evaluations of the requirements and capabilities during the design and development phases are not essential components of efficient time management. According to the poll, the current successful time management practices heavily involve reviewing suggestions for company performance improvement regularly. It is helpful to support businesses in identifying any issues and recommending appropriate action or mitigation to fix them. The third most significant factor in determining the efficacy of time management was a review of client comments on the success of your projects (RII = 0.882). Without a doubt, this is a crucial factor to consider to complete the work on time and with quality.

Table 4: Effective of Time Management

Items	Mean	RII
Company should review the clients' feedback on the performance of your projects.	4.71	0.882
Company should review the recommendations for improvement.	4.79	0.889
Company should review the information for improvement, effectiveness of the time management system and its processes.	4.56	0.828
Company needs to provide appropriate education and training to the personnel performing work effectively.	4.67	0.834

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Company needs to ensure that the personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the time management objectives in your organisation.	4.69	0.836
Company must systematically review the design and development stage to evaluate the ability of the results of design and development to fulfil the requirements of projects.	4.62	0.831
Company must systematically review the design and development to identify any problems and propose necessary action.	4.52	0.822
Company ensures that the purchasing of products conform to the specified requirements in the projects' contract	4.75	0.885

4.4 Factors contributing to the cause of project delays

Table (5) provides a summary of the relative importance index (RII) and factor rankings. Unreliable suppliers (RII = 0.597) were identified in the material group as one of the factors contributing to construction delays in Benghazi city. The factors "delay in payment to supplier/subcontractor" and "unreasonable constraint to the client" are both recognized as factors number one in the finance category (RII = 0.962). It appears from this finding that financial issues are the primary cause of the Libyan building project's delay; however, such financial issues with construction projects can be avoided. Underbids normally request too little funding to complete the project. The dependence of cash flow issues on having enough money at a particular time implies that they might occur even when there is enough money overall. They develop when the current level of funding is insufficient to cover the current costs for labor and materials. The client's delayed progress payment issuance can seriously impede the work's development. Delays in progress payments impact contractors' cash flow, which has an impact on how much they can pay employees and suppliers. This has a negative impact on both the credibility of suppliers and the motivation of employees. According to the analysis, the factor "poor labor productivity" is one of the most significant elements causing a delay in building projects; it is listed as factor number one (RII = 0.910) with reference to the labor group. The factor of "improper planning and scheduling" was identified as the primary cause of delay and ranked as factor number one (RII = 0.915) after the contractor group factors were analyzed. The causes of delays in Libyan construction projects are listed in Table (5) under various categories.

Table 5: Factors Contribute to Cause of Project Delays

Factor	M	SD	RII	Ranking
A) Material Group				
1 Unreliable supplier	4.83	0.379	0.957	1
2. Late delivery of material price	4.73	0.445	0.933	3
3. Imported construction material	4.81	0.395	0.952	2
B) Labour group				
1. Low motivation moral	4.35	0.623	0.839	4
2. Absenteeism	4.35	0.623	0.839	4
3. Shortage of labour supply	4.43	0.635	0.858	3
4. Low labour productivity	4.64	0.623	0.910	1
5. Shortage of skill labour	4.45	0.606	0.863	2
C) Equipment group				

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1. Inadequate modern equipment	4.16	0.752	0.792	4
2. Equipments allocation problem	4.15	0.632	0.787	5
3. Slow mobilization of equipment	4.36	0.688	0.849	2
4. Improper equipment	4.35	0.623	0.839	3
5. Shortage of equipment parts	4.54	0.573	0.886	1
D) Finance group				
1. Monthly payment difficulties	4.79	0.409	0.948	3
2. Delay payment to supplier / subcontractor	4.84	0.361	0.962	1
3. Unreasonable constraint to the client	4.84	0.361	0.962	1
4. Client's finance difficulties	4.83	0.469	0.957	2
E) Contractor group				
1. Inadequate contractor	4.45	0.572	0.863	4
2. Inappropriate contraction methods	4.47	0.503	0.867	3
3. Inaccurate cost estimate	4.56	0.604	0.891	2
5. Poor site management and supervision	4.43	0.516	0.858	5
6. Improper planning & scheduling	4.66	0.707	0.915	1
F) Consultant group				
1. Inadequate consultant experience	4.43	0.572	0.858	4
2. Poor design / delays in design	4.47	0.607	0.867	3
3. Inadequate project management assistance	4.43	0.607	0.858	4
4. Slow response and poor inspection	4.37	0.527	0.839	5
5. Incomplete drawing / detail design	4.58	0.497	0.896	1
6. Inaccurate site investigation	4.54	0.606	0.886	2
G) Client group				
1. Slow decision making by client	4.50	0.639	0.877	3
2. Lack of experience of clients in construction	4.52	0.575	0.882	2
3. Change orders	4.39	0.630	0.849	5
4. Client's orders	4.33	0.586	0.834	6
5. Clients interference	4.20	0.793	0.801	7
6. Lack of capable representative	4.66	0.552	0.915	1
7. Lack of communication & coordination between parties	4.41	0.663	0.853	4
H) External group				
1. Unforeseen ground condition	4.41	0.602	0.853	3
2. Unexpected geological condition	4.54	0.606	0.886	1
3. Inflation	4.39	0.688	0.849	4
4. Slow site clearance	4.47	0.660	0.867	2
5. Weather condition	4.35	0.653	0.839	5

5. CONCLUSION AND RECOMMENDATIONS

The aim and objectives of this study indicated in chapter one had been accomplished based on the outcomes of the presented data analysis. The identification of the current time management policy was the first objective of the study. The results showed that the majority of respondents did concur that creating a clear and adequate time management policy is essential for meeting project timelines because doing so at the outset will guarantee the project's success. Thus, the statement "To identify the current

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time management policy" can be interpreted as having been accomplished. According to the study's findings, the majority of construction companies undertake management reviews on time management of the administration as a practical and efficient time management technique. Regarding the third, it is abundantly obvious from the analysis of the results that the objective, "to ascertain the effectiveness of time management in construction performance," has been accomplished. The majority of construction firms concur that reviewing recommendations for company performance improvement is a crucial component of assuring successful time management in construction performance. Further analysis of the eight (8) categories used to classify the variables causing delays in Libyan construction projects reveals that one of the most delayed issues in the financial category is the failure to make timely payments to suppliers or subcontractors. The study also found that the top three factors causing delay under the contractors' category were things like poor planning and scheduling. Incomplete drawings and detailed designs, which fall under the category of consultants, are another intriguing factor that contributes significantly to delays. There is never an "optimal" technique to keep track of time spent on Libyan building projects. There are countless options for keeping track of the project. The strategy used can only be categorized as good, better, or best. Of course, using the best time management strategy will result in increased earnings; the profit margin will undoubtedly be impacted by an efficient time management plan. A prudent approach to handling materials costs and good management of resources will affect the status of the contractor in this competitive climate, particularly under the burden of the economic recession. Thus, this study concludes that effective time management is crucial for any construction firm that wants to complete a project on schedule; this will prevent cases of abandoned projects. These factors should receive extra attention during project monitoring as the work progresses because they are the ones that lead to delays if not caught early enough. As a result, successful monitoring of the important parameters outlined in this study will guarantee project success. Several recommendations have been drawn from this conducted study. These were:

i. Monitoring and managing of project time occur at every stage, from the feasibility stage to the monitoring stage to the completion stage. Although many of these suggested tactics are not new to the construction industry, they are not frequently used on building sites. However, we may adapt this idea to the construction setting and employ it because it might be beneficial if properly implemented.

ii. Numerous tasks are completed during the construction phase in accordance with the original plan. It is important to understand what kind of actions or circumstances are most likely to cause project disruption and delay. So, ranking the importance of the activities is the first step. The total time spent on critical path activities determines a project's length; any delay in a critical path activity will push back the project's completion date. First, it is important to monitor and regulate the activities on the critical path. Second, while keeping an eye on the activities that still have a free float, every activity that is delayed will cause some other activities to be delayed. Thirdly, monitoring the activities with less float is important because these

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activities have a higher likelihood of going over budget or running over schedule if there is very little float available.

iii. Reevaluating the order of the tasks is another crucial control measure for putting the project back on track. Basically, the initial project was probably created for an ideal scenario. As the project progresses, various obstacles will impact how the activity is carried out, and the actual results will differ greatly from what was imagined.

iv. The Just-In-Time (JIT) philosophy has been well-established in the industrial industry for a while now. Some individuals in non-manufacturing sectors are under the impression that JIT is successful solely in the manufacturing sector. In reality, it is poorly applied and relatively new to the building sector. This idea refers to a coordinated series of actions intended to increase output while keeping inventories of raw materials, work-in-progress, and finished goods to a minimum. Its basis is the idea that nothing will be created until it is required. This JIT program ensures the availability of the appropriate quantities of each resource at the appropriate times such that wastage is minimized; it also ensures that operations are completed quickly and affordably while utilizing the necessary facilities, equipment, materials, and personnel.

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