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INVESTIGATION ON FACTORS CAUSING CONSTRUCTION DELAY AND THEIR EFFECTS ON THE DEVELOPMENT OF OMAN'S CONSTRUCTION INDUSTRY

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Abstract

Construction delay in projects is a common manifestation in the construction industry. Delay in construction will lead to a bad relationship between the parties involved and will also lead to an increase in the allocated completion time. Delay in the ongoing project might result in the loss of the money, time and other facilities by the client and cause a lot of financial damage to the contractor due to its investment in the purchase of equipment, construction materials and the hire of skilled workers. Delay in construction is a common problem that occurs mostly due to the unforeseen problems during the design & construction stages which often lead to delays in the completion of the project. Oman's construction industry is one of the most important industries for the country's economic development and growth. In this study, analysis of some available literature was conducted, and a questionnaire survey was floated among contractors, consultants, clients, project managers, and engineers involved in construction projects. All the collected responses were evaluated by using SPSS. The results of the study identified a total of 60 causes of delay out of which three factors have a «High» significance level for construction delays. These factors of «High» significance were associated with «Client related issues only» in which the initial design was altered by the client, delaying in deciding by the client and, scope change by the client. Majority of the delay (84 %) was observed to be lying in the range of 1–2 years. This study also recognized the effect and minimization of regular delay and delay resulted due to Covid-19. Minimizing construction delay criteria can be managed by having a proper control system in the project time and funds.

Keyword: construction industry, construction delay, client, Covid-19, contractor, Labor, SPSS, Consultant.

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1. Introduction

Around the globe, the construction business performs a very significant role in determining the economy of a nation. It has a huge impact on economic growth and complements the productivity and output of various industrial sectors [1]. The effectiveness of the project stands on the most optimal programming, planning, and strategizing the resources that are at one's disposal, giving priority to its time, cost, and utility values [2]. The construction sector in Oman has been contributing in a large way to the financial growth and development of the country. Oman's construction fraternity consists of a huge number of working groups, teams, and stakeholders coworking, which provides for an indisputable 9 % to the GDP of Oman through the quantum of capital that is put into it [3]. Project delay can be defined as the extra number of working days over the actual project delivery date [4, 5]. Delay makes the construction projects disturbing. An estimation has found that a delay of eight years in energy-related projects, seven years in irrigation and conveyance projects,

and maintaining an average delay of about three years in the projects [1]. These delays tend to be the most common problems that construction projects face, and thus they usually give rise to claims, and disputes [6].

Depending upon the type of project and the project contestants, the significance of the delay varies. Due to the delay in the ongoing project, the client may lose money, time, or other facilities but, on the other hand, the delay in the project may cost the contractor a loss of wealth due to its investment in the purchase of equipment, construction materials and the hire of skilled workers [7]. The delay causes vary from one terrestrial location to another [8]. Delay in construction will lead to a bad relationship between the parties involved and will also lead to an increase in the time allocated. Delays may be categorized as non-excusable delays, non-compensable excuses, compensate able excuses, and concurrent delays that are simply explained as in the case of non-excusable delays. These are caused by the contractor and the risk is taken by the contractor [9]. All excusable delays are compensable in which the contractor usually claims for an extended period, compensation, or both. If it is the sole fault of the contractor, the delay is most probably going to be non-compensable (https://www.levelset.com/) [10]. As the non-compensable excusable delay receives payment beyond the scope of contractors and other stakeholders which are not dealt with by them. The client itself can cause the compensable excusable delay which is the suspension or interruption in any segment of the project and is reasonable. Finally, the concurrent delays happen concurrently and simultaneously and are caused by the contractor and client [9].

The most important objective of this study is to find the factors responsible for delays and their relevant impact on project completion. As a result of modifications in government projects and governing policies from 2010 to 2013, Oman has faced a loss of more than one billion Omani riyals [11]. The study conducted in Nepal finds the important factors of cause and impact of their delay in completed construction projects. The study has also identified the major causes, and effects of delay as cost overturn, time overturn, dispute, arbitrations, and litigations [7]. Audits and questionnaire reviews concluded that the delay problem originates because of disputes and its causes cost overrun, time overrun negotiation total desertion, litigation, lawsuit, abandonment [1]. The study identified the eleven important categorized delay factors. The delay in projects leads to an increasing cost and has been contributing highly to the initial cost of the project in Saudi Arabia [12].

The data analysis was carried out in two stages and investigated a total of 42 possible delay factors. SPSS (Statistical Package for the Social Sciences) was used to generate the frequency (fi) for causes factors and their effect, and RII (Relative Importance Index) for each factor was calculated using the frequency data for each response category generated from SPSS [13]. The typical causes of delay at different stages of construction and their effect are investigated in Ethiopia [14]. The climate is a major cause of delay and found that poor schedule performance in construction projects and considered as a major concern for both industry professionals and researchers around the globe [3]. Payment delays, financial problems, poor communication, absence of coordination and conflict between stakeholders, climate/weather conditions, lack of experience among project stakeholders, shortage of labour, inadequate or improper planning of equipment and resources, and improper management of the site are the most frequent type of delays reported. Unpredicted weather conditions may also have an implicit effect on project schedule performance that is hard to predict [15].

The main reasons for the delay have classified into two different groups based on each role of the parties and the type of projects. The collected survey data was summarized by the ‘relative importance index techniques’ along with ‘percentage agreement factor ‘was employed for data analysis [16]. The completed project in Muscat, Sultanate of Oman, region was investigated, and data collection has been divided into two groups between the years 2007–2008, and 2009–2010. But both groups have noted that the delay is mainly caused by the owner, and other common factors include financial difficulties for both the client and the contractor, inexperience, and lack of fiscal study as well as lack of study from both client and contractor has led to an incomplete understanding of the project which has led to delay in the project. In 2007–2009, most delays were about 300 per cent which highlights the significance of planning and efficiency in specialized construction projects [17].

A total of 48 delay factors around the world were identified based on a convenience sampling technique. The collected data was analyzed using the Average Index method to identify the

most important causes of delay [18]. Singh et al in their study collected feedback from contractors and consultants, which was later analyzed using the (RII). Time overrun has been experienced by greater than 55 % of projects in 2013 in India [19]. By targeting 100 project manager, causes and costs overrun and their findings showed that most of the delays in the Oman project were due to the inability of the client (28.57 %) to make decisions and include a change in scope. Initial design change (17.14 %) was also shown to be the second highest in project determination and followed by the payment delay (14.29 %). Low issue of bids due to the client and deficient drawings was considered one of the leading causes for consultant-related cost overrun [20]. The study conducted in Macca city of KSA (Kingdom of Saudi Arabia), the result of study showcased six significant factors that contributed to delays which were changes in design documents, difficulties in financing projects by contractors, low task-work level of labour, scarcity of manpower, poor contract management, and unqualified workforce [21].

The study aimed to develop the planning and the procedures using the critical factors for delays in public construction projects in the KSA. The study had an employed dataset derived from an interview survey involving some 450 project owners and developers of private residential houses structures delays in KSA [22]. A study was carried out in Turkey based on the questionnaire and personal interviews in construction industries as well as using the available literature extensively. The study identified/calculated and considered the highest 20 delay causes and the lowest 20. In the study, it was found that most of the reasons for the delay were related to the owner's financial problem, the inadequate experience of the contractors, shortage in construction materials, and shortage & breakdown of equipment and due to lack of maintenance [23]. The Delay Analysis Techniques (DATs) were used during research in their study. 76 % of the contractors and 56 % of the consultants stated that the average delay in time lied in the range of 10 % to 30 % of project duration [5]. The study stated to reduce delay the financial issues should be given the highest importance by confirming an efficient mechanism of making appropriate payment from the client to the contractor, from contractor to sub-contractor, and to suppliers and staff [24]. Oman's construction industry is the backbone of the country's economy. As per study conducted on the delayed projects in Oman, main pressure has appeared after several foreign workers left the country because of repeated government initiatives of replacing them with the locals [25]. Proper control of time, financial, manpower, work scope, can minimize the construction delay. The owner is trying to control its contractor through the weekly schedule. Effective detailed and careful planning can control the time and the financial issue can be managed by proper payment to the labourers and contractors on time [26]. Frequently construction delays may cause by several parties: contractor, owner, or other parties. In their study, they conclude that different analysis produces different results for some exited schedule delay [27]. As per the report by Deloitte, Covid-19 does not stop work altogether, but work will likely be costlier and take more time. Significant steps can be taken by shareholders, vendors, subcontractors, and suppliers to improve the construction to avoid further delay [28].

2. Materials and methods

2. 1. Identifying the factors responsible for construction delay

To study the factors responsible for construction delay, their causes, and effect, it is imperative to emphasize the various factors that may have an impact on the country's construction delay especially due to health and safety and COVID-19. A total of 60 factors were identified after an extensive literature review that may cause a delay in construction projects and a total of 5 factors were identified which affects the progress of work, around 4 factors were identified which are helpful for effectively minimizing construction delay. Also, mainly 5 factors that cause delay because of Covid-19. Moreover, a total of 60 causes of delay factors attributes were identified under ten broad categories [29]:

1. Project characteristics, necessary variations, lack of coordination and communication among the various parties, speed of decision making involving all project teams, and ground conditions.

2. The delays due to owner related issues are client characteristics, payment delay by the client, initial design altered by the client, delaying in deciding by the client, financial problems faced by the client, and lowest price bid issuance.

3. Design team/Consultant related factors consist of design team skills, inadequate design, incomplete drawing details, delayed approval, inadequate project management assistance, and inaccurate site investigation.

4. Contractor related issues are inadequate contractor's experience in planning and controlling the projects. Shortage of experienced professionals and workers, Scarcity of workers, Inadequate site management and supervision, Delayed delivery of materials, Late payment of suppliers and sub-contractors and cash flow, conflict with sub-contractors, inaccurate time estimating.

5. Project Management related issues are like neglecting safety regulations, and arbitration fluctuation in rules and regulations likely total eight issues.

6. Materials factors' causes included, shortage of materials, imported construction materials, materials changes, procurement programming, appreciation of material prices, percentages of cast-in-situ, and precast work.

7. There are a total of six labor factors that causes the delay.

8. Plants and equipment related five factors contribute to the delay in project.

9. External factors comprise those such as, problems with land conflict issues, political stability, cultural matters, issues with the neighbors, extreme climate effect, changes in rules and laws.

10. Health and safety factors which are compensation benefit premium, property shortfall, accident cost, returned workers and the workforce slashed productivity, clean-up costs replacement costs, stand-by costs, cost of overtime, and administrative costs.

Part two includes the effects of project delay they are, time overrun, cost overrun, dispute, Arbitration, litigation, total abandonment, and all the factors. Part three includes. The last part of delay causes which are due to Covid-19 are supply chain disruption, labor chain, claims due to delays and cost overturn and consider contractor claims for time extensions and delay damages.

2. 2. Questionnaire Design

The research methodology of the study is depending upon the identification of the main causes of construction delay and their effect through the extensive literature survey. Also, four factors were identified which will minimize the delay. A questionnaire was prepared and floated among the owner, the engineers, and the foreman in the Public and Private sectors of the Oman Construction Industry to get their insight on the problem. The analysis was carried out on the collected feedback to identify the most important causes and their effects and remedial measures to minimize the construction delay and their effect. The questionnaire survey was floated to investigate the major factors which cause the slowdown of projects and their effects on the construction industry in Oman. To ensure the response of the respondent, proper administration was done. The Google form was used to conduct the study [30].

2. 3. Method used for Data Analysis

(1) is used to calculate the Cronbach alpha value to check and analyze the internal consistency of the data Cronbach's alpha method:

$$\propto = \frac{k}{(k-1)} 1 - \left(\frac{\sum Vi^2}{Vx^2} \right), \quad (1)$$

where k – the number of items; Vi – the variance of scores on each item; Vx – the variance of the observed total test scores. SPSS V26 was used to compute Cronbach's alpha [28]. The range of Cronbach's alpha value lies between 0 to 1. A value close to 1, signifies high reliability on the scale. The interrelation of the Cronbach's alpha value and internal consistency is shown in **Table 1** [31].

The Relative Importance Index (RII) is picked as an analytical method used to establish a mean rating point by analyzing the rating given by the respondent in each group of questions [29]. (2) is used to compute the responses for every single cause and to calculate the average value and fixed the ranking accordingly to each cause [32].

$$RII = \frac{\Sigma W}{AxN}, \quad (2)$$

W – respondent weightage to each element; A – maximum weightage; N – total number of repondents. Value of W maybe 1 which represents 'not significant' 2 represent 'slightly significant', 3; 'moderately significant', 4 stands for 'significant' and 5 represent 'strongly significant'. The maximum value of A is considered '5' in this work. The RII values are converted into five important levels as shown in **Table 2** [31].

Table 1
Relationship between the Cronbach's alpha value and internal consistency [31]

Cronbach's alpha value (α)	Internal consistency
α ≥ 0.9	Excellent
0.9 > α ≥ 0.8	Good
0.8 > α ≥ 0.7	Acceptable
0.7 > α ≥ 0.6	Questionable
0.6 > α ≥ 0.5	Poor
0.5 > α	Unacceptable

Table 2
Relationship between the RII values and importance levels [31]

RII Values	Importance Level
1.0 ≥ RII ≥ 0.8	High (H)
0.8 > AV ≥ 0.6	High-Medium (H-M)
0.6 > AV ≥ 0.4	Medium (M)
0.4 > AV ≥ 0.2	Medium-Low (M-L)
0.2 > AV ≥ 0.0	Low (L)

The high level of importance was lying in the range of 0.8 to 1.0 whereas the low importance level ranges from 0 to 0.2 of RII.

3. Results and Discussion

3. 1. Sample Characteristics

The designed questionnaires were sent to 55 Omani construction industries, client contractors, and consultants, and a duly completed questionnaire form was submitted by 31 respondents. The demographic data for the study is collected from a group of respondents in which 54.8 % age group is below 35 years which followed by 25.8 % of the age group lies between 36–44 years.

The highest respondent (48.39 %) are the contractors who are followed by the consultant (25.81 %) with minimum (3.23 %) participation of supervisor as shown in **Fig. 1**. From the analysis of the collected data, the majority (54.84 %) of the respondents were working as a contractor, followed by a consultant (19.34 %) as shown in **Fig. 2**. **Fig. 3** illustrated that 41.94 % of the respondent are having a bachelor's degree. **Fig. 4** illustrated the years of experience of the respondent which showed most of the respondents (35.48 %) were having 0–3 years of experience which followed by 4–7 years which is 32.26 %. As per **Fig. 5**, 83.9 % of the project were delayed less than two years only, followed by 3–4 years delayed (12.4 %) and the maximum delayed are 3.2 % only which was 7–8 years. The majority (35.5 %) were involved in the residential project which was followed closely (32.2 %) by the commercial projects as depicted in **Fig. 6**. The highest number (64.5 %) of respondents carried out private projects, whereas (22.6 %) were involved in public projects in their last project as given in **Fig. 7**.

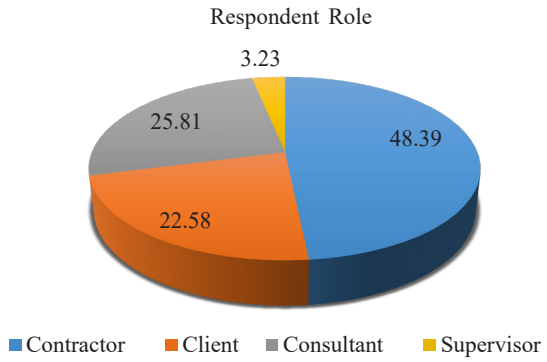

Fig. 1. Respondent role

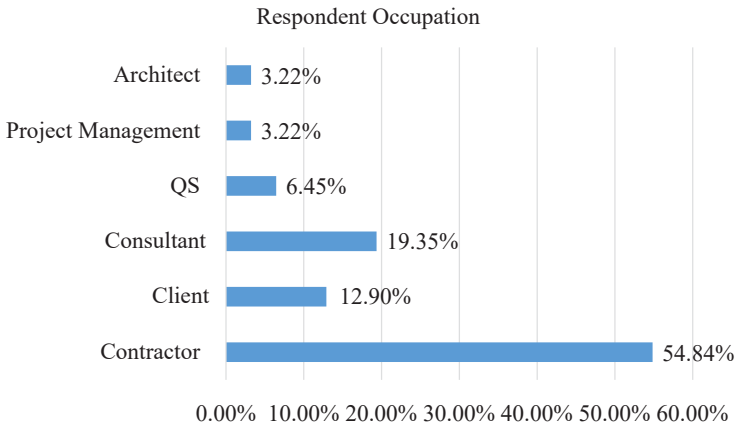

Fig. 2. Respondent occupation

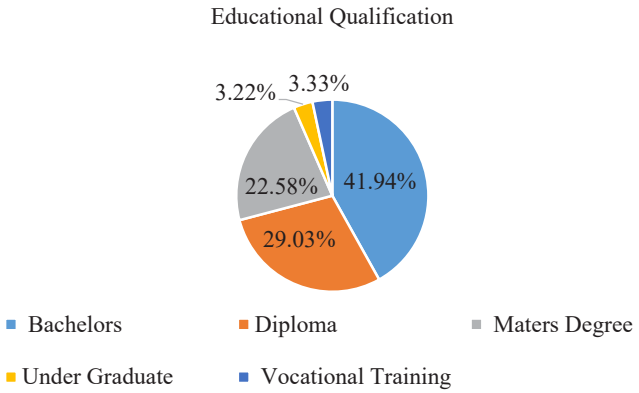

Fig. 3. Educational qualification

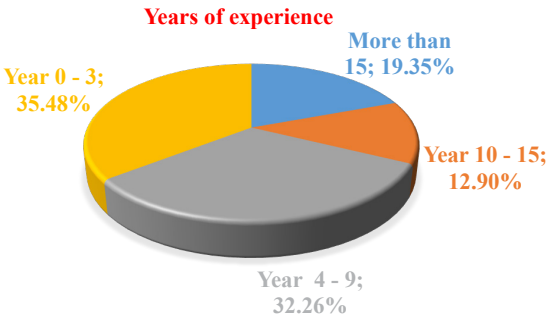

Fig. 4. Years of experience

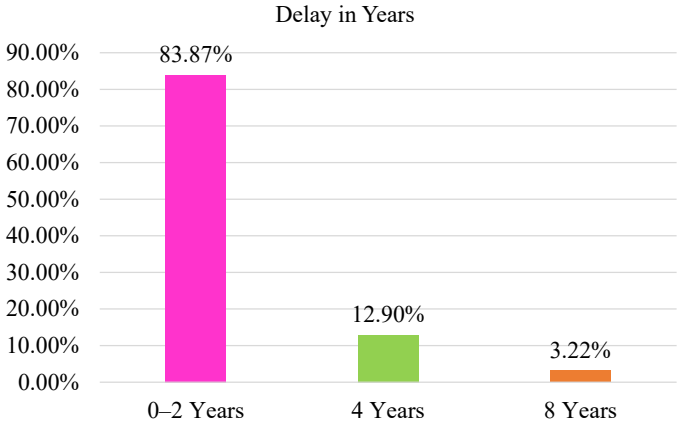

Fig. 5. Years in delay

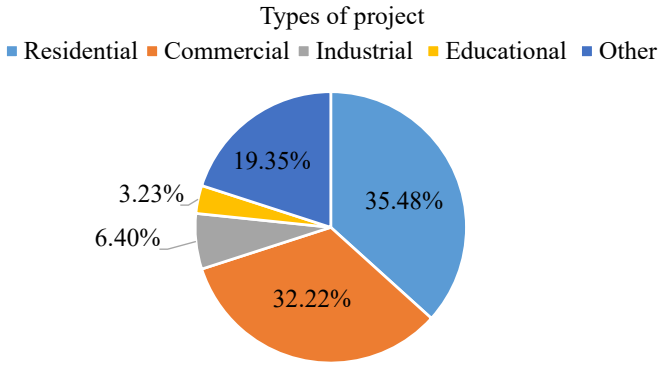

Fig. 6. Type of the project

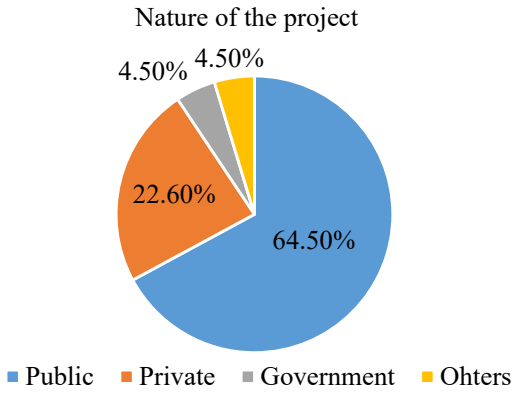

Fig. 7. Nature of the project

The responses were analyzed by using SPSS 26 software to determine the internal consistency and to ascertain the reliability of the created level used in the questionnaire used for the study.

3. 2. Reliability of the questionnaire

Cronbach's alpha values computed for each group factor lowering the pace of the construction project are tabulated in **Table 3**. Cronbach's alpha value for different construction delay factors is shown in **Table 3**.

The value of Cronbach's alpha value lies between 0.81 to 0.96 suggests that the scale is reliable for use in the current work. All reliability coefficients lie in the range of good and excellent and the internal consistency of the factors included in the scale is 'satisfactory' based on the results of the reliability analysis.

Table 3
Cronbach's alpha values

C&D factors group	Number of questions	Cronbach's alpha value
General factors responsible	5	0.81
Client-side related delay factors	7	0.89
Design team related delay factors	6	0.87
Contractor related delay factors	7	0.92
Project Management related delay	8	0.93
Materials related delay issues	5	0.86
Labor related delay issues	6	0.91
Equipment-related delay issues	4	0.93
External delay factors	6	0.96
Health and safety	6	0.95
Effect of project delay	5	0.89
Covid-19	4	0.83

3. 3. Ranking Analysis

RII were computed using (2). The average rating, relative importance index, ranking by category, overall ranking, and importance level for each construction delay factor is categorized into three main groups, group one consists of 10 sub-groups, namely general factors, client-related, design team, contractor, project management, materials, labors, equipment, external factors, and health and safety also Covid-19 delay. Group two is about the effect of delay on the project and group three is delay minimization related factors, as well as period of delay, were also presented in **Table 4**.

Table 4
Ranking of factors that may create construction delay

Categories	Factors	Average value	RII	Impor-tance level	Ranking by categories	Overall ranking
	Causes of construction delay					
1	2	3	4	5	6	7
General delay factors	Project characteristics	2.84	0.57	M	4	29
	Necessary variations	3.71	0.74	H-M	1	7
	Lack of coordination and communication among the various parties	3.58	0.72	H-M	2	11
	Speed of decision making involving all project teams	3.71	0.74	H-M	1	7
	Ground conditions	3.19	0.64	H-M	3	19
Client/owner-related issues	Client characteristics	3.06	0.61	H-M	6	22
	Payment delay by the client	3.71	0.74	H-M	4	7
	Initial design altered by the client	4.29	0.86	H	1	1
	Delaying in deciding by the client	4.06	0.81	H	2	2
	Scope change by the client	4.06	0.81	H	2	2
	Financial problems faced by the client	3.81	0.76	H-M	3	5
	Lowest price bid issuance	3.68	0.74	H-M	5	8
Design team-related/consultant factors	Design team experience	2.71	0.54	M	5	32
	Poor design	2.71	0.54	M	5	32
	Incomplete drawing details	2.97	0.59	M	1	25
	Delayed from approval	2.9	0.58	M	2	27
	Inadequate project management assistance	2.84	0.57	M	3	29
	Inaccurate site investigation	2.77	0.55	M	4	30

Continuation of Table 4

1	2	3	4	5	6	7
Contractor-related issues	Inadequate contractor's experience in planning and controlling the projects	3.23	0.65	H-M	7	18
	Shortage of experienced professional and workers	3.42	0.68	H-M	6	15
	Scarcity of workers	3.81	0.76	H-M	1	5
	Inadequate site management and supervision	3.68	0.74	H-M	2	8
	Delayed delivery of materials	3.61	0.72	H-M	4	10
	Late payment of suppliers and sub-contractors and cash flow	3.65	0.73	H-M	3	9
	Inaccurate time estimating	3.55	0.71	H-M	5	12
Project management-related factors	Neglecting safety regulations	2.68	0.54	M	8	33
	Arbitration slowness in decision making	2.94	0.59	M	7	26
	Time overrun Contractor's poor site management	3.52	0.7	H-M	4	13
	Time overrun, poor project management	3.42	0.68	H-M	6	15
	Time overrun Contractor's improper planning	3.68	0.74	H-M	2	8
	Time overrun problems with sub-contractors (lack in controlling sub-contractors)	3.74	0.75	H-M	1	6
	Time overrun, project schedule changes	3.45	0.69	H-M	5	15
	Time overrun, futile planning, scheduling, controlling and quality monitoring	3.55	0.71	H-M	3	12
Materials-related factors	Shortage of materials	3.42	0.68	H-M	3	15
	Materials changes	3.68	0.74	H-M	1	8
	Procurement programming	3.55	0.71	H-M	2	12
	Appreciation of materials prices	3.32	0.66	H-M	4	17
	Percentage of cast-in-situ and precast work	3.13	0.63	H-M	5	20
Labour-Related issues	Low skill levels	3.52	0.7	H-M	4	13
	Low productivity	3.61	0.72	H-M	3	10
	Labor shortage	4	0.8	H-M	1	3
	Bad facilities	3.68	0.74	H-M	2	8
	Low motivation/Moral	3.35	0.67	H-M	6	16
	Absenteeism	3.45	0.69	H-M	5	15
Equipment-related issues	Shortage of equipment	3.55	0.71	H-M	1	12
	Poor maintenance of equipment	3.23	0.65	H-M	3	18
	Low efficiency of the equipment	3.19	0.64	H-M	4	19
	Insufficient contemporary equipment	3.42	0.68	H-M	2	15
External factors	Land conflicts issues	2.74	0.55	M	5	31
	Political stability	2.77	0.55	M	4	30
	Cultural matters	2.65	0.53	M	6	34
	Issues with the neighbors	2.84	0.57	M	3	29
	Extreme climate effect	3	0.6	H-M	2	24
	Changes in rules and laws	3.35	0.67	H-M	1	16

Continuation of Table 4

1	2	3	4	5	6	7
Health and Safety-related factors	Compensation benefits premium	2.87	0.57	M	5	29
	Property shortfalls	2.87	0.57	M	5	28
	Accident cost	3.1	0.62	H-M	2	21
	Returned workers and the workforce slashed productivity	3.13	0.63	H-M	1	20
	Clean-up costs	2.9	0.58	M	4	27
	Administrative costs	3.03	0.61	H-M	3	23
Effects of project delay	Times overrun	3.84	0.77	H-M	2	2
	Cost overrun	3.87	0.77	H-M	1	1
	Dispute	3.52	0.7	H-M	3	3
	Arbitration	3.39	0.68	H-M	4	4
	Total abandonment	3.39	0.68	H-M	4	4
Covid-19 factor	Supply chain	3.55	0.71	H-M	1	12
	Labour shortage	3.52	0.7	H-M	2	13
	Claims due to delays and cost overturn	3.13	0.63	H-M	3	20
	Consider contractor claims for time extensions and delay damages	3.52	0.7	H-M	2	13
Duration of the project before Covid-19	1 Year	1.77	0.35	M-L	1	NA
	1.5 Year	1.45	0.29	M-L	2	NA
	2 Year	0.48	0.10	L	4	NA
	2.5 Year	0.48	0.10	L	4	NA
	> 3 Years	0.81	0.16	L	3	NA
Deadline of finishing during Covid-19	Yes	4.19	0.84	H	1	NA
	No	0.81	0.16	L	2	NA
Months delayed	0 < 3 Months	0.65	0.13	L	3	NA
	3–6 Months	2.42	0.48	M	1	NA
	6–9 Months	1.29	0.26	M-L	2	NA
	9–12 Months	0.65	0.13	L	3	NA
Minimization of delay	Control of cost	0.97	0.19	L	3	37
	Control of finance	0.32	0.06	L	4	38
	Control of Management	2.26	0.45	M	1	35
	Control of time	1.29	0.26	M-L	2	36

* *NA = Not Applicable*

Based on the ranking results as tabulated in **Table 4**, three factors have a «High» significance level for construction delays. These factors were related to «Client related issues only» in which the initial design was altered by the client, delaying in deciding by the client and, scope change by the client. Further, the fifty factors belong to the «High-Medium» ranking category are subdivided into 4 general delay factors, 4 client-related factors, all 7 contractors related factors, 6 project management factors, all 5 Materials related factors, All 6 labour-related factors, all 4 equipment-related factors, 2 external factors, 3 health-related factors. All five effects of project delay as well as all four Covid-19 factors fall under these categories. The remaining seventeen factors have «Medium» importance levels which fall under categories of 1 general team, 6 design team, 3 project management, 3 external factors, and 4 health and safety factors. As stated in **Table 4** maximum projects (35.48 %) were started a year before Covid-19 and 29.03 % of projects started before 1.5 years of Covid-19. Total 84 % of the

project are having deadlines during the Covid period, out of that 48.39 % of the project delayed for 3–6 months which followed by 25.81 % which delayed 6–9 months. In this study, 45.16 % of the respondent stated delay can be minimized by control of Management which is followed by control of time.

3. 4. Limitations of the study

A global pandemic Covid-19 hits badly construction industries in the world in general and Sultanate of Oman in particular, limiting job opportunities and creating new challenges. This was aggravated by the travel bans and restrictions throughout the world. This research has provided a new point of view and evidence on the most important delay causes and effects. Because of lockdowns during pandemic, it was difficult to physically meet the respondents to explain them about the seriousness of the study and managed only through social media and e-mails. This was resulted in a smaller number of respondent than expected. Analysis of more responses may result in much clear picture of the factors driving the delays during the pandemic time.

4. Conclusions

This study aims to identify the factors which cause and effects delays in the construction work of the Sultanate. An extensive literature review was carried out and a questionnaire survey was distributed among the group of experts working in the role of Contractors, Engineers, Quantity Surveyors, Architect, and Project managers in different construction companies in the Sultanate of Oman. Three «High Significant', causes of delay have been identified due to client-related factors. 'Initial design altered by the client', 'Delaying in deciding by the client' and 'Scope change by the client' are ranging from the average value of 4.09 to 4.26 and placed in the 'High importance' category and ranked from 1 to 2. These factors are obviously having high impact as they are related with the client who may wish to change design, material or construction at any point of time during the project and holding the financial implications of the project. Time overrun, cost overrun, dispute, arbitration and total abandonment have been identifying to which was equally affect the construction projects. The Management of control of time has been identified as a major factor for minimizing the delay.

Conflict of interest

The authors declare that there is no conflict of interest in relation to this paper, as well as the published research results, including the financial aspects of conducting the research, obtaining and using its results, as well as any non-financial personal relationships.

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