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Importance of the Factors Affecting the Delays in the Projects of Construction of Collective Housing in Algeria - Program Rent-Purchase

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Abstract: Faced with rapid urbanization and increasing demographic pressure on Algerian cities, housing policy in Algeria has evolved considerably over the past twenty years. However, the construction process is subject to many variables and unpredictable factors, which result in delays in project completion. It is therefore essential to identify and evaluate the relative importance of the main factors affecting delays in collective housing construction projects according to the vision of professionals and experts established in Algeria. Indeed, we focus our attention on the point of view of clients, consultants, designers and contractors to assess the relative importance of 67 delay factors. In total, 37 valid responses were analyzed and ranked. The results indicate that the 5 most important causes are Delay in payment of performed work, Shortage in skilled workers, Bureaucracy in public administrations, Delay in the provision of on-site public services and difficulties in financing the project by contractor. This study is hoped to help the practitioners to implement the mitigation measure at planning stage in order to achieve successful construction projects.

Keywords: Construction, Time overrun, Project, Management, Collective housing, Algeria

Introduction

Although projects are routinely conceived to operationalise strategic goals or to meet operational needs. Consequently, projects contribute to the operational and financial success of the organization (Anantatmula & Rad, 2018). Nevertheless, delays are inevitable in construction and are considered by the construction industry to be expensive, complicated and risky. Thus, construction delays have to be resolved promptly by apportioning the liabilities among the parties fairly and appropriately (Perera, 2019). For this reason, a plethora of studies have addressed the issue of project delay and identified its main causes according to country, region, project type and procurement methods, as well as from the perspectives of various stakeholders (Durdyev, 2018). In most developing countries, the biggest customer of the construction industry is the government and the procurement strategy adopted is the traditional contract in which the contract is awarded to the lowest bidder. This has led to significant delays resulting in overruns in initial time and cost estimates in the majority of projects (Ramanathan, 2012).

In Algeria, the owner-related causes are the most severe and important sources of delay (Zemra, 2019). Algeria's housing policy consists in generalizing the right of ownership of family housing. The Programme Rent-Purchase projects are awarded to design and build companies that are selected from a shortlist of companies approved by the Ministry of Housing that are generally good performers. Substantial investment of 3,500-4,500 billion DZD (32-41 billion USD) was committed to the various government housing programs during the 1999-2019 budget periods, but only 3.1 million of the planned 5.5 million units were actually built and delivered.

Our research aims to provide insights that can enrich previous work on the risk events related to delays in public housing construction projects in Algeria.

Literature Review

Several researchers have carried out literature reviews to provide an updated compilation of previous studies on the ranking of causes of delay. In order to identify a universal set of causes of delay that affect the performance of construction projects, (Durdyev &. Hosseini, 2018) presented a systematic review of studies published between 1985 and 2018. A total of 149 causes of delay were identified in an in-depth review of 97 selected studies. However, the results reveal that there are common causes that have been reported by the majority of researchers in this field. Thus, due to the concentration of resources on the most damaging causes, only the ten most frequently cited causes were considered and discussed in depth: Weather/climate conditions; poor communication, lack of coordination and conflicts between stakeholders; ineffective or improper planning; material shortages; financial problems; payment delays; equipment/plant shortage; lack of experience/qualification/competence among project stakeholders; labour shortages, and poor site management.

Ramanathan, et al. (2012) concluded that none of the studies are comparable to another and each study has a different ranking for the groups/categories/sources/factors/causes of delays and cost overruns. The groups most influential in earlier studies (in 1995) are now (2010) not considered high risk factors. The possible variations in the ranking results are most unlikely to be because of the different respondents. It would therefore appear that the groups and factors causing delays are country, location and project-specific and that there are no root causes that can be generalised.

Durdyev, et al (2017), investigated the key causes of delays, which are specific to the operational and socio-cultural context of the Cambodia's residential building sector. Results showed that the most 10 influential factors agreed by the contractors and consultants as the main causes of project delays are : shortage of materials on site ; unrealistic project scheduling ; late delivery of material ; shortage of skilled labour ; complexity of project ; labour absenteeism ; rain effect on construction activities ; design changes ; delay by subcontractor, and accidents due to poor site safety. It was recommended that construction frontline players should focus their efforts on the identified key factors in relation to their magnitudes of influence, which will ultimately lead to the on time project completion.

Ariffin et al. (2018), showed that weakness in management by developer and financial crisis are the main factors leading to the abandonment of housing project in Malaysia. Based on real data from projects in Egypt, Saudi Arabia, the United Arab Emirates and Qatar, Badawy et al. (2020), concluded that the cost of late payments in residential buildings can be estimated considering the total value of the contract, the duration of late payments, and the total project duration.

Aiyetan and Dillip (2018), indicated that the shortage of skilled labourers affects significantly the quality of work, causing rework and low productivity, followed by construction delays of projects in the Eastern Cape Province of South Africa. The strategies to improve the availability of skilled labourers were suggested namely: enhancing investment in labour wages ; investing in talent management and staff development programmes, and ensuring a better work environment with improved health and safety.

Research Methodology

This section is devoted to the precise definition of the initial causes that could defeat the project objective. These causes were identified through an extensive review of previous literature and a real exchange with experts in the construction industry. The specific research method aims to collect data from a large sample, it includes an online questionnaire in Google Forms, it has a practicality and relative simplicity, as all returned answers can be easily analyzed. The questionnaire included an ordinal measurement scale (Likert scale) ranking the level of importance of each identified risk in an "ascending" order from 1 to 5.

Finally, the evaluation consists of quantifying the probability of occurrence of each identified risk and estimating the severity of the consequences on the project objectives. The combination of these two parameters is used to measure and judge the criticality of an identified risk in relation to the others. The analysis of survey is done by Relative Importance Index (RII) of each cause. The following formulas were used to calculate the different indexes (Zemra et al. 2018).

Frequency Index

$$F = \frac{1}{4} \times \sum_{i=1}^{5} Wf_i \times \left(\frac{n_i}{N}\right) \times 100(\%) \quad \text{.....(1)}$$

where Wfi is the constant weighting given to each response (0 for Not relevant up to 4 for Always), ni is the frequency of the ith response and N is the total number of responses.

Severity Index

$$S = \frac{1}{4} \times \sum_{i=1}^{5} Ws_i \times \left(\frac{n_i}{N}\right) \times 100(\%) \quad \text{..... (2)}$$

where Wsi is the constant weighting given to each response (0 for Not relevant up to 4 for Extreme), ni is the frequency of the ith response and N is the total number of responses.

Relative Importance Index

$$R = [F\ (\%) \times S(\%)] \div 100(\%) \text{..... (3)}$$

Results and Discussion

The ranking indexes of frequency, severity and relative importance were used to rank delay causes from the viewpoint of respondents. In order to analyse the delay causes, Table 1 shows the importance index of each cause and the rank of the top 10 causes in the overall ranking obtained from the combined data of the all respondents.

Table 1. Ten most important causes

ID	Description of delay causes	Index	Rank
C43	Delay in payment of performed work	59,49	1
C9	Shortage in skilled workers	56,25	2
C6	Bureaucracy in public administrations	52,43	3
C4	Delay in the provision of on-site public services	50,09	4
C52	Difficulties in financing the project by contractor	49,94	5
C50	Slow variation orders in extra quantities	49,72	6
C11	Lack of qualified professionals in construction project management	49,65	7
C55	Ineffective planning and scheduling of project by contractor	49,27	8
C34	Work start before completion of the execution study	49,19	9
C54	Poor site management and supervision by contractor	48,75	10

The sources of each cause of delay are summarised below :

1- Delay in Payment of Performed Work :

The funding logic of the public authorities, which is focused on the social sector but in an excessive manner, makes the economic logic absent in their behaviour. This has put the administration on projects of intention or declaration rather than on real projects which must be technically prepared, programmed and budgeted both financially and in time.

2- Shortage in Skilled Workers :

The status of skilled labour in the public housing sector has not been considered at all levels, especially in terms of remuneration, working conditions, retraining and especially further training. Moreover, this category is involved in both private and self-employed work.

3- Bureaucracy in Public Administrations :

The public authorities have remained in a logic of a state that distributes rent, although the context has changed and the administration is no longer that authority of public sense, synonymous with spending. Now, value is created by people who work, setting clear rules and ensuring the equality of actors that is something concrete and not a speech. Social pressure is now present, but leaders must make decisions on a technical and political level.

4- Delay in the Provision of on-Site Public Services :

Lack of knowledge of the legislation in terms of economy or technical regulations by the implementing body. We find ourselves, therefore, with an administration that responds as many times differently as there are situations.

5- Difficulties in Financing the Project by Contractor :

The lack of rationalisation of the budgetary choice accounts for the importance of the deviation of the results from the target. There is an efficiency problem. The strongest signal is that the exchange rate is not stable and that a bureaucratic administrative staff is given responsibility for designing and controlling economic projects.

6- Slow Variation orders in Extra Quantities :

Prices are capped and short deadlines are imposed on companies in favour of free market rules. However, the housing programmes are not precisely defined and evaluated, and in fact, during the course of the project, the expenditure is re-evaluated and revised, and as a result, the budget is systematically increased, thus increasing the budget deficit.

7- Lack of Qualified Professionals in Construction Project Management :

Sometimes political influence plays a big role, especially when a situation requires an emergency call to save the situation. In addition to the rationalisation of technical choices, the competences of certain institutions such as independent experts and assistants to the project owner should be associated in terms of control and strength of proposal, and also in making recommendations to be taken up by the executive.

8- Ineffective Planning and Scheduling of Project by Contractor :

The resources actually implemented are different from the resources foreseen by the planning tools, so constraints due to problems of availability of building land, sufficient financial resources, qualified personnel and the choice of competent companies as well as the suitability of the project environment are not taken into account in the planning phase.

9- Work Start before Completion of the Execution Study :

Social pressure forces the administration to announce the start of a project before the execution files have matured, the project lacks technical preparation, as well as programming and budgeting, both financially and in time.

10- Poor Site Management and Supervision by Contractor :

Use of obsolete means and methods, Lack of internal control on site and Execution of all lots by the general contractor rather than engaging subcontractors in the different phases of the project in an official manner.

Conclusion

This study was conducted to identify and evaluate the relative importance of the main factors affecting delays in collective housing construction projects. Sixty-seven delay causes were identified through a comprehensive literature survey and considerable contributions of construction experts and professionals established in Algeria.

The specific research method aims to collect data from a large sample, it includes an online questionnaire in Google Forms, we focus our attention on the point of view of clients, consultants, designers and contractors to assess the relative importance of 67 delay factors. In total, 37 valid responses were analyzed and ranked.

The results indicate that the 10 most important causes are Delay in payment of performed work, Shortage in skilled workers, Bureaucracy in public administrations, Delay in the provision of on-site public services, Difficulties in financing the project by contractor, Slow variation orders in extra quantities, Lack of qualified professionals in construction project management, Ineffective planning and scheduling of project by contractor, Work start before completion of the execution study and Poor site management and supervision by contractor.

A number of measures to mitigate the causes of delay were recommended following feedback from respondents in order to achieve successful construction projects.

Recommendations

In order to rationalise both the budgetary and the technical choice, one must work on a housing programme which should be identified and evaluated in a precise manner, and for which one should monitor the execution and estimate the rate of achievement of the objectives in terms of improving the social situation of society and trying to improve the efficiency of public expenditure.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPSTEM journal belongs to the author.

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