

Causes of Delays in Construction Projects in Many Developing Countries

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الخلاصة:

يعتبر التأخير في إنجاز مشاريع البناء في البلدان النامية من أكثر المشاكل شيوعاً والتي تواجه قطاع البناء والتشييد المحلي والدولي على حد سواء. وتؤثر المشاكل التي تؤدي إلى تأخير تنفيذ الأعمال في مشاريع البناء الدولية تأثيراً سلبياً على مختلف القطاعات الحيوية بما في ذلك اقتصاد تلك البلدان. إن الأسباب الرئيسية لتأخير مشاريع البناء قابلة للمقارنة فيما بين البلدان النامية. وبناء على ذلك تم الاستناد في هذه الدراسة على مسح استقصائي لدراسات سابقة، ومن ثم أجريت مقارنة بين ستة بلدان نامية من مختلف دول العالم وتم دراسة حالة لدولة أخرى من أجل توضيح أسباب وآثار التأخير في مشاريع البناء والتشييد في العديد من البلدان النامية. وعلى الرغم من أن هناك العديد من الأسباب التي قد تقود إلى التأخير إلا أن نتائج هذه الدراسة أظهرت أن هناك عشرة أسباب رئيسية وتمثل في: تغيير التصميم والمواد، الافتقار إلى إدارة الموقع، نقص الخبرة لدى المتعاقدين من الباطن، المشاكل المالية المتعلقة بالمقاولين، مشاكل التقديرات، تأخر المدفوعات من جانب المالك، ضعف عملية تخطيط المشاريع من قبل المقاول، تأخير وثائق التصميم، الافتقار لإدارة العقود من قبل الاستشاريين، وكذلك ضعف التنسيق بين الأطراف في الموقع. وعلاوة على ذلك تؤكد النتائج أيضاً أن هناك ستة آثار سلبية كبيرة ناتجة عن عملية التأخير، تتمثل في تجاوز الوقت، تجاوز التكاليف، النزاعات، التحكم، التقاضي، والتخلي الكلي أو التام. وتختتم هذه الدراسة ببعض التوصيات لكل من المقاول والمالك بناءً على المشاكل والأسباب التي تم تناولها والتي تؤدي إلى التأخير في مشاريع البناء.

ABSTRACT:

Delays of construction projects in developing countries are one of the most common problems facing both local and international construction sector alike. Problems that lead to delays of works completion in international construction projects affect negatively on various vital sectors including the economy of those countries. The main causes of construction delays are comparable across developing countries. Consequently, this study is based on a literature survey, comparison conducted among six developing countries around the world and case study analysis in order to demonstrate causes and effects of delays in construction projects across many developing countries. Although, there are many causes may lead to delays, the results of this study showed that there are ten main causes including: change in design and material, lack of site management, lack of experienced subcontractors, financial problems contractor-related, problems of estimation, delay of payments by client, weakness of project planning process by contractor, delay of design documents, lack of contract management by consultant and poor coordination among the parties in site. Furthermore, the findings also confirm that there are six major negative effects of delay including time overrun, cost overrun, disputes, arbitration, litigation and total abandonment. This study concludes with some recommendations for both contractor and client in light of the problems and causes that have been addressed which lead to the delays in construction projects.

Keywords: Construction Projects, Developing Countries, Delay.

1. INTRODUCTION:

Most developing countries still suffer from the problem of delays in construction projects to date. There are many problems and causes that may lead to delays in construction projects in developing countries. Once the delay of works completion in construction project takes place, many negative effects appear successively. For instance, the project budget that has been allocated at the beginning will be overrun also the expected income that can be gained with the project facilities

will be delayed [4]. Construction domain in developing countries is one of the most vital sectors that plays very significant role in economy [1]. All construction projects are restricted by scheduled contracts for many reasons including completion in time. Nevertheless, Delays in international projects in many developing countries are a common issue in particular in construction sector. The main objective of this study is illustrating the most common problems, causes and factors that cause delays in international construction projects in developing countries. Besides, the negative consequences of delays are also presented in this study.

2. LITERATURE REVIEW :

One of the first studies that concentrated to the causes of delays in construction projects has been conducted early in 1971 in USA by Baldwin and Manthei. 17 factors lead to the delays in construction projects in the US have been addressed in that study. After that in 1985 the other study conducted by Arditi et al. cited a number of causes that resulted delays in construction projects in Turkey. The causes involved difficulties of receiving payments from agencies, lack of materials, difficulties facing contractors and the organizational characteristics of contracting firms and public agencies. Nevertheless, related studies that have been published during the last two decades presented most causes, groups of factor and problems that lead to delays and its negative influences in construction projects in developing countries [8]. There are many research studies have been conducted to examine the issues that related to the causes of delays in construction projects especially in developing countries. Strategies that followed in most studies involved questionnaire approach and sometimes interviews in order to reach the real problems that cause delays in construction projects. Several studies found that most problems causing delays in various developing countries somewhat are similar. Nevertheless, most research studies that have been conducted across both developing and developed countries emphasise that there is a similarity among several problems causing delays in construction projects. These problems might include a complexity of construction and lack of professional human

resources and design [8]. In this study, related literature has been reviewed to determine common causes of delay in construction projects in most developing countries.

2.1 Common Problems Causing Delays in Most Developing Countries:

This part of the study concentrates on the most common significant problems that may cause delays based on the relevant literature. As mentioned earlier that many problems of delays across different developing countries are somewhat identical. The following points represent the most of those problems that may lead to the delay according to several studies [8].

- Shortage of resources
- Lack of experienced subcontractors and nominated suppliers
- Poor management, particularly the contractual management
- Changing in orders
- Imperfections in regulation of public agencies
- Shortage of appropriate communication
- Delay of design
- Insufficiency of site planning and control
- Misjudgement in estimating resources
- Imperfections in project planning and scheduling [8].

Considering that the above points represent the common problems leading to the delays in construction projects in developing countries, the lack of resources is the first and most significant cause. No doubt that any construction project needs resources to begin including the most three important ones, finances, material and labour. This means that once there was a lack in resources, the project will suffer many issues from the initial phases. Nevertheless, each problem mentioned above plays very important role in the time extension of construction project along the stages of implementation. For instance, despite the problem such as changing of orders might be at the any phase of project, this change may cause delay as long as it is unexpected. The other significant problem is the poor contractual management. This problem may cause many negative results along the implementation phases of project because of mismanagement. Mismanagement might result in

non-compliance with the terms of the contract and breach of its terms and therefore this will lead to delays.

2.2. Emergent Problems:

In addition to the above, according to several research studies that published in the first half of the past decade, there are some emergent problems that may cause delays in construction projects in developing countries [8]. These emergent issues can be included in the following points:

- Shortage of experience of contractor
- Slowness of decision-making process (client-related)
- Shortage of owner's experience
- Rise in prices of materials
- Shortage of labour's construction
- Complexity of Legal rules
- Lack of design criteria [8].

2.3. Groups of Factor :

There is a research study published in the last few years emphasises that there are seven groups of factor cause delays in construction projects. These groups of factor can be classified as the following [4].

- Financial factors.
- Managerial factors.
- Environmental factors.
- Project-based factors.
- Resource-based factors.
- Labour-based factors.
- Owner-based factors.

Each group include several problems and factors that could lead to the issues of delays, it is possible to address them one by one.

2.3.1. Financial Factors:

The financial factors are very important in such case of the delay. Cash flow problem is one of these factors and it can effect negatively on any construction project. The other significant factor is the financial problems of contractor, such factor sometimes lead to stopping the implementation of

project. Furthermore, the delay of payments also causes much problems leading to time overruns in project. Besides, both fluctuation in prices of material and inflation are two important factors that may contribute to delays of works completion in construction projects [4].

2.3.2. Managerial Factors:

The managerial factors are very common in construction projects including disputes between the parties in site, conflicts related to the contract, change in design, loading a contractor excessive work, problem of estimation, shortage of contractor's experience, relations between manager and worker, poor coordination between the parties in site and lack of both quality control and site management [4].

2.3.3. Environmental Factors:

Environmental factors are very effective causes and can rapidly lead to many problems of delays. Environmental factors may represent a bad weather conditions, geological issues, location of the site and work-related injury [4].

2.3.4. Project-based Factors:

Factors related to the project might include shortage of feasibility studies, lack of modern construction methods and shortage of maintenance works as result to the lack of materials and equipment [4].

2.3.5 Resource-based Factors:

Most factors included in this group play effective role regarding the causes of delay. These factors might represent the issues related to the material storage, shortage of resource production, mismanagement of material, inappropriate selection of material and problems related resources transportation [4].

2.3.6. Labour-based Factors :

With respect to the labour-based factors group, there are three important factors. These factors could include lack of productivity of worker, lack of skilled labours and defects of construction. Each one of these factors can cause delay once it takes place during any phase of project [4].

2.3.7. Owner-based Factors:

In many developing countries, two major factors are under the responsibility of the owner. Both defects of management and owner's bureaucracy represent the two main causes of this group. These two causes can definitely contribute to delays in construction project [4].

3. COMPARISON AMONG SIX DEVELOPING COUNTRIES IN TERMS OF THE CAUSES OF DELAYS :

In this part of the study a simple comparison between six various developing countries around the world has been conducted in terms of causes of delays in construction projects. Based on the literatures [2], [3], [4], [6], [7] and [8] the comparison has been done according to the findings of those studies which published during the last decade between 2003 and 2010. Table 1 below demonstrates this comparison.

Table 1 Causes of delay based on comparison between 6 developing countries.

No.	Causes of delay in 6 different developing countries	Thailand 2008	Ghana 2003	Turkey 2010	Jordan 2008	Zambia 2009	Malaysia 2007	Rank
1	Change in design and material	√		√	√	√		2
2	Payments delay by client		√	√		√		3
3	Problems of cash flow		√	√		√	√	2
4	Financial problems contractor-related	√	√	√	√	√		1
5	Lack of productivity of worker	√		√				4
6	Problems of resources estimation	√	√	√	√		√	1
7	Defects of construction			√		√	√	3
8	Fluctuation in prices of material		√	√				4

9	Shortage of contractor's experience	√			√		√	3
10	Shortage of resource production						√	5
11	Mismanagement of material		√				√	4
12	Lack of site management	√	√		√		√	2
13	Inflation problems		√					5
14	Location of the site	√						5
15	Conflicts related to the contract	√				√		4
16	Lack of skilled labours	√		√	√	√	√	1
17	Shortage of feasibility studies		√	√	√			3
18	Bad weather conditions		√					5
19	Poor coordination among the parties in site				√	√	√	3
20	Lack of quality control	√			√	√		3
21	Defects of management				√			5
22	Problems related to resources transportation					√		5
23	Disputes among the parties in site						√	5

3.1. Discussion of the Comparison:

In this comparison it is possible to address a top ten of significant problems that cause delays in each country. After that, 10 out of 23 of the most frequent causes between these countries are addressed based on the higher points and ranking as shown below in chart 1.

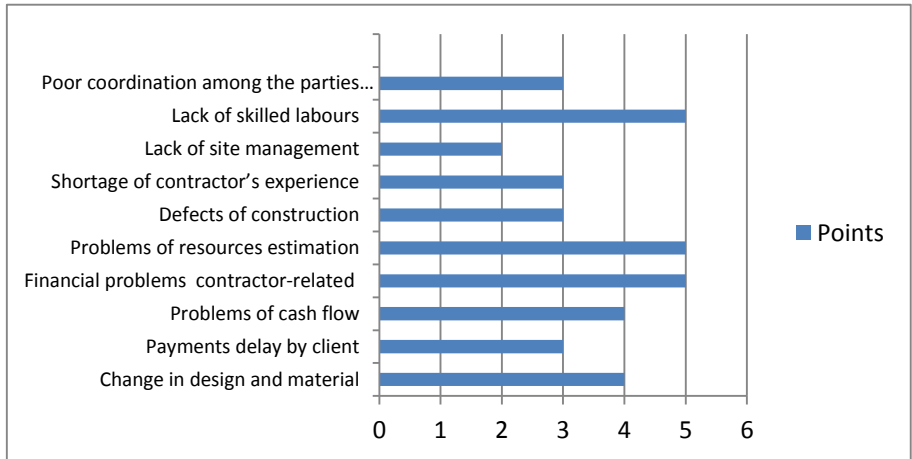


Chart 1 Top ten causes of delay based on higher points in table 1.

In light of this comparison, it seems that the first three points in the table below represent most frequent problems that may cause delay among those countries, the financial problems related to contractor, problems of resources estimation and lack of skilled labours. This indicates that the factors related to contractor, factors related to resources and factors related to labour are very important factors which may lead to the delay in those countries. Moreover, the next three ones are also important factors causing delay which include changing in design and material, problems of cash flow and lack of site management. Besides, as can be seen in table 2 above, the last four problems in the top ten represent the delay of payments by client, some defects of construction, lack of contractor's experience and lack of feasibility studies. By taking into consideration the factor groups that presented earlier, the above ten causes of delay are included in four of those groups. Financial factors, managerial factors, labour-based factors and project-based factors. In general, this does not mean that the other remaining problems are neglected in this comparison. This eventually depends on the situation of each country.

Table 2 Top ten causes of delay based on comparison between 6 developing countries.

No.	Top 10 causes of delay in construction projects in 6 developing countries	Rank
1	Financial problems contractor-related	1
2	Problems of resources estimation	1
3	Lack of skilled labours	1
4	Change in design and material	2
5	Problems of cash flow	2
6	Lack of site management	2
7	Delay of payments by client	3
8	Defects of construction	3
9	Shortage of contractor's experience	3
10	Poor coordination among the parties in site	3

4. CONSEQUENCES OF DELAYS :

There is no doubt that the delays in construction projects have immense influence on the project itself. Most research studies that concentrated on causes of delay and its impacts in construction projects indicate to that the impacts could be similar across most developing countries. Although the problems that may lead to the time overruns in the projects sometimes vary from country to country, the effects of delay are almost identical across those countries. Based on the literature [6] there are six major negative effects of delays have been addressed in this study.

4.1. Time Overrun :

One of the most common consequences of delays is a time overrun. Delays in any project may cause time overrun however, what are causes of these delays. There are some studies emphasis that the factors related to both contractor and client can affect on the time overrun. Factors related contractor such as shortage of contractor's experience, inadequate planning and lack of site management by contractor. The other thing is that the delay of payments that must be paid for the completed works may impact too. Besides, there are some other studies indicate that the labour-based factor and consultant-

related factors can lead to time overrun, while some studies say that the consultant-related and material-related factors may cause time overrun [6]. Consequently, this leads to say that the factors that may cause time overrun are the same factors that can lead to the delays.

4.2. Cost Overrun:

Cost overrun in construction projects could be caused by contract related factors. These factors might represent change orders, mistakes in the document of contract such as mistakes in payment terms and duration of project. In any case, the problems that cause delays can lead to time overrun then naturally time overrun will cause in cost overrun [6].

4.3. Disputes:

There are several factors and causes of delays that may lead to disputes during project duration. For instance, owner's based-factors, contract-related and delay in the payments for completed work. Furthermore, frequent client interference, shortage of communication among the different parties, and changing in orders may increase opportunity of disputes between the different parties [6].

4.4. Arbitration:

In most cases the disputes among the parties become in need to arbitration process in order to be settled. These disputes occur normally as result to delay's factors of both owner and contract relationship. A competent third-party can settle the disputes instead going to the court [6].

4.5. Litigation:

Once the disputes become hard to settled, the litigation process is the appropriate option. The factors that may reach the litigation process include labour-based factors, contract relationship-based factors, contract-based factors and client-based factors. In general, litigation process is considered as a last resort to settle disputes between parties [6].

4.6. Total Abandonment:

Total abandonment normally occurs gradually in the absence of all possible ways of settling including the litigation

process. Factors of delays that may lead to the total abandonment include labour-based factors, contract-based factors, consultant-based factors and owner-based factors [6].

5. CASE STUDY:

5.1. Significant Factors Causing and Effects of Delay in Iranian Construction Projects:

This case study has been addressed in order to link between its Findings and what has been presented in the study in terms of the causes and effects of delays in construction projects. This case study has been conducted last year to determine both causes and negative effects of delay in construction projects in Iran. This study concentrated on projects of roads and administration buildings using a questionnaire survey to find the causes and impacts of delay from 100 viewpoints of both consultants and contractors. By using the statistical procedures and recommendations, the data analysis has been discussed to minimise delay in construction projects. The related literature that reviewed in this study was published over the last decade [5].

5.2. Causes of Delay in Construction Projects in Iran:

In this study, ten important causes of delays in construction projects in Iran have been specified according to the analysis of the results. These causes can be seen in the table 3 below. The results demonstrated that there are three causes in high ranking among the top ten. The lack of site management, delay of payments by client and changing in design and material are in the first three ranks respectively [5].

Table 3 Top 10 causes of delays related to contractor and consultant viewpoints [5].

No.	Causes of delays in construction projects in Iran	Contractor	Consultant	Overall
		Rank	Rank	Rank
1	Lack of site management	1	1	1
2	Delay of payments by client	2	7	2
3	Change in design and material	3	5	3
4	Weakness of project planning process by contractor	7	2	4
5	Financial problems contractor-related	6	3	5
6	Slowness of decision-making process client-related	5	6	6

7	Delay of design documents	4	10	7
8	Delay of reviewing design documents client-related	8	4	7
9	Lack of contract management by consultant	5	12	8
10	Subcontractors problems	10	6	9

5. 3. Effects of Delay in Iranian Construction Projects:

The delay in construction projects can lead to many negative effects. In this case study, six impacts of delay have been observed according to the viewpoints of contractor and consultant. These effects include time overrun, cost overrun, disputes, arbitration, total abandonment and litigation. The consequences of delays in construction projects can be shown in table 4 below.

Table 4 Consequences of causes of delay in construction projects in Iran [5].

No.	Consequences of the delay	Contractor	Consultant	Overall
		Rank	Rank	Rank
1	Time overrun	2	1	1
2	Cost overrun	1	2	2
3	Disputes	3	3	3
4	Arbitration	4	4	4
5	Litigation	6	6	6
6	Total abandonment	4	5	5

6. DISCUSSION OF THE FINDINGS :

Considering that causes of delays in construction projects are based on the results of the comparison taking into account the findings of the case study and what shown in the study according to the previous studies. By comparison, there is identically by around a half between the top ten causes of delays in construction projects in case study and the top ten causes that observed from the comparison conducted in this study. The similarity includes lack of site management, delay of payments by client, financial problems contractor-related and change in design and material. In addition, again there is a similarity

between the result of the comparison and the most common ten causes of delay that presented based on the literature survey. For instance, lack of experienced subcontractors and nominated suppliers, poor of management, changing in orders, poor coordination among the parties in site and misjudgement in estimating resources. This means that there is a huge similarity between the causes of delays in construction projects across most developing countries. On the other hand, with respect to the consequences of the delays, once again there is identical between the negative impacts of delays in case study and the negative influences of delays in different developing countries that mentioned earlier in this study. The six observed effects of delays are the same. It is clear that there is a great matching among the result of case study and what presented in this study including the results of comparison. This leads to believe that the following ten problems can effectively cause delays across many developing countries.

1. Change in design and material.
2. Lack of site management.
3. Lack of experienced subcontractors.
4. Financial problems contractor-related.
5. Problems of estimation.
6. Delay of payments by client.
7. Weakness of project planning process by contractor.
8. Delay of design documents.
9. Lack of contract management by consultant.
10. Poor coordination among the parties in site.

It can be noted that many causes of delays are related to contractor, client and subcontractor. For instance, the financial problems related both contractor and client. Once the contractor or client starts suffer from the financial issues, this means that the symptoms of delays will appear soon. Besides, once the subcontractor suffers from the lack of experience, this also strong indication that the construction project probably will pass a several difficulties. Nevertheless, the consultant also can play role in delays in different stages of project, for example, once the consultant does not give sufficient attention to the management of contract, the delay probably takes place.

7. CONCLUSION:

In this study, causes and consequences that lead to delays in construction projects in developing countries have been investigated. This investigation has been conducted based on the literature related and previous research studies. In addition, comparison has conducted between six developing countries in this study. Furthermore, analysis of case study that links results of the comparison and what presented in the study. The results show that there is a similarity in causes and identical in effects of delays in construction projects in most developing countries. Based on what mentioned above, this study concludes that the most common causes of delays have been grouped in ten factors, change in design and material, lack of site management, lack of experienced subcontractors, financial problems contractor-related, problems of estimation, delay of payments by client, weakness of project planning process by contractor, delay of design documents, lack of contract management by consultant and poor coordination among the parties in site. Besides, the impacts of delays as the findings demonstrated are six, time overrun, cost overrun, disputes, arbitration, litigation and total abandonment.

8. RECOMMENDATIONS :

The recommendations that could be provided in this study in terms of the causes of delays in construction projects in developing countries are as follows:

- Recommendations to clients:
 1. Clients should follow right ways during selection process of contractors by applying selection criteria.
 2. Client should not have delays in payments for a completed works to the contractor.
 3. Client must avoid major changing in order and requirements.
 4. Client should not interfere frequently during the execution period.
- Recommendations to contractors:
 1. Contractors should have sufficient experience regarding the international construction.
 2. Contractors must give more concentration to site management by depending on a good experience of site-managers.

3. Contractors should ensure that they have sufficient financial support and manpower.
4. Contractor must make sure apply selection criteria during selection process of subcontractors.

It is also recommended that local studies should be carried out for some developing countries that lack such studies, in order to determine whether they suffer from the same causes of delays or there are additional factors. As well as to investigate in some further aspects such as the type and classification of projects whether public or private are they related to the delay or not. In general, by conducting much studies and comparisons between several developing countries it can specify more accurate causes of delays. Consequently, such studies may assist the international construction sector to avoid many negative impacts in future. Furthermore, developing countries can also take advantage of these studies to improve their economical situation with respect to the international construction.

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