

Causes of Delay in Iran Construction Projects

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Abstract

The construction industry in Iran, with an annual turnover of US\$ 38.4 billion, is one of the most profitable sectors in the country. However, the process of construction is very slow and expensive in Iran. Recently, due to a sharp increase in the price of land, materials, equipment and the high rate of population growth, more efforts are being made to avoid delays in construction projects. This paper presents the result of an investigation into the main factors which cause construction delay in Iran. Eleven in-depth interviews are conducted with construction managers and practitioners associated with the Iranian construction industry. Responses are analyzed qualitatively and a comprehensive interpretation is developed. The results reveal that most construction projects in Iran are subject to delay. The negative impacts of delay are explained in this paper. Moreover, the most significant causes of construction delay have been identified. Causes are categorized under three groups of stakeholders, politics and economy. Cash constraints, shortage of resources, high inflation rate, delay in payments, and disputes in supply chain are the top causes of delay in the Iranian construction industry.

Keywords

Construction projects, delay, Iran, time.

1. Introduction

Project planning and scheduling is an essential and challenging activity at the inception of most construction projects. In fact, systematic planning and scheduling is a foundation of effective construction management. For a project to be capable of being planned and scheduled, it must have experienced staff and a reliable pre-estimate of cost and time (Keane and Caletka, 2008). However, projects' schedules often are affected by several factors which can endanger the success of the project. One of the most important factors that always has serious effect on projects' schedule is delay. Construction delay is 'the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project' (Assaf and Al-Hejji, 2006). Delay is also defined as an 'act or event which extends required time to perform or complete work of the contract manifests itself as additional days of work' (Zack, 2003).

In today's construction industry, it is clear that time is a critical issue. A project that is not completed on time can hardly be called successful from a project management point of view. Delay has a reverse relationship with the *on time* concept. Therefore, delay is a risk that always threatens the success of the projects. Construction projects frequently suffer from delay and industry professionals have struggled to distinguish the causes of delay in their projects for many years. Consequently, delay is an inherent risk in construction and should be treated in a similar fashion as other risks. It can be managed, shared, minimized, or accepted but must not be ignored (Keane and Caletka, 2008). The financial impacts associated with delay incur significant unanticipated costs in construction projects. In addition to time and cost overrun, delay may have other negative effects on projects such as increase in disputes, arbitration, litigation, and project abandonment. (Sambasivan and Soon, 2007)

Delay is often the result of an unpredicted event that does not necessarily indicate that the management system is ineffective; but the way that a management team respond to delays can expose its strength or weakness in relation to delay analysis and management. A systematic analysis and management of delay ensures that the cause of that delay is identified and documented. Hence, the impact of delay on the schedule can be recognised and the risk of further delay can be minimized. In addition, this systematic analysis will provide valuable information about different causes of construction delay that can be referred to in the future projects.

On most construction projects, there are common causes of delay that frequently happen. Identifying these causes may help practitioners to anticipate potential delay and plan to minimize their effects. Therefore, identifying delays and investigating their causes is an important part of delay analysis and management process. This study aims to interpret the main causes of delay in the Iranian construction projects. The result may be used in the early stage of delay analysis for construction projects regardless of their size.

2. The Construction Industry in Iran

The problem of delays in the construction industry is a global phenomenon, as many researchers have stated in their studies. The construction industry in Iran is no exception. The Iranian construction industry, with an annual turnover of US\$38.4 billion (Australian Government-Austrade, 2007), is continuing to grow and an average growth of 4.40% over 2008 to 2012 is predicted (Companies and Markets, 2008). However, the process of construction in Iran is very slow and expensive. Construction of four-storey buildings in Tehran often lasts more than 90 weeks. This is much longer than similar projects in the UK. Moreover, in recent years, due to a sharp increase in the price of land, construction materials and machines, housing has posed a dilemma for the low-income stratum in Iran (Aftab News, 2006). From March 2004 to March 2005 total Iranian households were 15.1 million and the total numbers of dwelling units were 13.5 million (Statistical Centre of Iran (SCI), 2006). This reveals a huge difference between demand and supply in the residential sector. Moreover, every year there is a need for 750,000 additional units as young couples embark on married life. In addition, Iran's geographical position over a seismic belt necessitates the reinforcement and renovation of buildings in Iran (Australian Government-Austrade, 2007).

This put much pressure on the Iranian government to declare that the Iranian construction industry requires improving productivity to satisfy these huge needs. In July 2008, the Iranian President, Mahmoud Ahmadi Nejad, announced that his government is looking for different ways to reduce time and costs of construction projects, especially in residential projects, by insisting on industrializing the construction of buildings (ISNA, 2008). Before this announcement the government spokesman had publicized that 30 prefabricated building factories will be open by April 2009 (Fars News Agency, 2008). The government and practitioners are also looking for ways to reduce the time of construction by minimizing delays in projects. Identifying different causes of delay is the first step to reduce the time of construction projects. Therefore, the aim of this research is to introduce different causes of delay in

Iranian construction projects. By knowing these causes practitioners will be able to anticipate negative impacts and minimize the risk of delays in their projects.

3. Previous Research

Much research has been conducted to identify causes of delay in construction industry and their effect on the life cycle of projects in different countries. Mezher and Tawil (1998) explained that preparation and approval of drawings, slowness of the owner's decision-making process, obtaining permits or approval from different government authorities, non-availability of materials on time, and unskilled manpower are major causes of delay in Lebanese construction projects. A study in 2006 in Saudi Arabia by Assaf and Al-Hejji revealed the highest frequent factors of delay in this country as: awarding contracts to the lowest bidder, changes in orders by owners during construction, delay in payments, ineffective planning and scheduling by contractors, poor site management by contractors, shortage of labor and difficulties in financing. In the UAE, preparation and approval of drawings, slowness of the owner's decision-making process and inadequate early planning of the project, shortage of manpower, conflict between contractors and the consultants are the major causes of delay (Faridi and El-Sayegh, 2006). Sambasivan and Soon (2007) believed that contractors' improper planning, contractors' poor site management, inadequate contractor experience, inadequate clients' finance and payments for completed work, and problems with subcontractors are the main causes of delay in Malaysian construction projects. In Egypt, El-Razek *et al.* (2008) identified the most important causes of delay as financing by contractors during construction, delays in contractors' payment by owners, design changes by owners or their agents during construction, and no utilization of professional construction.

Clearly, some delay causes are common between different countries and some others not. The reason is that delay is a factor that has a close relationship with working culture, stakeholders, the government policy, economy situation and availability of resources (man, money and machine). These are concepts that often vary from one country to another. Hence, it is not so surprising that some causes of delay may be more significant or more frequent in one country in comparison to the others. Faridi and El-Sayegh (2006) had a similar interpretation when they compared causes of delay in the UAE to Saudi Arabia. Therefore, for a better result, identifying causes of delay should be done in a specific country, which is Iran in this research.

4. Research Methods

The aim of this study is to grasp an in-depth understanding of the reasons for delays in construction projects in Iran. In other words, this research investigates *why* delay happens in projects. Hence, this is a qualitative research that uses a small, but focused and carefully selected sample.

At the first stage, literature with the subject of construction projects' delay were found and reviewed. The aim of the literature review was to find different causes of construction projects' delay in the other countries, specifically in the Middle East region. Fortunately, much research was conducted in some countries in the region such as Lebanon, Saudi Arabia, UAE and Egypt. However, because there is a limited amount of literature about construction projects' delay in Iran, it was essential to get help from experienced people in the field of construction in the country. Eleven in-depth interviews were conducted with practitioners who are involved with day-to-day issues of the construction industry in Iran. All participants have 10 or more years of experience and are involved in residential, commercial, and road building projects in Iran.

Data gathered from interviews was analyzed by using a qualitative data analysis method. First, responses were classified under three relevant categories as stakeholders, politics and economy. Under these categories, new sub-categories were developed by progressing through the transcript of interviews. Then, a comprehensive interpretation was developed to produce well-grounded conclusions. Wherever it was

suitable, the participants' direct quotes are cited anonymously to make the interpretation more meaningful. Figure 1 illustrates the structure of the categories and sub-categories.

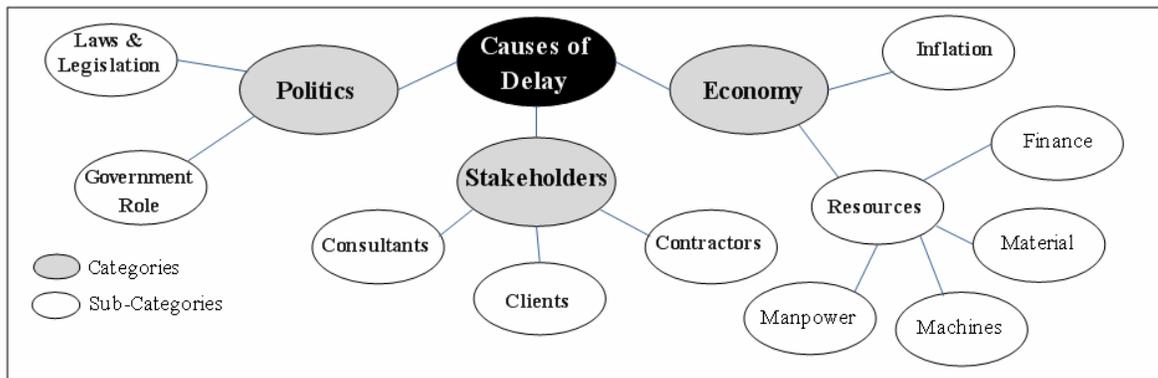


Figure 1: Categories and sub-categories emerged from a qualitative data analysis

It should be explained that the result of this study is restricted to the participants' experiences and their viewpoints and cannot be generalized in wider contexts. In addition, the result may not be the whole reality as, in social studies like this, there may be multiple realities. However, to achieve reliable data, respondents are selected carefully among construction practitioners who have three specifications: a) to have worked as a senior manager in a construction specialist company, b) to have 10 or more years of experience in construction, and c) to be completely familiar with culture and environment of construction in Iran. Reliable level of data saturation was achieved within 11 interviews.

5. Negative Impacts of Delay in Construction Projects in Iran

Most of respondents agreed that delay will have negative impacts on construction projects. They believe that delay may raise the cost of construction in the case of a high inflation rate when contractors should spend more money to buy construction materials and equipments. Inflation also increases the rate of disputes between contractors, consultants and the owners that usually causes more delay in the project. In addition, respondents emphasize that delay raises the overhead cost of projects, which includes office expenses, administrative costs, utility bills, maintenance, and repair expenses. One of the respondents, who is the senior manager of a general contractor company, emphasized the importance of time in construction by explaining a metaphor about contractor activities in Iran: *"Generally, construction contracting in Iran is like a bucket with a hole at the bottom. Whenever you draw it up sooner from the well there will be more water in it."*

Some respondents stated that delay in infrastructure and public projects is more crucial. For instance, delay in building a bridge will cause both financial and social problems for the Government. However, few respondents thought that delay is not always negative in terms of profit. They explained that delay is a relative concept and depends on the political and economic conditions in which a project is being built. *"Imagine that you are constructing a four-storey building. You have a choice to finish it in six months and sell it at £100,000 or finish it in 18 months and sell it at £140,000. Which one do you prefer? The second choice gives the opportunity to you to work less and earn more. So the second choice seems better."* In fact, in a chaotic market with a high rate of inflation and huge gap between supply and demand, the above argument might be true for property developers and owners. This situation happened in the residential market between 2006 and 2008 in Iran. Yet, it should be considered that the situation of the market is always changing and, in the case of long delay, this idea can be challenged easily when the price of materials and services also increase.

6. Causes of Delay in Iranian Construction Projects

As was explained above, causes of delay are divided into three categories. Here these categories will be focused on more.

6.1 Stakeholders

Stakeholders are parties that are involved in construction projects and affect, or can be affected by the project. The most important stakeholders in typical construction projects are clients, consultants, and contractors. In this section, delays that are caused by these groups will be discussed.

Based on information obtained from the interviews, clients can cause delay in four ways. A majority of clients does not have enough knowledge about construction legislation that are enforced by the municipality or other authorities. Hence, sometimes they request something that is basically illegal. Clients also are not able to visualize their projects by looking at the drawings and plans. Therefore, when the structure is almost built they will find that this is not something that they wanted. This will lead to demolition and rework which can cause serious delay in projects. Changes in drawings are also a problem that frequently happens. This may be due to a matter of taste or even changing the functionality of the building. One of the respondents has a desperate experience of changing functionality: *"We were hired by a client to build a multi-story parking. When the steel structure was completed the clients asked us to change the functionality of the building to residential. It lasted more than one year to change the drawings, design for M&Es, change the material, prepare new contract documents, etc."*

Another problem is that the process of the clients' decision-making is often slow. Selection of wrong consultants and contractors may also happen because most clients are looking for the lowest price within tenders. Therefore, contractors with low competency will get the job and this is the starting point of a chain of problems that finally causes delay for the project.

Mistakes in drawings, wrong structural design, selection of materials that are not easily available in Iran, and complex or unusual designs are the areas that consultants may cause delay for the projects. However, as most respondents confirmed, consultants have the least role in causing delay for the projects.

Contractors and sub-contractors may cause delay as well. In recent years, many contractor companies have been established. These new companies try to get jobs by offering very low prices to the clients. In the middle of the projects, because their cost estimation is not based on reality, they will have many problems to execute the project. Hence, sometimes they have to look for other sources of finance and that takes a long time to do in the Iranian banking system. These inexperienced contractors, to reduce the cost, use poor quality material. This usually will lead to a conflict with the clients and can cause long delays. Most of them will try to negotiate with the clients about the final cost of the project. Yet, the process of negotiation, and preparing new contract documents is time-consuming. Moreover, there is no guarantee that the new estimation that they produce is accurate enough to finish the job in the proposed quality. This continuing loop causes huge delays in construction projects.

Contractors' managing style is very important in terms of causing delay too. Generally, traditional managers who do not have enough knowledge about modern management concepts manage construction projects in Iran. For instance, Iranian managers usually have problems making teams and distributing duties to the team members. Hence, they have to undertake much responsibility their selves. This, in addition makes managers exhausted and busy and will put the projects in serious trouble in their absence. It means that in the event of a crisis if the manager is not available, nobody is able to make a decision because team members have neither enough information nor enough confidence to make decisions.

Another dilemma in the Iranian construction projects is conflict among sub-contractors. They always accuse each other of low quality work, robbery and using other parties' resources (e.g. materials) without permission. In some serious cases, conflicts may lead to vandalism. Arbitration among sub-contractors is a time-consuming task that may cause delay for the project.

6.2 Politics

As is clear in Figure 1, this category includes the Government's role and construction laws and legislation in causing delay for the projects. The role of the Government is significant in the Iranian construction industry and it may cause delay in different ways. Here price indices and the Government's liabilities to contractors will be focused on.

Price indices have been a major problem of the construction industry in Iran since 2006. Each year the President Deputy for Strategic Planning and Control produces price indices that are a series of tables which shows average price for materials, equipment and services. Practitioners usually use price indices to calculate project cost escalation. There are two problems with these indices. First, they are published late and, so, contractors have to use the old version and that will reduce the accuracy rate of cost estimation or escalation. Second, for some items, there is no symmetry between prices in the indices and the real inflation rate. Some respondents explained that the Government does not publicize the real rate of inflation because it may have a negative social effect on the public. Regardless of whether statement might be true or not, unreal price indices means inaccurate data and this will lead to wrong cost estimation or escalation, which is the main source of disputes in Iranian construction projects. Delay is one the results of construction disputes. Hence, unreal price indices are one of the main causes of delay in construction projects in Iran.

Another issue is that the Government's liabilities to the contractors especially in the infrastructure sector have been increased in the recent years and it seems that these liabilities are not going to be paid in the near future. The main reason is that economists believe if the Government pays its liabilities, the inflation rate will jump up in an uncontrollable way and this is something that the Government is trying to avoid. Therefore, there is no reason for contractors in national projects to finish them on time.

Another issue that may cause delay and can be grouped in the Government's role framework is the municipality's bureaucracy. Most of the respondents expressed that the process of getting permission for construction is one of the main causes of delay in projects. In addition, respondents believed that current construction laws and legislation, which are enforced by the municipality, are old and in some cases illogical. This phenomenon may have a root in a cultural fact that Iranian construction practitioners are not eager to obey the laws. Thus, the municipality should first provide a cultural base for obeying laws among construction practitioners (e.g. via education) and, secondly, review construction legislation and make it more logical. Otherwise, breaking laws will increase the rate of disputes between the municipality and practitioners and that will lead to delay.

6.3 Economy

The economic condition may cause delay for projects. Two effects of the economy on projects are studied in this paper: the inflation rate and availability of resources. A high inflation rate may cause delay for projects. As was discussed in the previous section, if the price of resources increases sharply and continuously, price indices cannot cover escalation costs and this increases the amounts of dispute in the supply chain. One of the respondents has a problem with a cement supplier that is explained below: *"I signed a contract to buy a large amount of cement for my project three months ago and paid for it completely. The supplier provided me with a quarter of the contract and after that, he argued because the price of cement had increased, I have to pay the difference between the current price and price of three months ago. It is not fair because I paid for that contract three months ago. So why should I pay more?"*

Inflation forces suppliers to be not committed to their contracts." When suppliers do not keep their commitments, it can be expected that the project will be delayed.

Resources have a direct impact on construction projects and may make them delayed. In this study, resources are divided into four groups: financial, material, machines, and manpower. Abdoh and Djamshidi (2000) explained that the Iranian construction industry usually suffers from cash constraints. Getting loans from Iranian banks is time-consuming and there is no guarantee that after two or three months an applicant can get the money needed. Other sources of finance are limited and expensive. In addition, international financing is very rare due to political reasons and unfamiliarity of practitioners with the process of getting them. Cash constraint is a major problem that prevents construction firms from buying materials at the right time. Hence, especially for items with a long lead-time, materials or equipment cannot be delivered to the site on-time and this will cause delay in the programme. Moreover, cash constraints usually lead to payments disorder. Hence, contractors and sub-contractors lose their motivation for projects. In many cases, as expressed by the respondents, when payment is delayed, sub-contractors will reduce their resources (e.g. halving the numbers of workers on site and sending them to the new projects). Consequently, the project's progress will be slower than the expected rate and the project will be delayed.

Shortage of construction materials is also an issue that usually causes delay. Cement and concrete are two materials which are highly critical in projects. All respondents emphasize that they are often in shortage of concrete: *"It frequently happens that our project is suspended for 20 days or more because there is no concrete in the market."* To solve this problem, the Government has been investing in the cement and concrete industry and has privatized distribution channels of cement (ISNA, 2008). Hence, it is expected that the problem of cement and concrete shortage will be solved in the near future. Practitioners may also be short of other materials such as bricks, sand, gravel, and plaster but this may happen only in the warm season when construction activities are at their peak.

In terms of machines and equipment, most respondents explained that basic construction machines are usually available and there is no delay associated with them. However, just small delays may occur due to repair and maintenance of these machines. For more complex machines, due to political matters (e.g. economic sanctions), importing them from other countries takes a long time and may cause delay.

The quantity and skill of manpower can have a major impact on the projects. The shortage of labor in Iran started when the government decided to deport foreign construction workers. Afghan laborers have worked in the Iranian construction industry for many years. After the establishment of Karzai's Government in Afghanistan, the Iranian Government tried to return Afghan laborers to their country. Although a few Afghan laborers could get working permits, most of them have to work illegally in projects. Occasionally, immigration inspectors visit construction sites to catch and deport illegal Afghan laborers. This causes a shortage in the labor pool in the construction industry. In addition, contractors think that Afghan laborers are more skilled and work faster and better than Iranian laborers. When a dramatic fall in the numbers of Afghan laborers happened, Iranian laborers asked for higher wages: *"When Afghan workers were deported, Iranian laborers announced that they will not work at current rates of wages anymore. In some cases we have to double their wages and they still do no work effectively."*

In addition to shortages, workers' productivity is also low. The majorities of construction laborers are not trained and make many mistakes on site that will lead to delay: *"Last night, about 15 cubic meters of concrete were wasted during pouring concrete by mistake of one of the laborers. Regardless to its cost, we have to order concrete and bring a concrete truck and pump to the site again and that is time-consuming."*

7. Conclusion

There is a significant delay problem in construction projects in Iran. The critical problems associated with delay, as revealed by this study, are time overruns, cost overruns, and increased disputes. This study, also, identifies the main causes of delay in the Iranian construction industry by conducting a qualitative analysis. Three general categories are developed as stakeholders, politics, and economy. Ten major causes of delay discussed in this paper are: clients' lack of knowledge about construction legislation and process, changes in drawings, unreal cost estimation by contractors, disputes in the supply chain, high rate of inflation, Government liabilities to contractors, old construction legislation, shortage of materials and labor, delay in payments, and cash constraints. Practitioners should be familiar with these significant causes of delays and plan to avoid or at least mitigate their impact on project success by application of delay analysis methods.

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