

T.R.
MIMAR SINAN FINE ARTS UNIVERSITY
INSTITUTE OF SCIENCE AND TECHNOLOGY

**CAUSES OF DELAYS IN OVERSEAS CONSTRUCTION PROJECTS OF
TURKISH CONTRACTORS**

M.Sc. Thesis by
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Division of Structural Engineering

Programme of Construction Project Management

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Kübra Başkapan tarafından hazırlanan "Causes Of Delays In Overseas Construction Projects Of Turkish Contractors (Türk Yüklenicilerin Yurt Dışı İnşaat Projelerindeki Gecikme Sebepleri)" adlı bu tezin Yüksek Lisans tezi olarak uygun olduğunu onaylarım.

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Tez Yöneticisi

Bu çalışma, jürimiz tarafından Yapı Mühendisliği Anabilim Dalında Yüksek Lisans tezi olarak kabul edilmiştir.

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MİMAR SİNAN GÜZEL SANATLAR ÜNİVERSİTESİ
FEN BİLİMLERİ ENSTİTÜSÜ

TÜRK YÜKLENİCİLERİN YURT DIŐI İNŐAAT PROJELERİNDEKİ
GECİKME SEBEPLERİ

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Mimar Sinan Gzel Sanatlar niversitesi Fen Bilimleri Enstits tez yazım klavuzuna uygun olarak hazırladığım bu tez alıřmasında;

- Tez iindeki btn bilgi ve belgeleri akademik kurallar erevesinde elde ettiğimi,
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- ve bu tezin herhangi bir blmn bu niversite veya bařka bir niversitede bařka bir tez alıřması olarak sunmadığımı

beyan ederim.

.....

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Thank you.



CAUSES OF DELAYS IN OVERSEAS CONSTRUCTION PROJECTS OF TURKISH CONTRACTORS

ABSTRACT

Since 2001, that the activities of Turkish construction companies operating in various overseas construction projects as the main contractor or sub-contractor have rapidly increased. Especially in recent years, overseas contracting investments are known to be worth of more than 20 billion dollars per year, and the main reason for this is the slowdown of the domestic construction sector and the increase in the competitive strength of Turkish construction firms in international projects in terms of the technical and management capacities. Since 1972, as a result of improved experience and quality Turkish construction companies have been able to compete with European firms and the high-quality price ratio is one of the strongest competitive advantage for Turkish construction companies. However, delays in international projects, which are riskier than domestic construction projects, cause more time and money loss than delays in the base country. In international construction projects, due to the legal, environmental, economic and political and technical factors, it can be seen that construction companies often have delay problems and fail to complete construction project during the contract period.

The present thesis aims to identify the causes of delays in overseas construction projects of Turkish contractors with a survey analysis among participants from the industry. Results reveal that delays in approval of drawings, materials by consultants, slow decision making by client, planning and scheduling deficiencies are the top three causes of delays.

Keywords: construction project delays, delay types, Turkish contractors, overseas construction, competitive advantages of Turkish contractors

TÜRK YÜKLENCİLERİN YURT DIŞI İNŞAAT PROJELERİNDEKİ GECİKME SEBEPLERİ

ÖZET

2001den bu yana Türk inşaat firmalarının yurtdışı taahhüt sektöründe gerek ana yüklenici gerekse alt yüklenici olarak faaliyetlerinin hızlı bir şekilde arttığı görülmektedir. Özellikle son yıllardaki yurt dışı müteahhitlik yatırımlarının 20 milyar doların üzerinde gerçekleştiği bilinmektedir, bu artışın başlıca sebebi Türkiye'deki inşaat sektörünün yavaşlaması ve firmaların teknik ve yönetim kapasitelerinin gelişmesi ve daha profesyonel olması nedeniyle uluslararası projelerdeki rekabet gücünün artmasıdır. 1972den bu yana Türk inşaat firmalarının edindiği tecrübe ve kalitesinin Avrupa firmaları ile rekabet edebilecek düzeye ulaşmış olması ve fiyat kalite oranının yüksek olması Türk firmalarının güçlü rekabet faktörlerindedir. Fakat riski yüksek uluslararası projelerde yaşanan gecikmeler yurtiçinde yaşanan gecikmelerden çok daha fazla zaman ve para kaybına sebep olmaktadır. Yurt dışı inşaat projelerinde şirketlerin hukuki, çevresel, ekonomik, siyasi ve teknik sebeplerle inşaat projelerini sözleşme sürelerinde tamamlayamaması problemi çok sık yaşanmaktadır.

Endüstride çalışan profesyonel katılımcılar arasında yapılan anketin analizi ile yapılan araştırma, Türk yüklenicilerin yurtdışı inşaat projelerindeki gecikme sebeplerini ortaya çıkarmayı amaçlamaktadır. Sonuçlar müşavir firma tarafından çizim ve malzeme onaylarının geç verilmesi, müşteri tarafından yavaş karar verme ve planlama hatalarının gecikmelerin ilk üç sebebi olduğunu göstermektedir.

Anahtar Sözcükler: inşaat projelerindeki gecikmeler, Türk inşaat firmaları, yurtdışı taahhüt projeleri, Türk inşaat firmalarının rekabet faktörleri

PREFACE

In this thesis, I have tried to reveal the causes of delays in overseas construction projects of Turkish contractors. First of all, I would like to thank participants who contribute my research with their valuable knowledge, my thesis supervisor Prof. Dr. Selin GÜNDEŞ and the faculty dean Prof. Dr. Sema ERGÖNÜL for their kindness and support to all learners. Everytime we cannot be a good student but what matters is to be a good learner and teacher.

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Also I dedicate my thesis to all labors and workers who realize all engineers and architects lines on the papers, to Abdulgaffur SAVAC Usta (Craft master) and others...

I hope, this research could be a guide and contribution to literature for the industry and learners.

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LIST OF ABBRAVIOTIONS AND SYMBOLS

CIS	: Commonwealth of Independent States
ENR	: The Engineering News Record Magazine
EOT	: Extension of Time
MENA	: The Middle East and North Africa
MUSIAD	: Müstakil Sanayici ve İş Adamları Derneği (Independent Industrialist and Businessmen Association)
NATO	: North Atlantic Treaty Organization
PMBOK	: Project Management Body of Knowledge
PPP	: Public-private partnership
SCL	: The Society of Construction Law's
TCU	: Turkish Contractors Union
USA	: United States of America

1. INTRODUCTION

1.1 Background

Time, cost and quality of work are the basic conditions of success in project management (PMBOK, 2004: 6). The shortcomings in one or more of these conditions cause problems or may lead to partial or complete failure of the project. One of the most frequent problems in construction projects is the delay in the realization of the projects according to the duration of the contract (Kenley, 2003: 228). The delay in construction projects is a global phenomenon, because construction projects have a complex organizational structure and realization process. Therefore, delays may occur due to unforeseen reasons or poor project management processes (Assaf and Al-Hejji, 2006). Even in two separate construction projects with the same characteristics, there may be delays in different periods (Younis et al. 2008). As a result, it can be said that delays in construction projects have occurred very commonly. In this context, it is important to reveal the reasons for delays in construction projects.

In order to be able to carry out the delay analysis that will provide the basis for programming in construction projects, the reliability of data is important. Especially, when investing in overseas construction projects, which have specific features and needs better planning, it is necessary to know the conditions of the country and factors that may affect the duration of projects. For this reason, obtaining data from past projects realized in a particular foreign country will have a positive effect on the success of future projects in that country.

Delay factors differ for overseas construction projects and domestic construction projects and for overseas projects these factors depend on many variables like base country, contractors' and host country business culture, level of professional development in time, type of the project. Therefore, delay analysis should be different for domestic and overseas construction projects.

1.2 Problem Statement

It is known that some variables of countries; such as development level, financial stability, working conditions and climatic conditions affect construction projects. Especially for companies planning to make construction investments abroad, these variables are of particular importance as they have a significant effect on project success. Experience to date shows that some firms that plan to invest in overseas construction projects are unfamiliar with the conditions of countries in which they will invest, and these variables can cause problems in terms of the success of the projects. These problems may lead to schedule delays and cost overruns (Özçekiç, 2007; Işık, 2008; Özorhon and Demirkesen, 2014). In this context, identifying the factors that cause delays and determining the most common problems on a country basis will provide important data for the construction companies in order to make foreign investments.

The Turkish construction sector is one of the locomotives of the country's economy. It contributes significantly to the economy and employment both by overseas and domestic construction projects. Since the early times of the Turkish Republic, it is observed that the Turkish contracting and consulting companies operating in overseas construction projects increased rapidly in terms of number and the total value of the projects undertaken. Especially in recent years, overseas contracting investments are known to be more than 20 billion dollars (Şat Sezgin, 2018). Construction companies in the Turkish construction sector is known to adopt the industry's needs and conditions in the market easily. However, in international construction projects, due to the legal, environmental, economic and political factors, it can be seen that Turkish companies may have some problems. As a result, there may be a problem that construction projects cannot be completed in contract periods. As a result, it is important to identify the factors that cause delays in overseas projects.

Although delay analysis is a phenomenon in the literature especially for the big markets which are developing countries, all of the delay analysis for country or city based (Table 3.2: Studies on the causes of delay in construction projects) and for contractors who works in that country. Results of these researchs show that for every country causes of delays for construction projects or ranks of them different fom each other. The delay analysis for domestic market (Arditi et al. 1985, Kazaz et al. 2012)

which have a serious time gap shows that development of the country and the industry changes the delay factors as well. Therefore, delay analysis should be performed regularly to evaluate the industries time and management performance. Also, domestic and overseas construction have different variable for time management which needs separate analysis and evaluation of results for different regions and different delay factors.

Contractors time value and cost is higher in overseas construction, especially for Turkish contractors that operate in overseas have higher risk than many developed country's contractors due to unstable domestic economy and sudden currency changes in Turkey. Considering these risk factors, importance of delay analysis for Turkish contractors that perform in overseas construction is more vital. There is not a delay analysis or time management performance research for only one group of contractors, including Turkish contractors. This research will be the first delay analysis for a certain group or country's contractors in the literature.

1.3 Objectives of Research

This study basically but not limited to, has been carried out for the following purposes below.

- i. To reveal the overseas construction investments in the Turkish construction sector,
- ii. To examine types and reasons for delay in overseas construction projects,
- iii. To reveal the most common problems and delay factors faced by Turkish construction companies operating overseas,

1.4 The Research Method

In the first phase of the research, the presence of Turkish construction firms in overseas markets, types of delays in overseas construction projects and their reasons were examined by using the literature review method. In the second phase, a survey instrument aiming to explore the nature of these delays was prepared using the information gathered from the first phase.

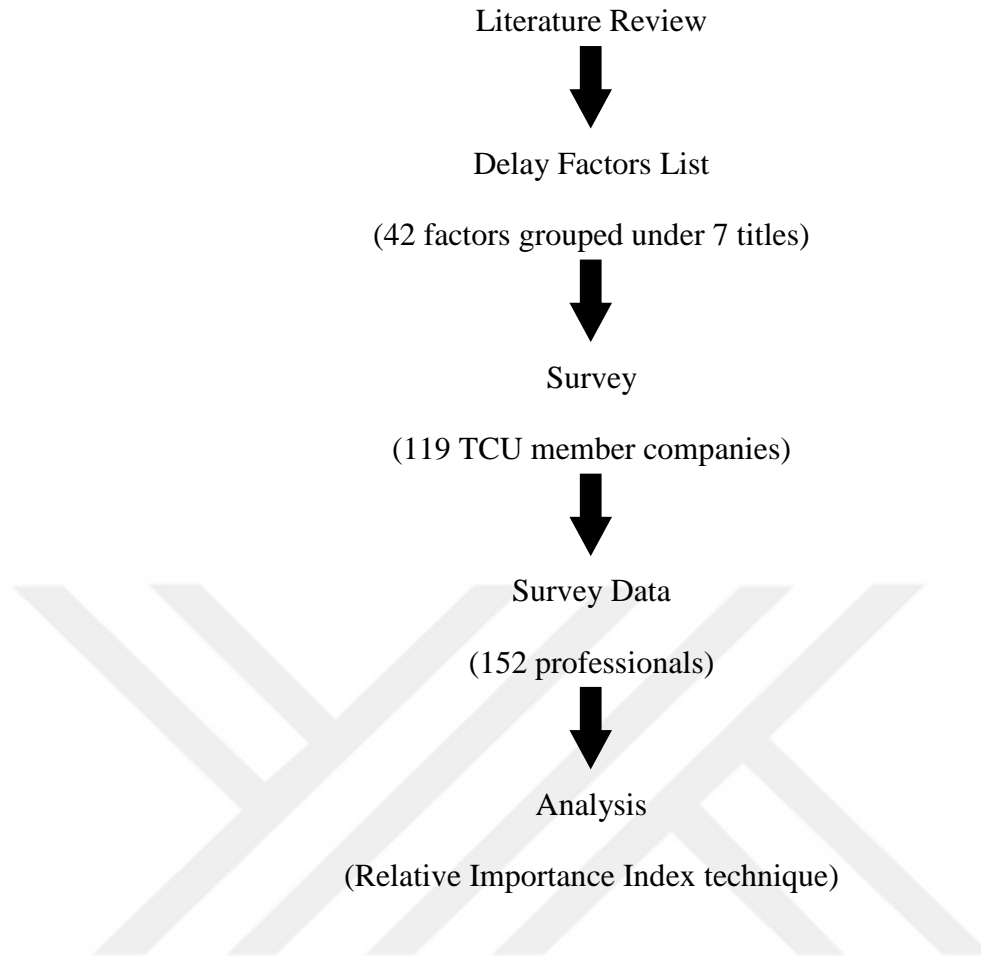


Figure 1.1: The Research Method Phases

Then, in the next phase, the online survey was distributed via email and social media messages (LinkedIn) to the 119 TCU (Turkish Contractors Union) member companies and other overseas construction firms like subcontractors and non-members of TCU.

In the fourth phase, data gathered from 152 professionals from Turkish construction companies operating overseas was examined with frequency analysis and Relative Importance Index (RII) technique. In this concept, the findings of frequency analysis about participants', their companies' and their overseas projects (e.g. company's organization type, number of employees, participant's position in the organization, experience in overseas construction works, type of projects undertaken in overseas markets) were revealed.

Then, the problems in overseas projects according to overall 42 factors which gathered from delay studies for different countries, including Turkey were examined one by one and these problems were grouped under 7 titles (The sources of delays: Related to

contractor, client, consultants, materials and equipment, labor, construction site, exogenous factors). The information gained from the survey analysed with RII technique.

Finally, the problems and causes of delays that emerged as a result of survey analysis were discussed, and recommendations were provided.

1.5 Organization of Thesis

In this thesis, a literature review was performed, and a qualitative analysis was carried out in order to reveal the causes of delay in the overseas construction projects. In this context, the thesis work is organized as follows:

- i. Following the introduction, in the second part of the study, a comprehensive literature review about overseas construction projects, the importance of overseas construction projects and their advantages and disadvantages for firms has been provided. Additionally, in this section, the historical development of the Turkish Overseas Construction Sector has been examined, and information has been provided about the overseas activity.
- ii. In the third part of the study, types and causes of schedule delays in construction projects have been discussed. In the next chapter, the findings of the frequency analysis and RII technique have been explained and discussed.
- iii. Finally, in the last part of the study, the conclusions section, the implications of the research results have been presented.

2. TURKISH CONSTRUCTION SECTOR AND OVERSEAS CONSTRUCTION

2.1. Overseas Construction

Overseas construction differs from domestic construction projects due to different environmental and business culture factors which shape the strategy of the company for investments. In this part of the study features of overseas construction projects and its advantages and disadvantages for contracting companies will be evaluated.

2.1.1. Competitive Advantage in Overseas Construction

Construction companies operate in international markets due to internal market recessions, to allocate investment risks, to use resources in a more competitive environment, and to capture opportunities in global markets (Günhan and Arditi, 2005a). Although international markets may offer different advantages for construction companies, they are riskier and more competitive than construction projects in the domestic market. In internationally constructed projects, engineering and construction firms need to take into account factors such as 'company-specific factors' and 'factors specific to project location' in order to achieve success (Peak and Kim, 1993). Global competitiveness is increasing every year due to globalization and improvements in the construction industry and the renewal of the companies themselves in line with the current conditions is crucial. Therefore, it is essential to analyse the sources of competition strength correctly and adapt to changing market conditions in order to achieve success in the international construction sector permanently.

Several studies have already been conducted on the success of construction firms in international projects. Ofori (2003) noted that a company's archives, corporate information, communications structures, resources, and risk management capabilities might be indicators of success in international markets. In a similar study, Günhan and Arditi (2005b) ranked the most important factors in universal success in the construction sector, such as archive attendance, expert experience, project management ability, international communication network, financial power, equipment, materials and labor power. Özorhon et al. (2006) have determined that the intensity of competition among the bidders of international competitiveness is highly

correlated with the attitude of the host country, the company's experience in similar works and the cultural closeness between the host and the contractor's countries. Korkmaz and Messner (2008) have investigated the competitive positioning and the continuity of the international market and pointed out that the construction companies' strategies are shaped according to market needs and global trends.

Sectoral competitiveness has been the focus of a group of research. For example, Momaya and Selby (1998) examined the level of competitiveness of countries such as Canada, USA and Japan in the construction sector. In their study, the authors emphasized the importance of assets and processes that created competitive power and pointed out that long-term communication relationships between technological and managerial skills and companies are critical components of the success of the network. Flanagan et al. (2005) conducted a similar study on competitiveness in the construction sector in the UK, Sweden and Finland. The findings of the study reveal that risk management skills, innovative construction technologies, the use of information technology and openness to change are sources of competitive advantages. Öz (2001) investigated the sources of Turkish construction firms' competitive power in international markets. As a result of the study, it is pointed out that competitiveness is mainly dependent on the advantages of labor costs and geographical and cultural proximity. Also, it was emphasized that the presence of a dynamic domestic market influenced international competitiveness. Zhao et al. (2009) pointed out that while insufficient design activities, lack of workforce qualification and low productivity are weaknesses of Chinese contractors which is one of the biggest competitors of Turkish contracting companies, has low labor-force costs, low-cost materials, machinery and equipment, expertise and strong contribution from the state are the sources of the competitive advantage in the international market.

2.1.2. Advantages and Disadvantages of Overseas Construction

The construction sector is an extremely important item of economic activity. It provides a significant contribution to the economy of countries due to other industries dependence on its with its employment potential, its intense input-output relationship with other sectors, especially manufacturing industry, and its foreign exchange earning characteristics of activities carried out abroad (Ergin, 2003). Therefore, the expansion

of the construction industry is important for other industries such as white goods, furniture and all building material manufacturing industries.

International contracting services are of particular importance in the economy, especially when public construction and domestic investments decline. Contracting firms that undertake construction work abroad make a major contribution to the balance of payments through the export of construction materials, machinery and equipment as well as foreign exchange inputs in the form of profit transfer or through the currencies sent by the workers. In addition to these, international contracting services make positive contributions to employment, technology accumulation, quality and standards of construction materials (Ergin, 2003). In this context, the unemployed labor force may find an opportunity to work abroad, and therefore, unemployment rates may decrease. On the other hand, companies can transfer new technologies, efficient solutions and new materials for their internal markets in order to develop their construction processes. Especially for the countries that have the problem of foreign trade deficit like Turkey, overseas construction projects can provide a contribution to close the deficit (Yurdakul, 2017), by supporting export of building materials.

In addition to increasing foreign investment and employment, foreign contracting services sector also contributes to domestic companies' access to technology accumulation and international standards. While technology accumulation brings an increase in capacity of construction companies, developed standards make these companies more institutionalized. As a result of the increase in capacity and production standards of companies and the necessity of institutionalization, companies can undertake large domestic projects with local and foreign consortiums (Ergin, 2003). Internationalization of a company and its employers is beneficial for both domestic and international business, also important in terms of expanding the vision of individuals.

Experience to date has shown that the economic contraction and crises in host countries have direct negative impacts on construction companies operating in foreign markets (Zhi, 1995; Kerur and Marshall, 2012). Therefore, it is important that financial feasibility is done correctly before entering in overseas construction projects. The competitive environment in foreign countries, the standards required to comply, and the need for advanced technology can negatively affect construction companies' overseas investments. For the prevention of any possible failure, construction

companies receive professional assistance from firms offering investment consultancy services in foreign countries (Işık, 2008: 18). Therefore, companies can expand their business network and ensure the stability of their continuity in other countries.

2.2. Turkish Construction Sector and Overseas Investments

In this part of the study, the historical development of the Turkish construction industry from the establishment of the Republic of Turkey and its overseas investments until now will be explained in detail.

2.2.1. Development of Turkish Construction Sector

Since the establishment of the Republic of Turkey, 95 years of development of the Turkish construction sector can be evaluated in five consecutive periods: preparation, internal market efficiency, opening up to the international market, market and product diversification and global competitiveness. The first two periods continued until the early 1970s. The Turkish construction sector, which took a step-in international project after the 1970s, has made a significant leap in the 2000s.

In 1923, after the establishment of the Republic of Turkey and the new government model with the political, economic, social and cultural reforms, Turkey experienced a rapid modernization process, where major infrastructure and industrial investments were carried out across the country. This development was so rapid that the state had to take many specific measures in the 1920s, including the employment of foreign experts in public institutions, in order to close the gap of qualified white-collar workforce due to deficiency of the architects and engineers in the country. Partly with the help of this policy and due to the economic crisis, which was taking place at that time in Europe, many European architects, engineers and entrepreneurs have come to Turkey (TMB, 2016; Çelik, 2007: 3).

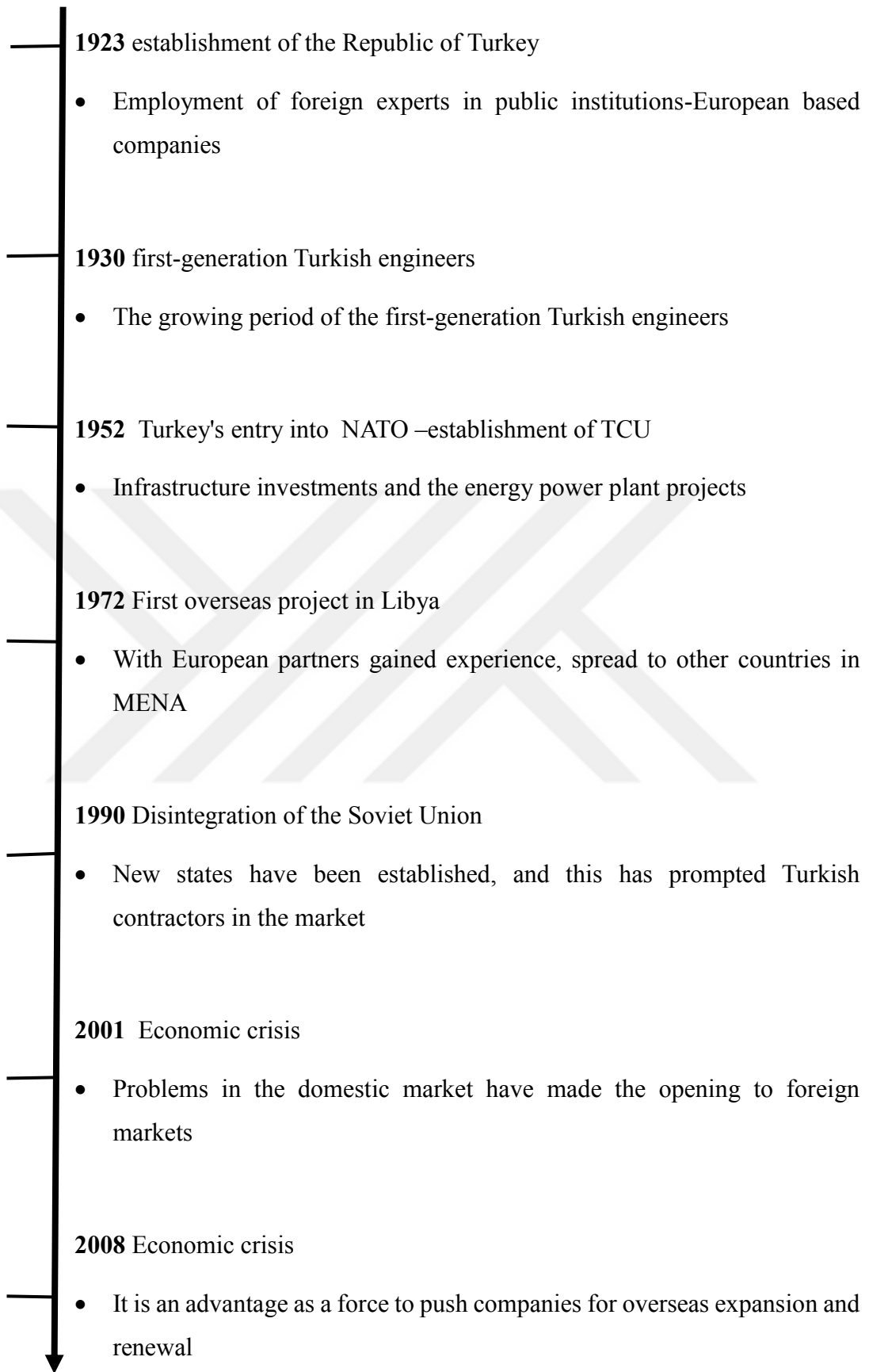


Figure 2.1: Timeline of overseas construction of Turkish contractors

At least one-third of the 28 construction companies established in Istanbul between 1925 and 1926 were European based companies. The 1930s were the growing period of the first-generation Turkish engineers who later completed many challenging projects, both domestic and abroad (TMB, 2016).

Turkey's entry into the North Atlantic Treaty Organization (NATO) in 1952 and the political changes experienced in 1950 were the major turning points in terms of infrastructure investments carried out in later periods. In the same period, the first engineers started their career life rise in an environment that offered them great opportunities to establish their own companies. In 1952, these engineers and business people established Turkey Contractors Union (TMB), one of the oldest non-governmental organizations of the construction sector in Turkey. Water distribution projects in the 1950s, dam projects and the energy power plant projects started in the late 1960s, and the beginning of 1970s provided many opportunities for Turkish contractors to spread their activities to Anatolia (Eşkinat ve Tepecik, 2012: 34). These experiences lead and encouraged Turkish companies to expand their business in the overseas market, especially the Middle East and North African countries that need infrastructure projects in those times.

In the 1970s, Turkish contractors started to enter into foreign markets. In 1972, Libya was the first country which got contracting services from Turkey (İntes, 2016: 36). In foreign markets, Turkish contractors have worked with European partners, and thus, they have started to use and learn European technology. Within ten years, they have spread to countries other than Libya in North Africa and to the Middle East. While their largest share of projects was carried out in Libya, they also have started to operate in countries such as Saudi Arabia, Kuwait and Iraq (Eşkinat and Tepecik, 2012: 34) which have hard working conditions and complex projects and high European quality standards. Therefore, Turkish contractors operate in the Middle East and North Africa (MENA) gained both technical and organizational experience.

Political imbalances in the Middle East in the 1990s have affected the Turkish construction industry and construction projects in the geography. Turkish construction firms, which were included in Libya for the first time in an international project in 1972, have sought other markets due to political imbalances in the 1990s. With the disintegration of the Soviet Union in the 1990s, new states have been established, and this has prompted Turkish contractors to carry out projects in these newly established

independent states. The economic crisis that broke out in 2001 has furthermore led Turkish construction companies to overseas contracting services activities. During this period, problems in the domestic market have made the opening to foreign markets attractive. The increasing competition of Turkish sub-contractors in these years allowed the sector to develop rapidly. The developments occurring in the sector during this period was a result of economic growth, and the situation has continued up to the 2008 economic downturn. For this reason, the 2001 and 2008 economic crises constituted the most important elements affecting overseas contracting services (Özhorhon, 2012: 30). Although recession periods slow down the country's economy, it is an advantage as a force to push companies for overseas expansion and renewal.

2.2.2. Overseas Investment of Turkish Construction Sector

From 1972 to the end of 2017, Turkey overseas contracting services sector has operated in 9,173 international projects that are worth 354.6 billion dollars in 119 countries (KPMG, 2018: 18). While the average total value of projects of Turkish contractors abroad was about 20 million dollars at the beginning of the 2000s, the average project cost reached 87.4 million dollars in 2015. While the average project cost of 2016 is 71 million dollars, the figure for 2017 is 61 million dollars, as seen in Table 2.1 (MUSIAD, 2014).

Turkish contractors' overseas projects are concentrated mainly in Russia and the Commonwealth of Independent States, then in the Middle East and Africa. Regional distribution of projects undertaken to date by 2017 as follows; Russia and the CIS account for 46.8 percent (\$ 165.9 billion), Middle East 26.2 percent (\$ 92.8 billion), Africa account for 18.1 percent (\$ 64.2 billion) - Sub-Saharan Africa account for 4.1 percent, Europe and the Americas accounted for 5.6 percent (\$ 20 billion), while the Asia Pacific region accounted for 3.3 percent (\$ 11.8 billion) (KPMG, 2018, Şat Sezgin, 2018).

Table 2.1: Turkish Construction Sector Overseas Investments

Years	Number of Project	Total Project Price (USD)	Average Project Price (USD)
2002	207	4.491.234.346	21.696.784
2003	337	6.240.609.988	18.518.131
2004	475	8.630.834.610	18.170.178
2005	452	12.978.472.136	28.713.434
2006	574	22.079.142.361	38.465.405
2007	615	25.039.971.457	40.715.401
2008	656	23.995.417.571	36.578.380
2009	511	20.334.308.971	39.793.168
2010	631	23.367.247.330	37.032.088
2011	561	23.915.301.304	42.629.771
2012	545	30.073.223.340	55.182.083
2013	428	29.890.222.255	69.836.968
2014	345	26.856.659.319	77.845.389
2015	265	23.162.952.814	87.407.369
2016	190	13.577.339.410	71.459.681
2017	241	14.666.729.498	60.857.799

Source: KPMG, 2018.

When the projects carried out from 1972 to today are analysed, it can be seen that Russia is a leader with 19.4 percent as seen in Figure 2.1. Russia is followed by Turkmenistan, while the first four countries are CIS (Commonwealth of Independent States) countries and other six countries are MENA countries (KPMG, 2018).

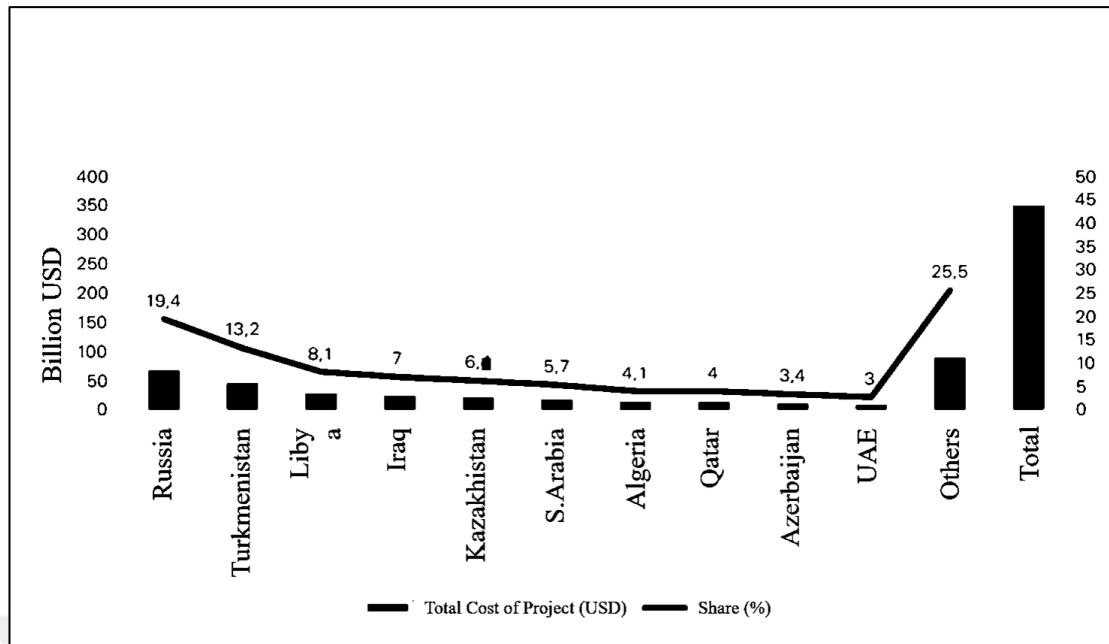


Figure 2.2: Distribution of overseas contracting services of Turkish contractors by country (1972-2017)

Source: KPMG, 2018.

With the addition of Liberia, Chad, Rwanda, Seychelles, Sri Lanka, Czech Republic, Estonia, Madagascar, the Philippines, Hungary, Malawi and Vietnam, the number of Turkish contractors has risen to 119 in recent years. On the other hand, for the first time in 2017, sub-Saharan Africa (Tanzania) has become the most project-bearing country, ahead of Turkish traditional overseas markets. Following the completion of Turkey's membership of the African Development Bank in 2013, The Ministry of Economy of Turkey played an important role in bringing the target country studies to Sub-Saharan Africa. Thus, priority countries such as Tanzania, Ethiopia, Nigeria, Mozambique and Ghana, as well as sub-Saharan Africa, were among the target markets for Turkish contractors. In this context, the "Contracting Committee Program" was carried out in Ethiopia, Nigeria and Mozambique with the participation of company representatives (KPMG, 2018).

The Engineering News Record (ENR) magazine announces the largest 225 contracting firms operating internationally every year. This list prepared by ENR magazine is based on the annual contract income of the projects the companies have undertaken abroad. This list, which has a considerable influence on the international market, is shown as a measure of success for companies (Özorhon and Demirkesen, 2014: 6832). There are many large-scale companies in the construction sector in Turkey that operate

in the international arena listed in this index. Turkey entered the International construction sector magazine ENR's "2017 World's Largest 250 International Contractors" list with 46 companies and took place the second rank after China (KPMG, 2018). Although ranked as second in terms of company number the total value of the project performed in overseas countries less than so many countries which shows that Turkish contracting companies still need a serious improvement for value-added advance project services.

In the conjuncture where the international contracting market has decreased by 14 percent in the last three years, the performance of Turkish contracting firms has increased. The number of Turkish firms in the ENR list increased from 40 to 46 according to 2016, while the market share of Turkish firms increased in the same period. The total market share of the listed Turkish firms was 3.8 percent in 2013 and 5.5 percent in 2016. While the share of Turkish contractors in regional revenues has decreased somewhat in Europe, it has increased all over their main markets. Market share rose from 7.9 percent to 9.1 percent in the Middle East, from 5.5 to 7.0 percent in Asia, and from 4.7 percent to 5.1 percent in Africa (KPMG, 2018).

Table 2.2: ENR, Turkish companies listed on the world's top 250 international contractors

No	2017 Rank	2016 Rank	Company
1	38	44	Rönesans Holding, Ankara
2	42	40	Polimeks İnşaat Taahhüt ve Sanayi Ticaret A.Ş., İstanbul
3	72	79	ENKA İnşaat ve Sanayi A.Ş., İstanbul
4	76	81	TAV İnşaat, İstanbul
5	78	93	Yapı Merkezi inşaat ve Sanayi A.Ş., İstanbul
6	79	**	Alarko Taahhüt Grubu, İstanbul
7	85	135	Limak İnşaat Sanayi ve Ticaret A.Ş., Ankara
8	86	86	Ant Yapı Sanayi ve Ticaret A.Ş., İstanbul
9	92	137	GAP İnşaat Yatırım ve Dış Ticaret A.Ş., İstanbul
10	98	**	Universal Acarsan Sağlık Hizmetleri ve İnşaat Ltd. Şti., Gaziantep
11	105	98	Nata İnşaat Turizm Taşımacılık Ticaret ve Sanayi A.Ş., Ankara
12	109	133	Mapa İnşaat ve Ticaret A.Ş., Ankara
13	110	101	Çalık Enerji Sanayi ve Ticaret A.Ş., Ankara
14	112	118	Tekfen İnşaat ve Tesisat A.Ş., İstanbul

No	2017 Rank	2016 Rank	Company
15	125	157	Sembol Uluslararası Yatırım Tarım Peyzaj İnşaat Turizm Sanayi ve Ticaret A.Ş., İstanbul
16	128	146	Doğuş İnşaat ve Ticaret A.Ş., İstanbul
17	130	141	Kuzu Grup, İstanbul
18	134	121	Yüksel İnşaat A.Ş., Ankara
19	140	151	Onur Taahhüt Taşımacılık İnşaat Ticaret ve Sanayi A.Ş., Ankara
20	151	148	Nurol İnşaat ve Ticaret A.Ş., İstanbul
21	154	**	Gülsan İnşaat Sanayi Turizm ve Nakliyat Ticaret A.Ş., Ankara
22	156	138	İlk İnşaat Taahhüt Sanayi ve Ticaret A.Ş., İstanbul
23	158	173	Eser Taahhüt ve Sanayi A.Ş., Ankara
24	162	155	GAMA İnşaat A.Ş., Ankara
25	165	158	STFA İnşaat Grubu, İstanbul
26	166	**	Tepe İnşaat Sanayi A.Ş., Ankara
27	167	169	KAYI İnşaat Sanayi ve Ticaret A.Ş., İstanbul
28	168	174	Esta İnşaat Sanayi Lojistik ve Dış Ticaret A.Ş., İstanbul
29	175	182	IC İçtaş İnşaat Sanayi ve Ticaret A.Ş., İstanbul
30	176	193	Aslan Yapı ve Ticaret A.Ş., Ankara
31	186	217	Meta İnşaat Ticaret A.Ş., Ankara
32	187	206	SMK Ulusal İnşaat ve Ticaret A.Ş., Ankara
33	190	222	AE Arma-Elektropanç Elektromekanik Sanayi Mühendislik Taahhüt ve Ticaret A.Ş., İstanbul
34	194	195	SUMMA Turizm Yatırımcı lığı A.Ş., İstanbul
35	196	200	Bayburt Grup A.Ş., Ankara
36	200	231	Anel Holding A.Ş., İstanbul
37	206	226	Yenigün İnşaat Sanayi ve Ticaret A.Ş., Ankara
38	216	**	Gürbağ A.Ş., Ankara
39	223	184	Cengiz İnşaat Sanayi ve Ticaret A.Ş., İstanbul
40	224	246	Kolin İnşaat Turizm Sanayi ve Ticaret A.Ş., Ankara

No	2017 Rank	2016 Rank	Company
41	225	**	Dekinsan Grup İnşaat A.Ş., Ankara
42	226	**	Makyol İnşaat Sanayi Turizm ve Ticaret A.Ş., İstanbul
43	233	224	Zafer Taahhüt İnşaat ve Ticaret A.Ş., Ankara
44	239	**	Polat Yol Yapı Sanayi ve Ticaret A.Ş., İstanbul
45	244	**	Caba Grup A.Ş., Ankara
46	250	**	MBD İnşaat Sanayi Turizm Mühendislik ve Ticaret A.Ş., Ankara

Source: KPMG, 2018.

Rönesans Holding, the first listed company in the list, bought 100 percent of Heitkamp Ingenieur und Kraftwerksbau GmbH. Renaissance Holding also acquired the Dutch company Ballast Nedam and reached a turnover of EUR 1 billion. Rönesans Holding has linked Zurich and Milan to Europe by constructing the world's longest railway tunnel Gotthard Base. The company also took the PPP project, which consists of roads and tunnels, in Rotterdam, the Netherlands, amounting to about 1 billion euros. Polimeks and Enka follow Rönesans Holding in order in terms of overseas construction investments.

The companies in the list have professional organizational structure, systematical information record, professional project management system and expand their overseas business through international consortiums.

3. CONSTRUCTION DELAYS

There are many definitions of delay in literature for construction projects. In its simplest form, the delay in construction projects is the completion of the project later than the project end date specified in the schedule. Bramble and Callahan (2010, page) defined delay as “delay in any part of the construction project, which was extended according to the planned time, with the realization of unexpected situations”. Trauner et. al. (2009: 25) defined delay as “Something is done later than expected or not timely acted.” As a result of delays, the construction of a project or part of a project is not completed within the period specified in the contract.

Delays often occur in construction projects and cause time and money loss for all parties. For this reason, conflicts are commonly caused by delays. The frequent occurrence of disputes arising from delays also increases the importance of delay analysis in construction project management. Construction projects consist of multiple business and work groups, the delay of the project may be the result of multiple delays occurring at the same time from different work groups, as it is possible that individual delays may occur in each of these groups. The delay analysis is used to determine the reasons for delays in order to decide whether time extension is required. The time extension saves the contractor from the liability of the loss (Lowsley and Linnett, 2006). In order to resolve disputes fairly, delay analysis must be done correctly, in order for the delays to be correctly classified. In order to classify the delays correctly, the reasons for the delays should be well understood.

3.1. Type of Delays

In order to conduct a delay analysis for a project, initially, it is necessary to identify the delay elements occurring in the process. Evaluating the effects of the delay elements on the whole project is an important issue to be examined under the title of analysis techniques. The classification of these elements and responsibility analyses should be carried out. This process is a priority issue that plays an active role in the

conclusion of the analyses. In order to prevent possible differences between delay analyses conducted by various parties, which may lead to conflicts, the events occurring during the construction phase must be determined in a way that will be checked by both parties. Before the analysis starts, all the information and records within the scope of the project should be examined, and data that shows the responsibilities of delays, should be obtained and recorded to be used as evidence in the conclusion of the analysis. There can be some different results between the delay analyses although same techniques are used. The most important factor in revealing those different results is that the delay analyses are carried out within the scope of one of the parties (contractor or owner) and these parties try to manage delay analyses for their own interests. During the analysis process, the slightest change in the program can lead to results that will change the whole process (Tumi et.al, 2009). Therefore, professional information record system and organizational structure are more important for international companies to analyse the delays and protect their rights.

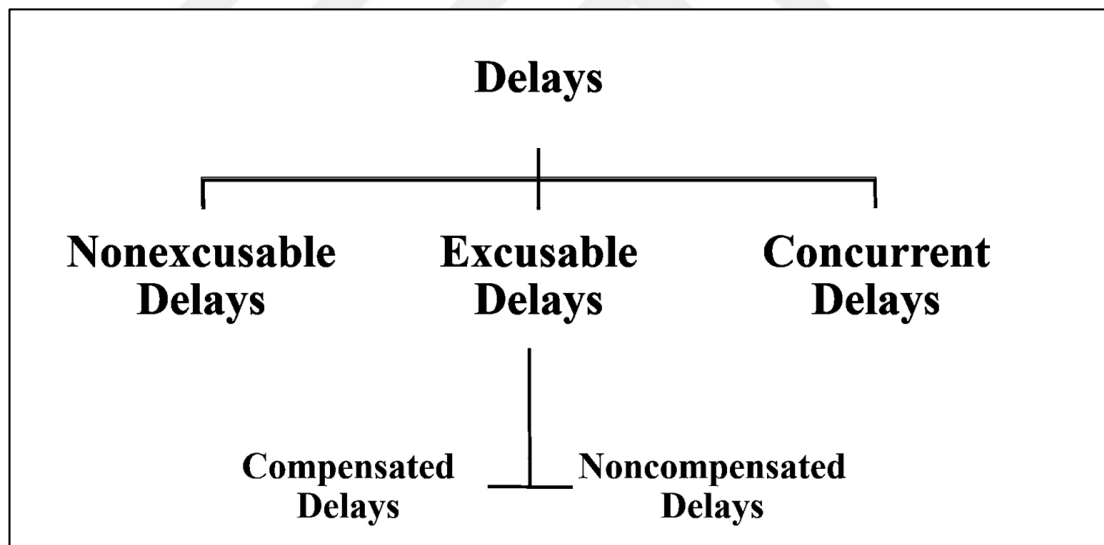


Figure 3.1. Type of Delays in the Construction Projects (SCL, 2000)

The delay definitions in the construction sector can be evaluated under three main approaches, as seen in Figure 3.1, which will be examined in this part of the study. Under the first approach, some descriptions indicate the status of delays related to excuses, and the importance of these excusable or non-excusable delays in the project will be investigated. As the second approach, the important issues about whether the

delays can be compensated or non-compensated, will be examined. Thirdly, the concurrent delays, which play an important role in the conclusion of projects and caused by the peer responsibility of the employer and the contractor, will be explained.

Table 3.1. Summary of Delay Types in the Construction Projects

Type of Delays		Definition	Responsible Part	Time Extension & Compensation
Nonexcusable Delays		delays in the responsibility of the contractor and subcontractors or material supplier	Contractor Subcontractor Suppliers	No additional time extension or compensation claims regarding these delays
Excusable Delays	Compensated Delays	under the terms of the owner's responsibility and affects the end date of the project	Client	contractor is entitled to compensation and extension within the limits of the rights
	Noncompensated Delays	Are not the responsibility of the owner or the designers (if the contract is not a design and build contract) and that delay the end date of the work	Third parties	contractor has the right to claim compensation, in case there is no possibility that delays can mitigate by the contractor without losses.
Concurrent Delays		more than one type of delay occurs together or separately, if it affects the critical path of the project	Contractor The owner	contractor is given a time extension; varies according to its situation in the project

3.1.1. Excusable Delays

Delays that are not under the responsibility of the contractor, in other words, delays that are not originated from the applications made by the contractor are considered as excusable delays. Such excusable delays may also be the responsibility of the owner, or a delay caused by unexpected conditions. Unless otherwise stated in the contract, if the impact of the excusable delay affects the end date of the work and it is on the

critical path, the contractor shall be granted the right to extend the contract within the rules of the Society of Construction Law (SCL) Delay Protocol (2002). This period of extension, no matter it is a compensated or non-compensated delay, varies according to the conditions of the project. SCL (2002) Delay Protocol Article 14 explains that the vested right of extension does not mean that delay may bring compensation at the same time. This rule that explains the link between the extension of time and compensation, has been written in this protocol as follows (SCL, 2000: 8);

“Entitlement to an Extension of Time (EOT) does not automatically lead to entitlement to compensation (and vice versa)”

3.1.2. Nonexcusable Delays

Nonexcusable delays are delays in the responsibility of the contractor, in case they are not under the responsibility of the owner, all delays related to project in the scope of the main contractor. Nonexcusable delays also include the delays under the responsibility of the subcontractor for the material supplier. These delays, which are under contractors' responsibility, also include delays caused by the environmental conditions in the seasonal norms (Keane and Caletka, 2008) which can be evaluated as compensable delay causes, because it is contractor's responsibility to research the country conditions.

The contractor is obliged to undertake all of the indirect-direct costs which are arising from these nonexcusable delays calculated by the analyses. Because of the nonexcusable reasons for these delays, there can be no additional time extension or compensation claims regarding these delays. Since nonexcusable delays are evaluated under the responsibility of the contractor, additional costs incurred due to the delay of the project must be compensated by the contractor unless otherwise stated in the contract. This penalty should be applied if there is a delayed penalty in the contract due to the prolongation of the work (Keane and Caletka, 2008).

Some reasons for nonexcusable delays are as follows (O'Brien and Plotnick, 2006).

- i. Slowness to take action,
- ii. Lack of labor,
- iii. Lack of equipment,
- iv. Poor workmanship,
- v. Lack of coordination,

- vi. Insufficient supervision,
- vii. Cash shortage faced by the contractor,
- viii. Inefficiency,
- ix. Subcontractor performance,
- x. The bankruptcy of subcontractor or supplier,
- xi. Supplier's late delivery,
- xii. Poor planning

3.1.3. Concurrent Delays

When more than one type of delay occurs together with or separately, a concurrent delay occurs if it affects the critical path of the project. (Arditi and Robinson 1995; Ostrowski and Midgett, 2006). Concurrent delays occur when two or more delays occur in the same period or overlap at a certain level. Trauner et al. (2009) defined these delays as concurrent delays on the critical path. According to Wickwire et al. (2002), when both the contractor and the owner have one or more delays at the same time, it is called a concurrent delay.

The process of evaluating and concluding the simultaneous delays varies depending on the situation of the project. The most important factor affecting the completion of the delay analysis is the evaluation of concurrent delays under the responsibility of the owner and the contractor. Concurrent delays mean that the contractor is given a time extension. Concurrent delays that affect the critical path of the project and delay the completion time of the work on a later date give the contractor the right to extend the time specified in the contract. However, the compensation of this period extension varies according to its situation in the project (SCL, 2002)

As stated in Article 10 of SCL (2002) Delay Protocol, the contractor is only liable to compensate for its delay if the risk elements of contractor and owner (employer) can be separated in case of concurrent delays. However, if these risk elements of concurrent delays cannot be separated, the owner cannot hold the contractor liable for these concurrent delays. Article 10, which explains the relationship between concurrent delay and compensation, has been written in the SCL (2002) delay protocol as follows (SCL, 2002: 7);

“If the Contractor incurs additional costs that are caused both by Employer Delay and concurrent Contractor Delay, then the Contractor should only recover

compensation to the extent it can separately identify the additional costs caused by the Employer Delay from those caused by the Contractor Delay. If it would have incurred the additional costs in any event as a result of Contractor Delays, the Contractor will not be entitled to recover those additional costs.”

In general, it was seen that the SCL (2002) Delay Protocol does not have a clear decision mechanism on how to act on concurrent delays. Alkass et al. (1996) propose the following assumptions in the classification of concurrent delays;

- i. The contractor shall only be granted time extension if the excusable and nonexcusable delays occur at the same time,
- ii. If the excusable and compensated delays, or excusable and noncompensated delays simultaneously coincide, the contractor shall not be given the total extension time extension, but the calculated compensation shall be given to the contractor.
- iii. If two excusable and compensated delays co-occur, then the contractor shall be granted both time extension and compensation.

3.1.4. Compensated Delays

Compensated delay is a definition of a situation that is not under the responsibility of the contractor, which is collected under the excusable delays that occur under the terms of the owner's responsibility and affects the end date of the project. In cases where there are delays in the responsibility of the owner, with no effect of the contractor, the contractor is entitled to compensation within the limits of the rights. The compensation situations arising from the delays in the owner's responsibility can be summarized as follows (Keane and Caletka, 2008):

- i. Request changes in the project,
- ii. Suspend whole or part of the project,
- iii. Postponement of the whole or part of the project,
- iv. Other owner responsibilities specified in the contract.

In the cases mentioned above, the owner must give an extension to the contractor. Indirect-direct costs incurred due to the extension of the duration of the work within this additional extension shall be compensated by the owner within the limits of the rights.

The direct costs caused by the changes in the project should be evaluated immediately when a change occurs, and the losses incurred should be recorded in writing between the parties. The SCL Delay Protocol (2002) recommends that immediate resolution shall be carried out between parties when a delay occurs. Because leaving a solution to a possible delay will cause disagreements over time. These disagreements will increase with the time elapsed, and over time, parties' approach to delays will vary in line with their interests. For all these reasons, delay analysis should be carried out as soon as possible when changes and delays occur. As stated by Article 2 of the SCL (2002) Delay Protocol, the main purpose of the delay analysis is to provide time extension to the contractor (i.e. to free the contractor from the compensation due to the delay specified in the contract) and to establish a new target date for the end of the work. Besides, Keane and Caletka (2008) state the situations which do not result in direct compensation, but are likely to be compensated as they cause contractors' performance to fall.

- i. Not to perform a job on time, which is the prerequisite of the contractor,
- ii. To interfere with the contractor's program and make it work at a time when it will affect its performance,
- iii. To give false information that will cause the contractor to fail,
- iv. Not conducting the follow-up inspections on time,
- v. To direct the contractor to a certain method for conducting the work, although any specific method was not given in the contract.

Although the condition mentioned above do not affect the completion time of the work, the contractor can be awarded compensation according to the evaluation of the project, since it limits the activities of the contractor and therefore reduces productivity.

3.1.5. Noncompensated Delays

Noncompensated delays are delays that are not the responsibility of the owner or the designers (if the contract is not a design and build contract) and that delay the end date of the work. Excusable delays which are noncompensated delays are the delays caused by third parties. The SCL (2017) Delay Protocol states that if the contractor has the opportunity to relieve the employer risk by using the float time without any loss in the project, then the contractor must mitigate the effects of delay. However, the contractor

has the right to claim compensation because of damages, in case there is no possibility that delays can be mitigated by the contractor without any losses.

Delays resulting from force majeure are noncompensated delays. When force majeure occurs, the contractor has the right to extend the time, but it is not possible for the employer to compensate for the damages incurred by the contractor. These delays are the delays that are not under the control of the employer and the contractor which occur in the following cases (Mubarak, 2005).

- i. Natural disasters such as earthquakes, floods, epidemics,
- ii. War cases,
- iii. Strikes,
- iv. Embargo situations,
- v. Unexpected weather conditions

In cases where there are delays caused by similar reasons above, the contractor is given the right to extend the contract to prevent any loss.

3.2. Factors Affecting the Delays

There are many reasons for construction delays. These reasons vary according to the nature of the project and the location of the project. Researchers have conducted numerous studies to explain the causes of construction delays. Table 3.1 summarizes the factors related to the causes of delays in construction projects obtained from the literature review.

Table 3.2: Studies on the causes of delay in construction projects

Authors	Region	Reasons
Baldwin et al. (1971)	USA	- bad weather conditions - limited labor supply - sub-contractor system
Arditi et al. (1985)	Turkey	- limited resources - financial difficulties faced by contractors and public institutions

Authors	Region	Reasons
		<ul style="list-style-type: none"> - enterprise shortcomings - delays in design work - frequent changes in order / design - remarkable additional works
Okpala & Aniekwu (1988)	Nigeria	<ul style="list-style-type: none"> - limited material - failure to pay for completed work - poor contract management
Dlakwa & Culpin (1990)	Nigeria	<ul style="list-style-type: none"> - delays in payments made by owners or institutions to contractors - fluctuations in material, labor and plant costs
Mansfield et al. (1994)	Nigeria	<ul style="list-style-type: none"> - improper financial and payments related regulations - poor contract management - limited material - incorrect cost estimates - fluctuations in expenses
Semple et al. (1994)	Canada	<ul style="list-style-type: none"> - Increases in terms of works, - Bad weather conditions - Restricted access
Assaf v.d. (1995)	Saudi Arabia	<ul style="list-style-type: none"> - slow preparation and approval of manufacturing drawing - delays in contractor payments - changes in design and design errors - limited labor supply - poor workmanship
Ogunlana & Promkuntong (1996)	Thailand	<ul style="list-style-type: none"> - Limited material - Changes in design - Communication problems between parties

Authors	Region	Reasons
Chan & Kumaraswamy (1996)	Hong Kong	<ul style="list-style-type: none"> - Unforeseen ground conditions - Poor field management and control - The Slow decision-making process of project teams - Client-driven changes
Al-Khalil & Al-Ghafly (1999)	Saudi Arabia	<ul style="list-style-type: none"> - Cash flow problems / financial difficulties - Difficulties in obtaining permissions -” Lowest bid wins “system
Al-Momani (2000)	Jordan	<ul style="list-style-type: none"> - Poor design - Changes in order / design - Bad weather conditions - Unpredictable ground conditions - Late deliveries
Lo et.al (2006)	Hong Kong	<ul style="list-style-type: none"> - Insufficient resources - Unpredictable ground conditions - Extremely low offers - Inexperienced contractors
Faridi and El-Sayegh (2006)	UAE	<ul style="list-style-type: none"> - Slow preparation and approval of drawings - Insufficient project pre-planning - Employers' slow decision making - Inadequate workforce - Poor field management and control - Inefficient Manpower
Assaf and Al-Hejji (2006)	Saudi Arabia	<ul style="list-style-type: none"> - Change of orders by the employer during construction - Delay of progress payment - Inactive planning and scheduling - Insufficient labor force - Financial difficulties on the side of the contractor
Sweis et al. (2007)	Jordan	<ul style="list-style-type: none"> - Severe weather conditions, - Too many changes ordered by owner - Changes in government laws and regulations, - Financial difficulties faced by contractors

Authors	Region	Reasons
Tumi et al. (2009)	Libya	<ul style="list-style-type: none"> - Lost of interest by the stakeholder - Blacklist by authorities - Waste of time and money - Declination of reputation
Khoshgoftar et al. (2010)	Iran	<ul style="list-style-type: none"> - Finance and payments of completed work, - Improper planning, site management, contract management, - Lack of communication between the parties
Kazaz et al. (2012)	Turkey	<ul style="list-style-type: none"> - design and material changes - delay of payments - cash flow problems - contractor's financial problems - poor labor productivity - estimation problems - lack of feasibility studies
Othuman, Mydin, Sani, Taib and Mohd Alias (2014)	Malaysia	<ul style="list-style-type: none"> - Unexpected weather conditions - Bad site conditions - Poor field control - Incomplete consultant information - Lack of experience of the consultant - Financial problems of the contractor - Contract changes - Delay of significant amendments within the scope of work by the consultant - Contractor coordination issues - Missing and defective work

Authors	Region	Reasons
Sivaprakasam, Dinesh and Jayashree (2017)	India	<ul style="list-style-type: none"> - Lack of experience in work, - Poor supervision, - Changes in design during construction by the owner, - Delay in delivery, - Lack of coordination, - Problems in project management, - Harsh weather and soil condition, - Slow mobilization.

3.2.1. Financial Factors

It is known that there may often delays occur arising from the problems in the financing of construction projects (Kenley, 2003). In particular, the failure to manage the cash flow in a balanced manner may cause projects to be delayed or even lead to the bankruptcy of contractors (Al-Khalil and Al-Ghafly, 1999). The disruptions in progress payments may also cause delays, which may further result in completion delays (Assaf and Al-Hejji, 2006). Therefore, the management of cash flows is of crucial importance in preventing delays. Trying to finish the project in a short time may not be financially efficient for both parties. According to Cooper (2004), the effects of time changes on the project are ironic. Delays lead to an increase in cost; however, the costs of accelerated projects increase as well. This is because more resources are spent to get the job done in a short time. In conclusion, construction projects have to be planned well and also have to be managed successfully in terms of financial activities in order to complete projects in the contract duration and contract value.

Al-Bahar and Crandall (1990) identified the financial factors that cause delays in construction projects as follows;

- i. Inflation,
- ii. Inability to receive money from the employer on time,
- iii. Financial errors caused by workers,
- iv. Exchange rate difference, if worked with foreign currency,

v. Exchange rate of money.

Investing overseas construction projects has financial risks that cause delays in a situation to fail to control the cash flow of the projects. As a result of the literature survey, it has been seen that the financial stability of the foreign country is the most important issue for the overseas contractors in order to manage the cash flow of the project successfully.

3.2.2. Labor Force

One of the reasons for delays in construction projects regards labor-related factors, a concept that expresses the supply of labor in terms of the number of people. There are many studies in the literature that show the role of labor-related factors in delays. For example, Chan and Kumaraswamy (1997) describe labor-related factors as; labor shortage, low skill level, weak motivation and low productivity. Mezher and Tawil (1998) identified labor-related factors like the poor competency of the workforce, the nationality of the labor force, scarcity of labor, low productivity and inadequacy of masters. Odeh and Battaineh (2002) and Sambasivan and Soon (2007) have identified labor-related factors as problems in labor supply and labor productivity. Assaf and Al-Hejji (2006) determined the scarcity of labor force, unqualified workforce, nationality of the labor force, low productivity of labor, personal disputes between workers as reasons for delays. In their study, Le-Hoai et. al. (2008) stated that the inadequacy of qualified labor force is an important factor related to labor force. Fugar and Agyakwah-Baah (2010) noted that the scarcity of skilled workforce brings delays in the projects. Mahamid et al. (2012) identified the low productivity of the workforce, the low skill levels of the equipment operators, the inadequacy of the workforce, the personal disagreements between the management team and the workers and the personal disagreements between the workers as labor-related factors.

Kazaz et al. (2012) revealed that labor related factors such as low labor productivity, low labor quality, shortage of labor caused construction delays. Gündüz, et. al (2013) related delays to labor-related factors such as the lack of attendance, low worker motivation and morale, low labor productivity, personal disagreements among workers, insufficiency of labor, slow mobilization of labor, strikes and unskilled labor force. Similarly, Ibironke et al. (2013) listed labor-related factors as follows; slow mobilization of labor, insufficiency of skilled workforce, labor productivity, the supply

of labor, absenteeism, strike and low motivation and morale. Aigbavboa et al. (2014) presented the low productivity level of the workforce, insufficiency of labor, disagreement among workers and work permits as labor-related delay factors.

In conclusion, the most important labor related factor is the quality of the labor force. Especially, in overseas projects carried out in underdeveloped countries with low labor capacity may suffer from low labor quality which may cause delays in projects. In order to solve low labor quality, contractors may transfer qualified labor force to their overseas projects.

3.2.3. Design Changes/Revisions

Another important factor that causes project delays regards design-related issues. These factors are delays caused by the architect, engineer and mostly by the client. Studies in the literature related to delays caused by design revisions and changes, design failures have been investigated and explained in the remaining part of this section.

Ogunlana et al. (1996) stated that inadequate drawings and slow responses from contractors due to the contractor incompetence/inadequacies, are the factors that cause design-related delays. Chan and Kumaraswamy (1997) listed design-related factors as follows; the inadequate experience of the design team, the complexity of the design, its mistakes and delays in the production of the design documents. Aibinu and Odeyinka (2006) pointed out that inadequate drawings, late information, change orders, insufficient inspections, inadequate information distribution and delayed work approvals are design related delay factors. In their study, Assaf and Al-Hejji (2006) stated that delay causes as follows;

- i. Errors and inconsistencies in the design documentation,
- ii. Delays in the production of design documents,
- iii. Uncertainty in the drawings and inadequate details,
- iv. The complexity of the project,
- v. Inadequate data collection and pre-design surveys,
- vi. Misunderstanding the requirements of owner by design engineer
- vii. Inadequate experience of the design team,

- viii. Lack of using advanced engineering design software.

Mahamid et al. (2012) determined that inappropriate design, design errors and late design studies are causes of design related delays. Akogbe et al. (2013) evaluated the change orders, changes in drawings, additional works and slow information among parties, approval of works and small audit issues under the design-related factors. Gündüz et al. (2013) listed the design related factors that lead to delays as follows;

- i. Complex design,
- ii. The design changes made by the owner or the consultant during the construction phase,
- iii. The design errors made by the designer,
- iv. The inadequacy of the data collection and anthology before the design,
- v. The lack of experience in the design team's construction projects,
- vi. The mistakes made in the production of the design documents and delays,
- vii. Misunderstandings of the owner's wishes,
- viii. Ineffective and inadequate use of advanced design software,
- ix. Inadacuate detail solutions in the drawings.

Changes in design during the construction of the project may lead to various problems that will cause delays. Therefore it has been understood that the design team should be created with experienced and qualified personnel.

3.2.4. Contractual Factors and Project Factors

The factors related to the contract that cause delays have also been frequently investigated in the literature. These factors are both contract-related factors and project-related factors. Various delay causes have been identified related to these factors in previous literature.

Chan, and Kumaraswamy (1997) stated project-related factors as; the characteristics of the project, necessary changes, communication between different stakeholders, rapid decision making and ground conditions covering all project teams. In their study, Lo et al. (2006) pointed out the causes of delays in the project as the unpredictable

ground conditions, the constructability and the incompatibility between initial requirements and construction projects. Assaf and Al-Hejji (2006) listed the contract related factors related to the project as follows;

- i. The short duration of the original contract,
- ii. The legal disputes with stakeholders,
- iii. Insufficient definitions,
- iv. Ineffective delay penalties,
- v. The type of construction contract and the type of the project.

Faridi and ElSayegh (2006) identified the lack of communication and coordination between stakeholders and changes in the contract as project/contract related factors. LeHoai et al. (2008) identified project-related factors as design changes, slow information flow across stakeholders, and additional work. Toor and Ogunlana (2008) found five factors related to the contract in their studies. These factors are inadequate contract management, lack of cooperation with local authorities, incomplete contract documents, use of inappropriate methods in dispute resolution and legal issues arising from state laws and regulations. Fugar and Agyakwah-Baah (2010) determined the factors related to contractual issues as; legal disputes, inadequate communication between the parties, insufficient professional management, delayed information by the consultant and the delay of subcontractors. Kazaz et al. (2012) in their review, identified project-related delays as; lack of physical feasibility, old construction methods, poor equipment and materials, inadequate maintenance of the project scale and rarely used construction methods. According to Mahamid et al. (2012), the tender to the lowest bidder, the public activities, discomfort, limited construction area, inappropriate field entrances, poor ground quality and poor land conditions are the factors related to the project. Gündüz et al. (2013) evaluated the complexity of the project, incomplete definition of temporary acceptance, ineffective delay penalties, legal disputes between the project participants, the duration of the original contract, and passive contractual clauses as project related delays.

It has been concluded that communication and coordination between especially contractor and owner, and other stakeholders are of great importance in order to create a good contract. This good cooperation will reduce problem and delays related contractual factors.

3.2.5. Environmental and External Factors

One of the categories selected to identify the causes of delay is environmental and external factors. Delays to be evaluated in this category have been examined and listed in the following paragraph.

In their research, Ogunlana et al. (1996) have pointed out that the limited field area, problems with neighbours and the delays in construction licenses given by public institutions as environmental factors. Chan and Kumaraswamy (1997) identified the issues associated with environmental and external factors as; environmental concerns and constraints; and waiting for the approval of material sample tests and drawings. Odeh and Battaineh (2002) and Sambasivan and Soon (2007) determined these types of factors like adverse weather conditions, problems with neighbours, unpredictable ground conditions and regulatory changes and building codes. Long et al. (2004) stated the environmental and external factors as; unpredictable ground conditions, harsh weather conditions, inadequate site allocation, price fluctuations, material scarcity and slow clearance of the site. Aibinu and Odeyinka (2006) listed external factors as; price increases, state regulations, difficult weather conditions, natural disasters, labor disputes and strikes, civil insurrection and slow governmental permits. Assaf and Al-Hejji (2006) listed environmental and external factors in their study as follows;

- i. The effect of underground conditions,
- ii. The delay of the receipt of municipal permits,
- iii. The construction in hot weather effect productivity during the construction activities,
- iv. Construction activities during the rainy weather effect,
- v. Water electricity telephones services not available in the field,
- vi. The effects of social and cultural factors,
- vii. Traffic control and job site constraints,
- viii. Accidents during construction,
- ix. Differentiated ground conditions,
- x. Changes in state regulations and laws,

- xi. Delay in the use of public services (water, electricity, etc.) and by third parties
- xii. Delayed certification.

Mahamid et al. (2012) pointed out the political situation, the increase in exchange rates, the change of banks' policies for loans, weather conditions, monopolization, natural disasters as external causes of delays. Gündüz et al. (2013) defined the external factors that bring about delays in construction projects as follows;

- i. Loss of time due to construction accidents,
- ii. Changes in state regulations and laws,
- iii. Conflict, war and hostilities,
- iv. Delay of municipality permits,
- v. Delay in inspection and certification by third parties,
- vi. Delay in the provision of public services such as water electricity,
- vii. The Global financial crisis,
- viii. Job site restrictions
- ix. Traffic control,
- x. Natural disasters (floods, hurricanes, earthquakes),
- xi. Price fluctuations,
- xii. Problems with neighboring parcels,
- xiii. Slow field pass permits,
- xiv. Unexpected ground and underground conditions
- xv. Unfavourable weather conditions.

Aigbavboa et al. (2014) identified external factors as; the impact of the weather during construction activities, political intervention, delay in the provision of public services, the effects of underground and ground conditions, delay in obtaining municipal permits, changes in economic factors, traffic control and job site restrictions, natural disasters, work accidents, changes in the state laws and regulations, and the delay in

the conduct of final audits and inspections. Jarkas and Younes (2014) identified the difficulties of obtaining the work permits of foreign technical personnel and workers, delay in issuing construction permits, delays in final checks and certifications by legal authorities, and delay in receipt of "no objection" as the external and environmental factors that lead to delay in the projects.

It has been seen that the most important environmental factor is the unsuitable weather conditions in overseas projects. Since overseas contractor will have less experience in the region, weather conditions may lead to delays in the projects. In order to solve this problem, contractors may work with a local consultant to learn weather conditions, details and various technical needs due to climate and number of non-working days in the region where construction project carried out.

3.2.6. Rules and Regulations

In every country, even if it varies, several rules and regulations determine the legal framework of the construction projects. However, in some countries, these rules and regulations may cause delays in the projects as they may lead to additional burden on parties. The factors that cause delays due to rules and regulations are listed below (Al-Bahar and Crandall, 1990);

- i. Obtaining permits from the municipality or other public authorities,
- ii. Building codes used in the design of the projects,
- iii. Excessive bureaucracy in project owner operation,
- iv. Changes and revisions in rules and regulations,
- v. Building permits approval process,
- vi. Safety rules and regulations,
- vii. Occupational safety and health regulations
- viii. Coastal construction control line permit
- ix. Obtaining permits for labourers,
- x. National flood insurance program,
- xi. Building rules and regulations in coastal regions,
- xii. Expropriation.

As a result, it is the fact that every country has its own distinct rules and regulation for construction sectors. It has been concluded that delays related to rules and regulations may be overcome with the help of local consulting firms since local actors will have much more experience about the legal procedures written above, than overseas contractors.

3.2.7 Material Factors

The factors associated with materials are one of the categories chosen to identify the causes of delays in construction projects. Literature review reveals that there are various types of factors related to materials which are explained below.

Chan and Kumaraswamy (1997) listed the shortage in materials, material changes, problems in the procurement program and the proportion of off-site prefabrication as material related factors. Abd Majid and McCaffer (1998) determined low-quality materials, inadequate supply, late delivery and unreliable suppliers as the factors that cause delays. Mezher and Tawil (1998) stated that material scarcity, the type and quality of the materials used during construction, slow delivery, storage problems in construction sites, damaged products and poor quality are material related factors that cause delays in projects. Odeh and Battaineh (2002) found that the poor quality and insufficiency of the materials are material-based factors leading to delays. In their research, Assaf and AlHejji (2006) state material related factors as follows;

- i. The material shortage of the market,
- ii. Changing material types and specifications during construction,
- iii. Material delivery delays,
- iv. The problem in the procurement of needed urgent material,
- v. The delay in the production of special building materials,
- vi. The late supply of material
- vii. The selection problem from the variety of finish materials in the market.

Fugar and Agyakwah-Baah (2010) stated the shortage of materials in the market or on the construction site and late delivery of materials as material-based factors. Mahamid et al. (2012) determined the changing material types and specifications in the

construction phase and the shortage of construction materials as material-related factors. Gündüz et al. (2013) determined factors related to materials as follows;

- i. Changes in the type and technical characteristics of the material,
- ii. Critical material damage,
- iii. Delayed production materials,
- iv. Increase in material prices,
- v. Late delivery of material,
- vi. Incomplete supply of construction materials,
- vii. The quality problem of construction materials,
- viii. Shortage of construction material
- ix. Unreliable supplier.

Ibironke et al. (2013) listed the factors associated with materials as follows; inadequacy of construction materials, low quality, insufficient supply, imported construction materials, increases in material prices, late delivery and unreliable suppliers.

In conclusion, although various material-related factors lead to delays in construction projects, it has been understood that shortage in construction materials and problems occurred in the delivery of the materials are very common material related factors which cause delays.

3.2.8. Equipment Factors

One of the delay categories in construction projects is related to equipment problems, which may lead to delays. Chan and Kumaraswamy (1997) described equipment related factors as; labor inadequacy, labor low efficiency, malfunctions and wrong choice. Mezher and Tawil (1998) stated the equipment related factors as; equipment failure, equipment shortage, incompetent operator, slow delivery, slow maintenance and outdated equipment. Abd Majid and McCaffer (1998) listed these factors as; equipment failures, unsuitable equipment, equipment transfers problems and equipment allocation problems. Odeh and Battaineh (2002) and Sambasivan and Soon (2007) also pointed out delays related to equipment as equipment failures and equipment availability.

In their study, Assaf and Al-Hejji (2006) identified equipment malfunctions, insufficient number of equipment, poor skills of equipment operators, low production and equipment efficiency, and the lack of high-tech mechanical equipment as equipment-related factors. Fugar and Agyakwah-Baah (2010) highlighted equipment malfunctions, disturbances and insufficient number of skilled equipment operators. Mahamid et al. (2012) found low equipment efficiency and equipment deficiencies as equipment-related factors. Nielsen and Özdemir (2013) studied the factors related to equipment and listed the problem of equipment allocation, frequent malfunctions, unsuitable equipment, inadequate technological equipment, low equipment efficiency, shortage (lack of equipment) and equipment slowdown as equipment related factors. Ibiro et al. (2013) listed the factors related to equipment as follows; insufficient number of equipment, frequent malfunctions, insufficiency in spare parts of equipment improper equipment, slow transport, allocation problems and insufficiency of modern equipment. Aigbavboa et al. (2014) identified failures, old equipment usage, equipment insufficiency, lack of high-tech equipment, unproductive and inefficient equipment, and lack of skilled operators as equipment-related factors.

As a result of the literature survey, it has been concluded that important equipment-related factors that lead to construction delay are insufficiency in equipment, failures in equipment and the lack of availability in the proper equipment.

4. ANALYSIS OF DELAYS IN OVERSEAS CONSTRUCTION PROJECTS OF TURKISH CONTRACTORS

4.1. Modelling and Hypotheses of Research

The model that was developed within the scope of the study is as in Figure 4.1. Causes of construction delays in overseas projects for Turkish contractors are analyzed under 7 factors and 43 items: Delays related to contractor (12 items), delays related to client (11 items), delays related to consultants (4 items), delays related to materials&equipment (6 items), delays related to labor (2 items), delays related to construction site (2 items) and exogenous factors (6 items).

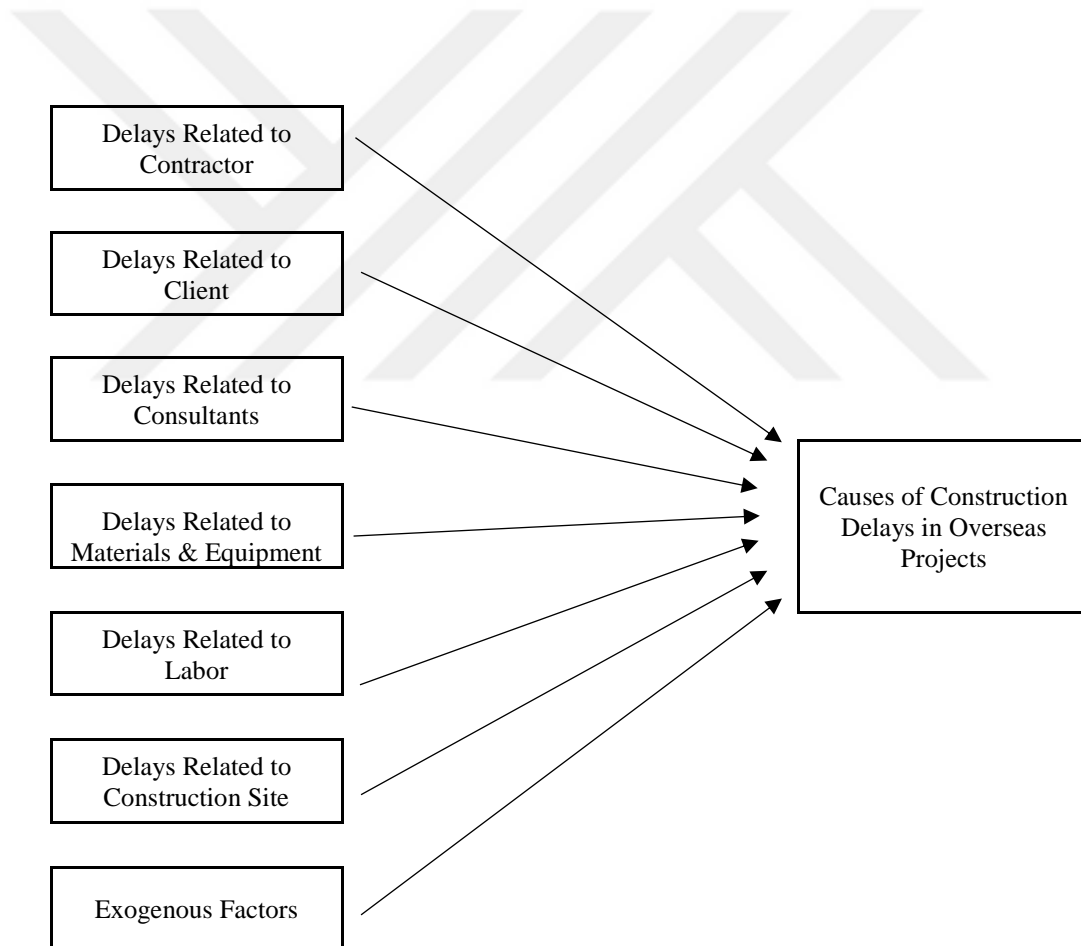


Figure 4.1: The Research Model

4.2. Universe and Sampling

The universe of the research consists of the employees of Turkish construction companies that are operating abroad which chosen from TCU members list. The resercher reached 152 participants of construction companies, for the first part of the research 151 people participated, for the second part of the survey 152 people participated. The information about these companies was taken from TCA (Turkish Contractors Association). The number of employees participated in the survey ($n = 152$) is evaluated as “large sample size” and statistically adequate ($n \geq 30$) to represent the universe.

4.3. Data Collection Tools

In the scope of the research, the questionnaire form was used as the data collection tool. The questionnaire forms were distributed to the participants in the online form.

The questionnaire form consists of two parts. In the first part, there are questions regarding general information on participants', their companies' and their overseas projects (Such as company's organization type, number of employees; participant's position in the organization, experience in overseas construction works; type of projects undertaken in overseas markets etc.). The second part comprises questions about the probable total of 43 causes of construction delays in overseas projects. Participants were asked to indicate how important they considered these items in 5 point Likert scales (1= Not important, 2= Slightly important, 3= Moderately important, 4= Important, 5= Very important).

4.4. Data Analysis Techniques and Resolution of Data

4.4.1. Data Analysis Techniques

For the resolution of the first part questions that are about the participants', their companies' and their overseas projects (Such as company's organization type, number of employees; participant's position in the organization, experience in overseas construction works; type of projects undertaken in overseas markets etc.), frequency analysis was used.

For the resolution of the second part questions that are about the probable causes of construction delays in overseas projects, RII technique was applied. In this method, the RII equation that was used is as below in Equation 4.1.

$$f(x) = \frac{\sum_{i=1}^5 a_i x_i}{\sum_{i=1}^5 x_i} \quad (4.1)$$

Here are the meanings of indications in the equation.

I= Relative Importance Index

i= Index of answer category

a_i = numerical value of answer of the related i, changing between 0 and 4
($i = 1 \rightarrow a_i = 0$; $i = 2 \rightarrow a_i = 1$; $i = 3 \rightarrow a_i = 2$; $i = 4 \rightarrow a_i = 3$; $i = 5 \rightarrow a_i = 4$)

x_i = the frequency of the related answer of i in total answers given to i.

The concluding intervals of numerical values are shown in Table 4.1.

Table 4.1: Resultant index intervals

Not important	Slightly important	Moderately important	Important	Very important
0.00-0.80	0.81-1.60	1.61-2.40	2.41-3.20	3.21-4.00

4.4.2. Resolution of Data

4.4.2.1. Findings of Frequency Analysis

This section contains descriptive statistical information about participants', their companies' and the overseas projects they performed in different countries, this part has mainly three section; first for participants profile, second for delay percentage analysis and last for the countries that participants has experience. Frequency analysis was used as the calculation method for all sections. Findings of frequency analysis are shown in Table 4.2.

The first four question aims to analyse the participants professional profile and experience for overseas construction projects, after that three question is to analyse the delay frequency of overseas projects of Turkish contractors. The frequency and the percentage of the countries of operation in overseas markets and the country that the delay problems experienced the most are also displayed in the last two parts of the table.

Table 4.2: Findings of frequency analysis for organization type

	Frequency	Percent
Organization Type		
Contractor	112	74,2
Consultant/ project manager/ construction manager	7	4,6
Subcontractor	24	15,9
Other	8	5,3
Total	151	100,0

Of the participants' companies' organization type;

- i. %74,2 of them are contractors, %15,9 are subcontractors, %5,3 are others and %4,6 are consultant/project manager/ construction managers.

Table 4.3: Findings of frequency analysis for number of employees

	Frequency	Percent
Number of Employees		
1-9	11	7,3
10-49	17	11,3
50-249	28	18,5
Over 250	95	62,9
Total	151	100,0

Of the participants' companies' organization type;

- i. %62,9 have more than 250, %18,5 have 50-249, %11,3 have 10-49 and %7,3 have 1-9 employees.

Table 4.4: Findings of frequency analysis for participant's position in the organization

	Frequency	Percent
Participants' Position in the Organization		
Owner	17	11,3
Project/ Construction Manager	38	25,2
Engineer	80	53,0
Other	16	10,6
Total	151	100,0

Of the participants;

- i. %53 of them are engineers, %25,2 are project/construction managers, %11,3 are owners, and % 10,6 are others.

Table 4.5: Findings of frequency analysis for participant's experience

	Frequency	Percent
Participants' Experience in Overseas Construction Works		
1-4 years	66	43,7
5-9 years	37	24,5
10-14 years	24	15,9
Over 15 years	24	15,9
Total	151	100,0

Of the participants;

- i. %43,7 of them have 1-4 years, %24,5 have 5-9 years, %15,9 have 10-14 years and %15,9 have over 15 years experience in overseas construction works.

Table 4.6: Findings of percentage of overseas projects subject to a delay

	Frequency	Percent
Percentage of Overseas Projects Subject to a Delay		
Up to 10%	30	19,9
11-20%	8	5,3
21-30%	17	11,3
31-40%	11	7,3

41-50%	12	7,9
51-60%	13	8,6
61-70%	19	12,6
71-80%	6	4,0
81-90%	16	10,6
91% and more	19	12,6
Total	151	100,0

Of the participants;

- i. %19,9 of them mention that up to %10 of overseas projects are subject to a delay, respectively %12,6, %12,6, %11,3 %10,6, %8,6, %7,9, %7,3, %5,3 of them indicate %61-70, %91 and more, %21-30, %81-90, %51-60, %41-50, %31-40, %11-20 of overseas projects are subject to a delay and %4 of them mention %71-80 of overseas projects are subject to a delay.

Table 4.7: Findings of type of projects undertaken in overseas markets

	Frequency	Percent
Type of Projects Undertaken in Overseas Markets		
Residential	71	18,9
Commercial (offices, shopping malls, etc.)	72	19,1
Healthcare facilities	32	8,5
Industrial	35	9,3
Transport (ports, roads & highways, airports, tunnels, bridges)	73	19,4
Education, sports and culture	33	8,8
Energy and infrastructure	39	10,4
Other	21	5,6
Total	376	100,0

Of the participants;

- i. %19,4 of them have undertaken transports (Ports, roads&highways, airports, tunnels, bridges) projects in overseas markets, respectively %19,1, %18,9, %10,4, %9,3, %8,8, %8,5 of them have undertaken commercial (offices, shopping malls, etc.), residential, energy and infrastructure,

industrial, education, sports and culture, healthcare facilities projects, %5,6 of them have taken other type of projects in overseas markets.

Table 4.8: Findings of frequency analysis estimation of delay as percentage

	Frequency	Percent
Estimation of Delays as a Percentage of the Original Estimated Delivery Time		
Up to 10%	50	33,1
11-20%	35	23,2
21-30%	26	17,2
31-40%	21	13,9
41-50%	11	7,3
Over 51%	8	5,3
Total	151	100,0

Of the participants;

- i. %33,1 of them estimate that delays are up to %10 of the original estimated delivery time, respectively %23,2, %17,2, %13,9, %7,3 of them estimate that delays are up to %11-20, %21-30, %31-40, %41-50 of the original estimated delivery time, and %5,3 of them estimate that delays are up to over %51 of the original estimated delivery time.

Table 4.9: Findings of the countries operating in overseas market

No		Frequency	Percent
Countries of Operation in Overseas Markets			
1	KSA	28	6,6
2	Qatar	33	7,8
3	UAE	22	5,2
4	Kuwait	11	2,6
5	Libya	22	5,2
6	Morocco	6	1,4
7	Algeria	11	2,6
8	Tunis	2	0,5
9	Egypt	6	1,4
10	Oman	11	2,6
11	Jordan	1	0,2
12	Iraq	20	4,7
13	Bahrain	4	0,9

14	Iran	5	1,2
15	Bulgaria	2	0,5
16	Russia	44	10,4
17	Turkmenistan	18	4,2
18	Uzbekistan	3	0,7
19	Azerbaijan	21	5,0
20	Kazakhstan	26	6,1
21	Abkhazia	1	0,2
22	Georgia	14	3,3
23	Romania	6	1,4
24	UK	13	3,1
25	CA	11	2,6
26	USA	7	1,7
27	Ukraine	11	2,6
28	Ireland	1	0,2
29	Belarus	2	0,5
30	Croatia	2	0,5
31	Portugal	1	0,2
32	Ethiopia	6	1,4
33	South Africa	3	0,7
34	Gabon	2	0,5
35	Senegal	2	0,5
36	Cameroon	1	0,2
37	Tanzania	6	1,4
38	Ghana	4	0,9
39	Guinea	2	0,5
40	Sierra Leone	1	0,2
41	Niger	2	0,5
42	Kenya	1	0,2
43	Congo	1	0,2
44	Pakistan	1	0,2
45	Afghanistan	6	1,4
46	India	3	0,7
47	Maldives	18	4,2
	Total	424	100,0

All of the participants;

- i. 151 participants gave 424 answer, each participant has experience at least in one country
- ii. From 151 participants 44 of them have experience in Russia which is %10,4 of the answers, 33 of them in Qatar which is %7,8 of the answers, 28 of them in KSA which is %6,6 of the answers, 26 of them in Kazakhstan which is %6,1

of the answers, 22 of them in UAE nad Libya which is %5,2 of the answers, these are the ranked fist five countries that most of the participants have experience.

- iii. Majority of the participants have experience in Russia, North Asia countries or MENA region.

Table 4.10: Findings of the country that the delay problems experienced the most

No		Frequency	Percent
The Country That the Delay Problems Experienced the Most			
1	KSA	9	6,7
2	Qatar	16	11,9
3	UAE	7	5,2
4	Kuwait	4	3,0
5	Libya	0	0,0
6	Morocco	2	1,5
7	Algeria	4	3,0
8	Tunis	0	0,0
9	Egypt	1	0,7
10	Oman	5	3,7
11	Jordan	0	0,0
12	Iraq	8	5,9
13	Bahrain	2	1,5
14	Iran	0	0,0
15	Bulgaria	0	0,0
16	Russia	13	9,6
17	Turkmenistan	13	9,6
18	Uzbekistan	1	0,7
19	Azerbaijan	4	3,0
20	Kazakhstan	9	6,7
21	Abkhazia	1	0,7
22	Georgia	1	0,7

23	Romania	0	0,0
24	UK	7	5,2
25	CA	0	0,0
26	USA	2	1,5
27	Ukraine	3	2,2
28	Ireland	0	0,0
29	Belarus	0	0,0
30	Croatia	0	0,0
31	Portugal	0	0,0
32	Ethiopia	3	2,2
33	South Africa	0	0,0
34	Gabon	2	1,5
35	Senegal	1	0,7
36	Cameroon	1	0,7
37	Tanzania	2	1,5
38	Ghana	1	0,7
39	Guinea	1	0,7
40	Sierra Leone	0	0,0
41	Niger	0	0,0
42	Kenya	0	0,0
43	Congo	0	0,0
44	Pakistan	0	0,0
45	Afghanistan	1	0,7
46	India	0	0,0
47	Maldives	11	8,1
	Total	135	100,0

All of the participants;

- i. From 151 participants 135 of them gave answer for thwe country that they experience the delay problems the most, %89 percent of the participant gave answered that question.

- ii. From 135 answers 16 of them mentioned Qatar which is the %11,9 of the answers, 13 of them mentioned Russia and Turkmenistan which is the %9.6 of the answers.

4.4.2.1. Findings of the RII Technique

The findings of the RII technique are as follows.

First, the delay factors in overseas projects listed and similar or same factors eliminated from the list to make the survey short and effective, according to overall literature review 43 were examined one by one, and the results are arranged as in the original questionnaire form in Table 4.3.

Table 4.11: The Results of Delays Related to Contractor

Item Groups	Items	Rank	RII Index	Importance Level
Delays Related to Contractor	Organizational problems: Poor coordination between the parties	7	2,59	Important
Delays Related to Contractor	Planning and scheduling deficiencies	3	2,73	Important
Delays Related to Contractor	Cash flow problems / Financial difficulties	4	2,69	Important
Delays Related to Contractor	Estimation problems	37	1,84	Moderately Important
Delays Related to Contractor	Delays in mobilization	41	1,36	Slightly Important
Delays Related to Contractor	Poor material management or procurement management	18	2,24	Moderately Important
Delays Related to Contractor	Construction defects and rework due to the incompetency of technical staff	32	1,99	Moderately Important
Delays Related to Contractor	Rarely used / new construction methods	43	1,04	Slightly Important
Delays Related to Contractor	Delays related to sub-contractors work	34	1,94	Moderately Important
Delays Related to Contractor	Delays in contractor's payments to subcontractors	30	2,03	Moderately Important
Delays Related to Contractor	Delays in detecting and correcting deviations from the planned budget, schedule and quality	27	2,06	Moderately Important
Delays Related to Contractor	Problems related to construction safety	40	1,46	Slightly Important

Table 4.12: The Results of Delays Related to Client

Item Groups	Items	Rank	RII Index	Importance Level
Delays Related to Client	Delays in site preparation	28	2,03	Moderately Important
Delays Related to Client	Work suspension by the client	11	2,49	Important
Delays Related to Client	Delays in progress payments to contractors	12	2,44	Important
Delays Related to Client	Changes in design, materials or scope	8	2,58	Important
Delays Related to Client	Contract related disputes or mistakes	24	2,11	Moderately Important
Delays Related to Client	Client's lack of experience in the construction business	23	2,13	Moderately Important
Delays Related to Client	Slow decision making or bureaucracy	2	2,85	Important
Delays Related to Client	Rarely used / new construction methods	42	1,13	Slightly Important
Delays Related to Client	Management faults (insufficient coordination among parties by the client)	15	2,36	Moderately Important
Delays Related to Client	Delay in materials to be supplied by the owner	13	2,44	Important
Delays Related to Client	Unrealistic contract duration imposed by the client	5	2,66	Important

Table 4.13: The Results of Delays Related to Consultant

Item Groups	Items	Rank	RII Index	Importance Level
Delays Related to Consultants	Contract management	33	1,98	Moderately Important
Delays Related to Consultants	Poor quality control and inspection	35	1,92	Moderately Important
Delays Related to Consultants	Conflicts between the parties	19	2,24	Moderately Important
Delays Related to Consultants	Delays in approval of drawings, materials, etc.	1	2,93	Important

Table 4.14: The Results of Delays Related to Materials & Equipment

Item Groups	Items	Rank	RII Index	Importance Level
Delays Related to Materials & Equipment	Fluctuations in material prices	36	1,91	Moderately Important
Delays Related to Materials & Equipment	Delays in material/equipment delivery	6	2,60	Important
Delays Related to Materials & Equipment	Modifications in material specifications	20	2,23	Moderately Important

Item Groups	Items	Rank	RII Index	Importance Level
Delays Related to Materials & Equipment	Failures due to poor maintenance of material and equipment	39	1,69	Moderately Important
Delays Related to Materials & Equipment	Shortage of materials	21	2,19	Moderately Important
Delays Related to Materials & Equipment	Shortage of equipment	25	2,09	Moderately Important

Table 4.15: The Results of Delays Related to Labor

Item Groups	Items	Rank	RII Index	Importance Level
Delays Related to Labor	Poor workmanship	10	2,52	Important
Delays Related to Labor	Shortages of labor supply	9	2,55	Important

Table 4.16: The Results of Delays Related to the Construction site

Item Groups	Items	Rank	RII Index	Importance Level
Delays related to the Construction site	Site location and restrictions (traffic congestion, site access etc.)	29	2,03	Moderately Important
Delays related to the Construction site	Geological problems	31	2,02	Moderately Important

Table 4.17: Exogenous Factors

Item Groups	Items	Rank	RII Index	Importance Level
Exogenous Factors	Economic conditions in the host country (Inflation, exchange rate fluctuations, etc.)	26	2,09	Moderately Important
Exogenous Factors	The political environment in the host country (Changes in government regulations or government)	22	2,15	Moderately Important
Exogenous Factors	Adverse weather conditions	16	2,35	Moderately Important
Exogenous Factors	Force majeure (earthquake, war, etc.)	17	2,30	Moderately Important
Exogenous Factors	Permissions from local authorities	14	2,44	Important
Exogeneous Factors	Social / Environmental oppositions	38	1,83	Moderately Important

As can be seen in Table 4.3 there is no item with “very important” and “not important” importance level. All the items belong to three different importance levels: “Slightly

important”, “Moderately important” and “Important”. This means that participants do not evaluate any item at the lowest or highest significance level.

The top 10 items of the causes of overseas projects are shown in Table 4.10.

Table 4.18: The Top 10 Items of Causes of Overseas Projects

Item Groups	Items	Rank	RII Index	Importance Level
Delays Related to Consultants	Delays in approval of drawings, materials, etc.	1	2,93	Important
Delays Related to Client	Slow decision making or bureaucracy	2	2,85	Important
Delays Related to Contractor	Planning and scheduling deficiencies	3	2,73	Important
Delays Related to Contractor	Cash flow problems / financial difficulties	4	2,69	Important
Delays Related to Client	Unrealistic contract duration imposed by the client	5	2,66	Important
Delays Related to Materials & Equipment	Delays in material/equipment delivery	6	2,60	Important
Delays Related to Contractor	Organizational problems: Poor coordination between the parties	7	2,59	Important
Delays Related to Client	Changes in design, materials or scope	8	2,58	Important
Delays Related to Labor	Shortages of labor supply	9	2,55	Important
Delays Related to Labor	Poor workmanship	10	2,52	Important

When we look at the top 10 causes of delays in overseas projects, it is seen that these items are gathered under 5 factors: Delays related to consultant, client, contractor, material&equipment and labor. The participants do not see exogenous and construction site items at the top 10.

According to participants, the most significant cause of delays stems from “Delays in approval of drawings, materials, etc.” by consultants. This item is followed by “Slow decision making or bureaucracy” by clients, “Planning and scheduling deficiencies” and “Cash flow problems / financial difficulties” by contractors and “Unrealistic contract duration imposed” by the clients respectively in the 2nd, 3rd, 4th and 5th place.

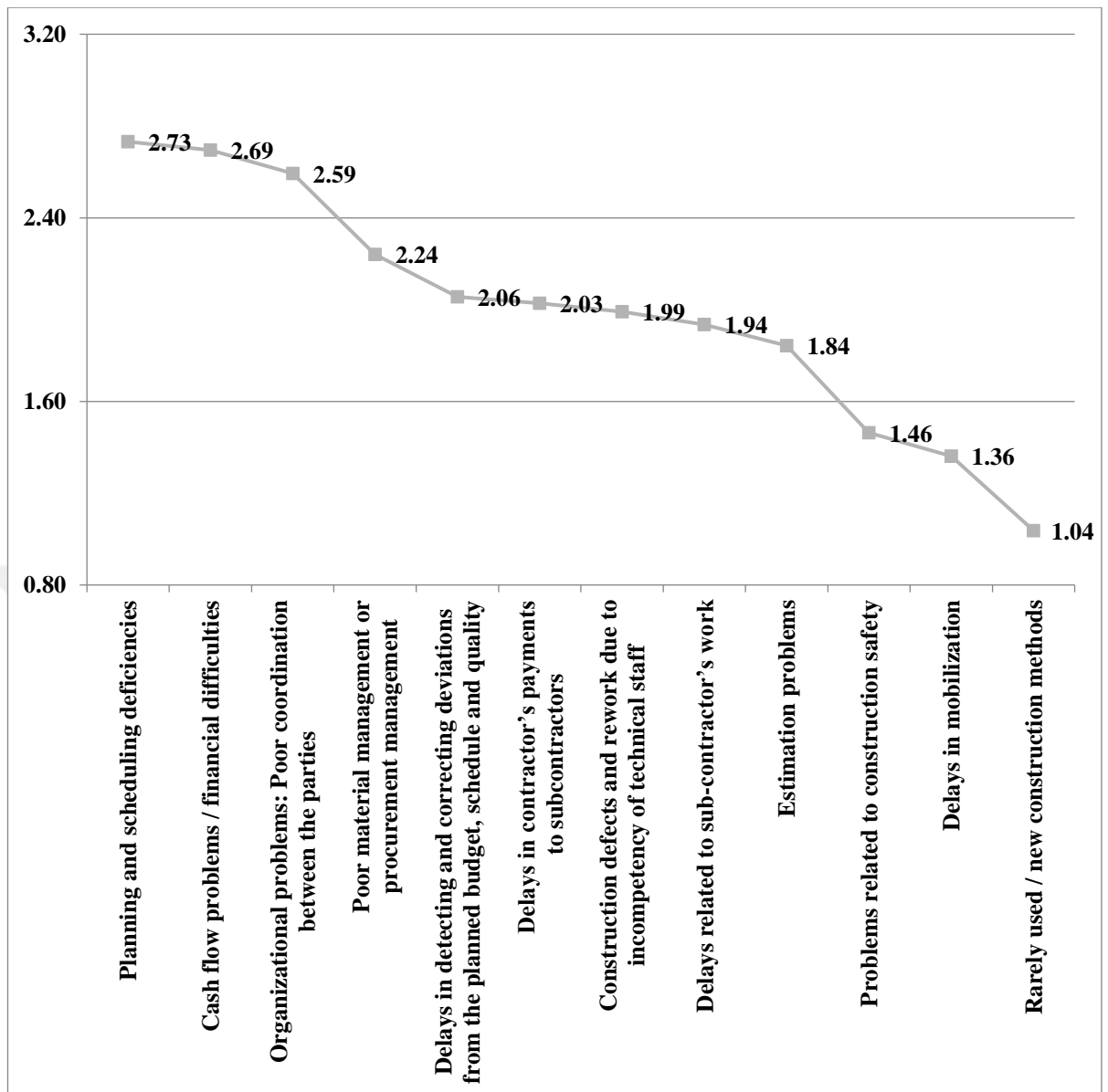
“Delays in material/equipment delivery”, “Organizational problems: Poor coordination between the parties”, “Changes in design, materials or scope”, “Shortages

of labour supply” and “Poor workmanship” are another 5 items of top 10 coming in order.

Of these top 10 items;

- i. One is related to consultants (Considering that there are 4 items related to consultants = %25), one is related to material&equipment (Considering that there are 6 items related to consultants = %16), three are related to clients (Considering that there are 11 items related to consultants = %27), three are related to contractors (Considering that there are 12 items related to contractors = %25) and two are related to labor (Considering that there are 2 items related to labour = %100).
- ii. Except for the items related to labor, it can be said that the top 10 items are distributed almost homogeneously.

The RII indexes of items under the factor of “Delays related to the contractor” are shown in Graph 4.1.



Graph 4.1: Relative Importance of Items Under the Factor of Delays Related to Contractors

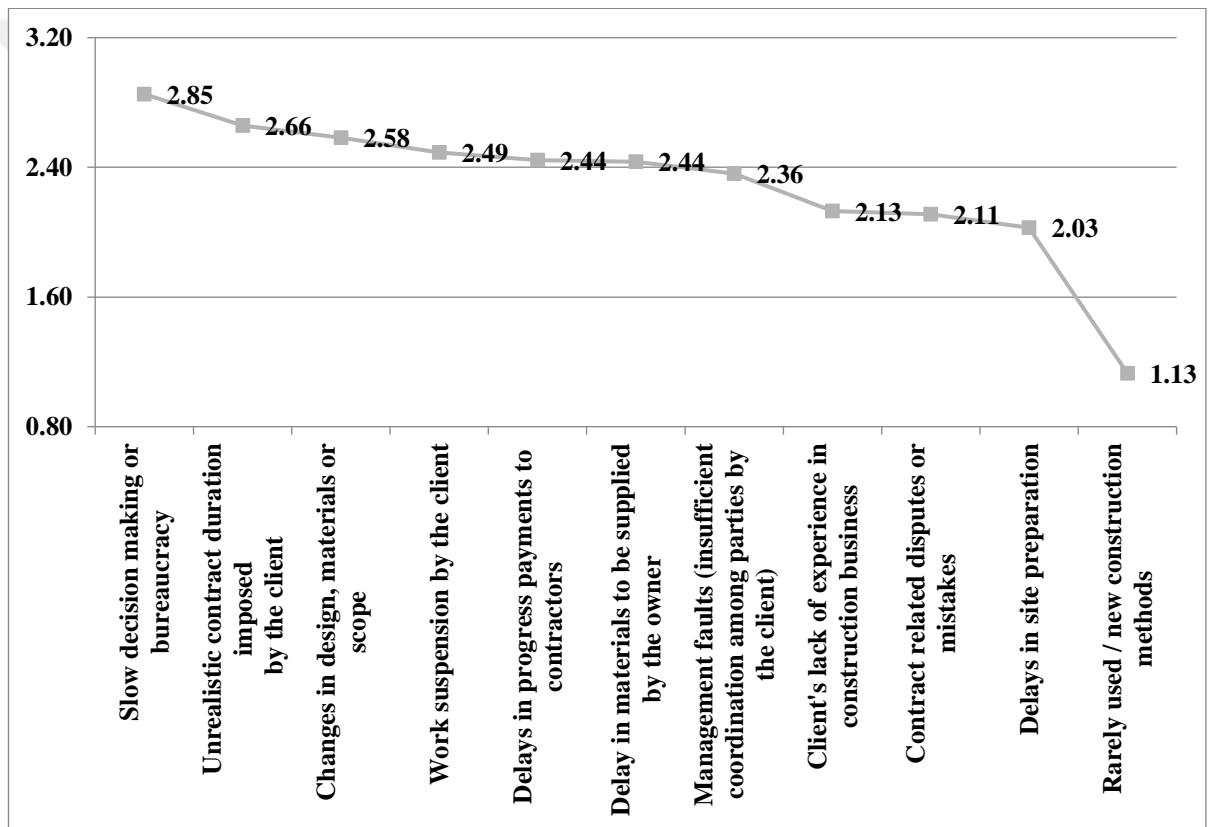
Of the items under the factor of “Delays related to the contractor”;

- i. “Planning and scheduling deficiencies” have the highest index rate. “Cash flow problems / financial difficulties” and “Organizational problems: Poor coordination between the parties” are coming in the 2nd and 3rd place. These items were evaluated as important by the participants.
- ii. “Poor material management or procurement management”, “Delays in detecting and correcting deviations from the planned budget, schedule and quality”, “Delays in contractor’s payments to subcontractors”, “Construction

defects and rework due to incompetency of technical staff”, “Delays related to sub-contractor’s work” and “Estimation problems” are the items coming successively in the 4th, 5th, 6th, 7th, 8th and the 9th place. These items have “Moderately important” importance level.

iii. “Problems related to construction safety”, “Delays in mobilization” and “Rarely used / new construction methods” are the last three items of “Delays related to contractor”. These items are evaluated as “Slightly important” by the participants.

The RII indexes of items under the factor of “Delays related to client” are shown in Graph 4.2.



Graph 4.2: Relative Importance of Items Under the Factor of Delays Related to Clients

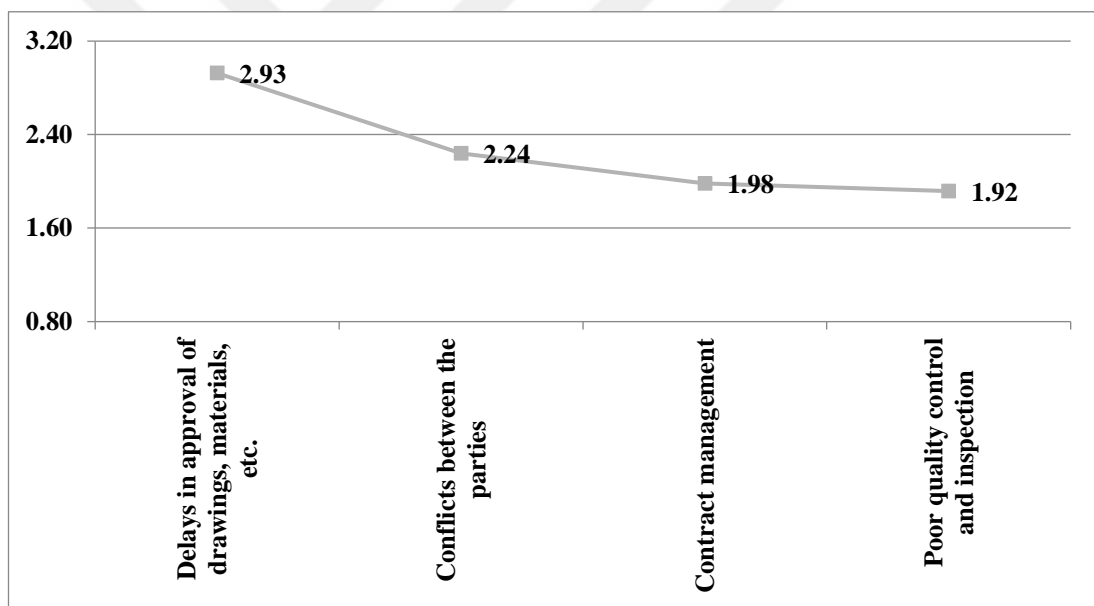
Of the items under the factor of “Delays related to a client;

- i. “Slow decision making or bureaucracy” has the highest index rate. “Unrealistic contract duration imposed by the client” and “Changes in design, materials or scope”, “Work suspension by the client”, “Delays in

progress payments to contractors”, and “Delay in materials to be supplied by the owner” are coming in the 2nd, 3rd, 4th, 5th and 6th place. These items were evaluated as important by the participants.

- ii. “Management faults (insufficient coordination among parties by the client)”, “Client's lack of experience in construction business”, “Contract related disputes or mistakes”, and “Delays in site preparation” are the items coming successively in the 7th, 8th, 9th, and the 10th place. These items have “Moderately important” importance level.
- iii. “Rarely used / new construction methods” is the last item of “Delays related to client”. This item is evaluated as “Slightly important” by the participants.

The RII indexes of items under the factor of “Delays related to consultants” are shown in Graph 4.3.



Graph 4.3: Relative Importance of Items Under the Factor of Delays Related to Consultants

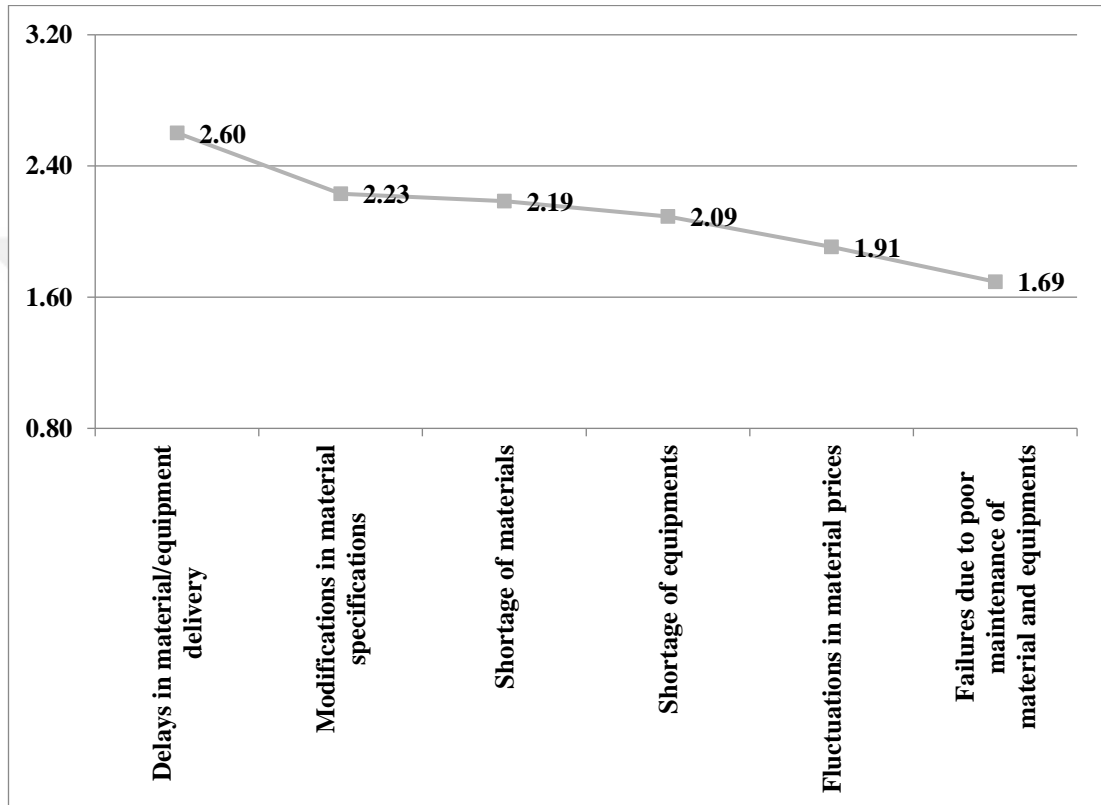
Of the items under the factor of “Delays related to the consultant”;

- i. “Delays in approval of drawings, materials, etc.” has the highest index rate. It has the highest rate of all the items as well. This item is the only one to be evaluated as important.
- ii. “Conflicts between the parties”, “Contract management”, and “Poor quality control and inspection” are the items coming successively in the

2nd, 3rd, and the 4th place. These items have a “Moderately important” importance level.

- iii. There is no item evaluated as “Slightly important” by the participants at this category.

The RII indexes of items under the factor of “Delays related to materials&equipment” are shown in Figure Graph 4.4.



Graph 4.4: Relative Importance of Items Under the Factor of Delays related to Materials&Equipment

Of the items under the factor of “Delays related to Materials&Equipment”;

- i. “Delays in material/equipment delivery” has the highest index rate. This item was evaluated as important by the participants.
- ii. “Modifications in material specifications”, “Shortage of materials”, “Shortage of equipment”, “Fluctuations in material prices”, “Failures due to poor maintenance of material and equipment” are the items coming successively in the 2nd, 3rd, 4th, 5th and the 6th place. These items have a “Moderately important” importance level. Among these “Failures due to poor maintenance

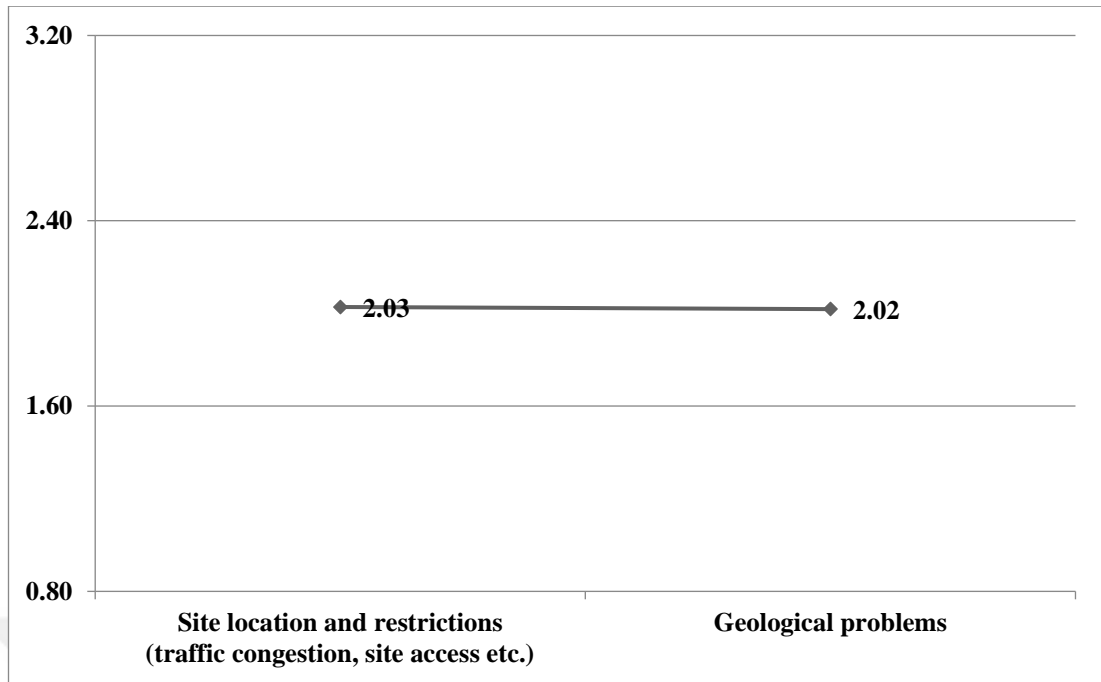
of material and equipment” is the last item just above the slightly important importance level.

The RII indexes of items under the factor of “Delays related to labor” are shown in Figure Graph 4.5.



Graph 4.5: Relative Importance of Items Under the Factor of Delays Related to Labor

Of the items under the factor of “Delays related to labour”; “Shortages of labour supply” has the highest index rate while “Poor workmanship”’s index rate is very close to that item. Both these items were in the top 10 in overall evaluation and evaluated as important by the participants.

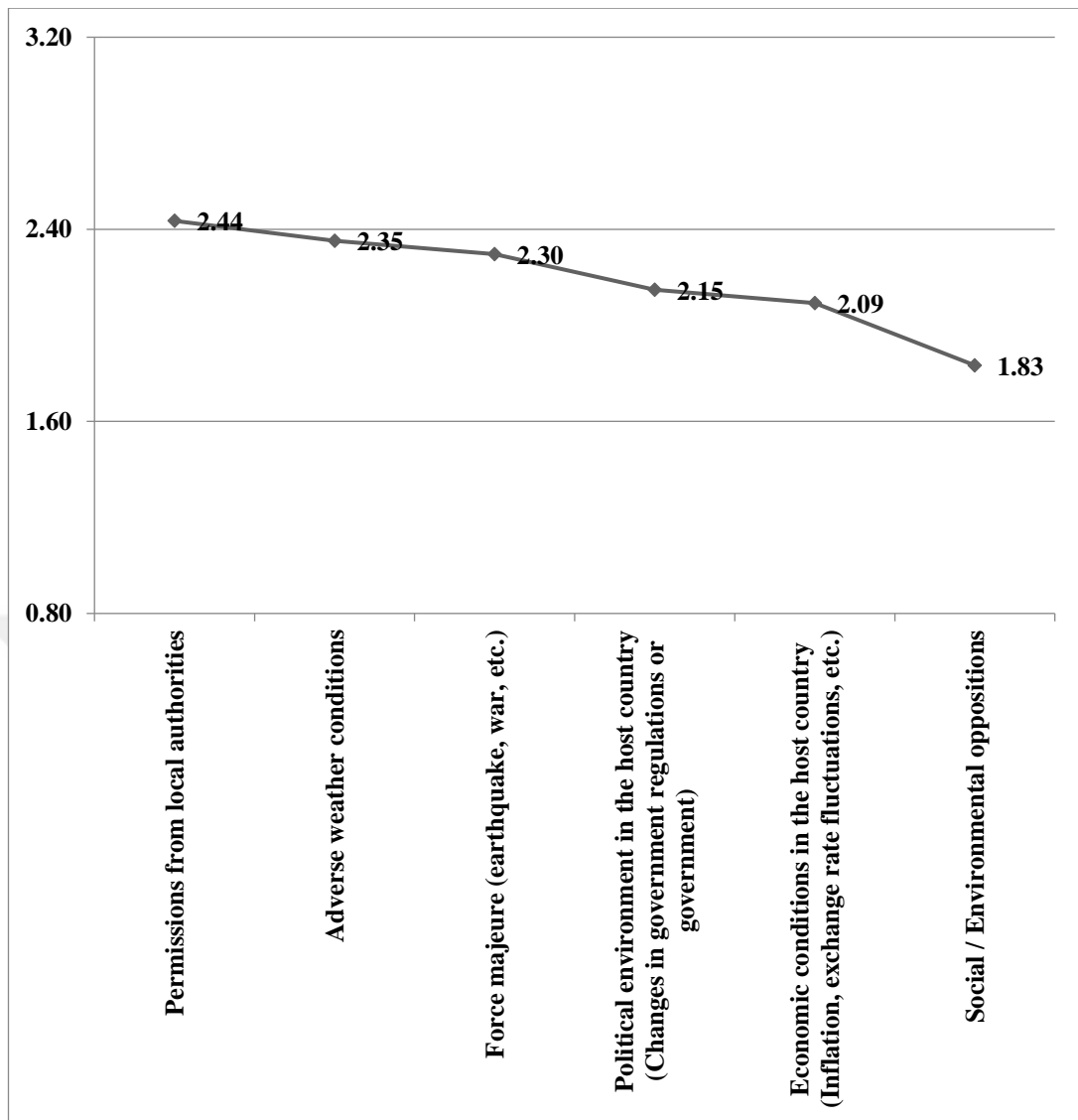


Graph 4.6: Relative Importance of Items Under the Factor of Delays related to Construction Site

The RII indexes of items under the factor of “Delays related to construction site” are shown in Graph 4.6.

Of the items under the factor of “Delays related to construction site”; The index rates of both “Site location and restrictions (Traffic congestion, site access etc.)” and “Geological problems” are almost the same. Both these items were evaluated as moderately crucial by the participants.

The RII indexes of items under the factor of “Exogeneous Factors” are shown in Graph 4.7.

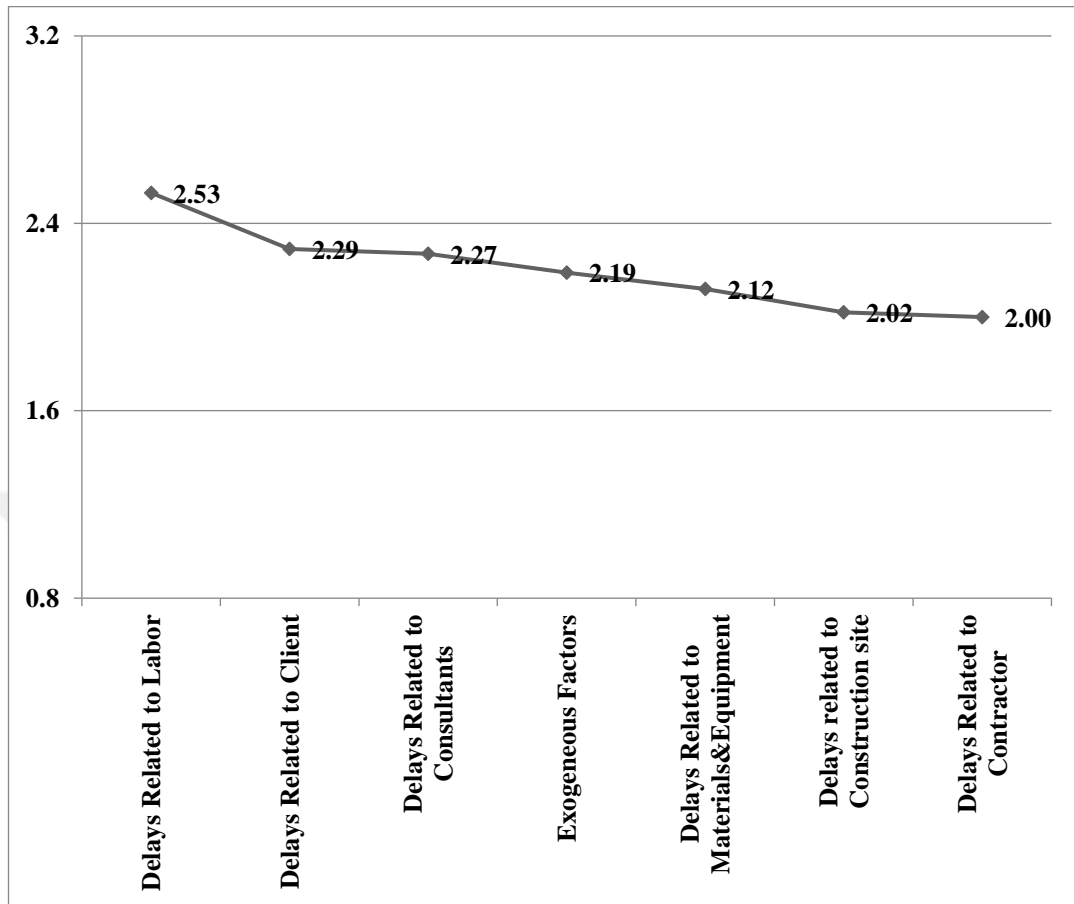


Graph 4.7: Relative Importance of Items Under the Factor of Exogenous Factors

Of the items under the factor of “Exogeneous Factors”;

- i. “Permissions from local authorities” has the highest index rate. This item was evaluated as important by the participants.
- ii. “Adverse weather conditions”, “Force majeure (Earthquake, war etc.)”, “Political environment in the host country (Changes in government regulations or government)”, “Economic conditions in the host country (Inflation, exchange fluctuations, etc.)” are the items coming successively in the 2nd, 3rd, 4th, and the 5th place. “Social/Environmental oppositions” has the lowest index rate. These items have a “Moderately important” importance level.

In the last part of the analysis, the index rates of the seven factors were compared. The RII indexes of 7 factors are shown in Graph 4.8.



Graph 4.8: Relative Importance of 7 Items

Among the 7 factors, “Delays Related to Labor” is in the first place in terms of rate index. This factor also differs from others with its “important” importance level. We can say both “Delays Related to Client” and “Delays Related to Consultants” lay in the second place since these two items’ index rates are almost the same. Then come “Exogeneous Factors” and “Delays Related to Materials&Equipment” respectively. “Delays Related to Construction Site” and “Delays Related to Contractor” are in the last place with the almost same lowest index rates.

5. CONCLUSIONS

5.1. Introduction

In this study, the purpose was to find answers to the following three questions:

- i. What kind of factors is important for time performance of Turkish contractors operating in overseas countries?
- ii. What types of problems of delays do they experience in their overseas construction projects?
- iii. How much important are these factors for Turkish companies operating abroad?

The findings obtained within this study are discussed in the following paragraphs.

Below is the discussion part for the findings of all the 43 items one by one. Among 43 causes of construction delays in overseas projects, there is no item with “very important” and “not important” importance level. So, it can be concluded that the firms do not evaluate any factor as too much critical as in the alarming level, but they see all the factors as somewhat important. Thus, no factor should be ignored by the companies operating or considering taking part in overseas projects.

Next part is the discussion part for the findings of each 7 main factors under which 43 items are gathered.

5.2. Delays Related to the Contractor

Of the items under the factor of “Delays related to the contractor”;

“Planning and scheduling deficiencies” have the highest index rate. “Cash flow problems / financial difficulties” and “Organizational problems: Poor coordination between the parties” are coming in the 2nd and 3rd place. These items were evaluated as important by the participants.

As an expected result, when you look at the first three items of the reasons for the delays related to the contracting firm, it is seen that all of them are related to management and strategy. For every company operating in a different country, any amount of time means loss of money. Due to this situation, planning is one of the first factors among these factors. Following this, cash flow financial difficulties and poor coordination between the parties are coming respectively. This is an indicator of the

importance of financial power and organizational system, communication management; shortly managerial skills in international projects. Although the concept of professional project management starts to be heard in the construction sector, it is a concept that will take time to be applied and to be comprehended of its importance by the companies except for the well-known big ones.

Among the basic triad of project management, which is time, quality and cost; time is the only one that cannot be compensated and has an additional cost (Opportunity cost) in itself. Because of this reason, planning should be done in all matters related to the project. Planning means not only time planning but also producing more than one option related to resource management and strategic management in case of a possible technical and administrative problem.

Cash flow\financial difficulties are among the most important factors that show international competitiveness of the company and very critical in international construction projects in which costs are high. This observation is supported in the studies by Kazaz et al., 2012; Sambasivan et al., 2007.

Organization and coordination problems, which are the biggest problems in construction projects (Generally a complex and human-based system) are among the most important factors in prolonging the project periods. These problems are not caused by individual mistakes but by the lack of correct organization and control.

5.3. Delays Related to the Client

Of the items under the factor of “Delays related to the client;

“Slow decision making or bureaucracy” has the highest index rate. “Unrealistic contract duration imposed by the client” and “Changes in design, materials or scope”, “Work suspension by the client”, “Delays in progress payments to contractors”, and “Delay in materials to be supplied by the owner” are coming in the 2nd, 3rd, 4th, 5th and 6th place. These items were evaluated as important by the participants.

When we look at the top 10 items (Table 4.4), 3 of these are the reasons for the delay caused by the clients. As the consultant company is the representative of the client in the organization, the factor that comes first is client-based. Looking at the types of projects where the participants work, one can see that the projects are mostly public or

semi-public infrastructure projects. Therefore, the longevity of bureaucratic processes is long, causes the duration of the project to prolong.

5.4. Delays Related to the Consultant

Of the items under the factor of “Delays related to the consultant”;

“Delays in approval of drawings, materials, etc.” has the highest index rate. It has the highest rate of all the items as well. This item is the only one to be evaluated as important.

In a construction project, the financial and time concerns of the consultant, the party responsible for both the system and the product quality, is not as high as the contracting firm. Therefore, they often neglect the importance of time management or do not take effective quick decisions. Since no action has been taken to create a mechanism against the delays of the consultant in the contracting phase, “project drawings” and “receiving material approvals” which are under the control of the consultant and the basis of production, take part in the most important causes of delay in international construction projects.

“Conflicts between the parties”, “Contract management”, and “Poor quality control and inspection” are the items coming successively in the 2nd, 3rd, and the 4th place. These items have a “Moderately important” importance level.

Since these issues are not directly related to production in construction projects, they are not considered to be significant delay reasons.

5.5. Delays related to Materials and Equipment

Of the items under the factor of “Delays related to Materials and Equipment”;

“Delays in material/equipment delivery” has the highest index rate. This item was evaluated as important by the participants.

Delays in supply of materials and equipment, which are the main building blocks of production, cause the entire project to be delayed, especially when it relates to critical production items. Since the majority of overseas projects are carried out in countries that are dependent on foreign supplies and equipment and Turkish companies supply

the majority of them from Turkey; it is an expected result that this item is in the first place.

Since the contracting firms have to deliver the products with the highest quality at the lowest cost, they try to obtain materials from the supplier with the most affordable price. However, this search causes time losses, especially in firms with non-systematic organizations. In order to prevent this situation, it is necessary for the contracting firms to make the procurement and logistics coordination right and give the necessary importance to the subject.

In the Turkish construction sector, planning is considered only as the planning of field activities and cash flow in many firms other than large scale companies. The function of the planning is to integrate the time schedule and all resources including financial resources to monitor and control the time-money efficiency of the construction project. Therefore, a planning without integrated to the material, logistic and equipment which is the biggest resource of the project and has a big cost and time impact, will be unfunctional. However, it is possible to make more accurate and realistic planning by integrating purchasing and logistics planning in the right project management with production planning.

5.6. Delays Related to Labor

Of the items under the factor of “Delays related to labor”;

“Shortages of labor supply” has the highest index rate while “Poor workmanship’s index rate is very close to that item. Both these items were in the top 10 in comprehensive evaluation and evaluated as important by the participants.

Turkish contractors mostly provide labor force from Turkey in their overseas projects, including the white-collar workers. Another reason for this is that the material and installation subcontractors are from Turkey. Although in Middle East projects cheap labor force workers from countries such as India, Bangladesh, Nepal are employed, Turkish workers make up the majority of the workforce, which is more costly due to quality concerns. Cost problems in the construction sector, where production is mostly based on the labor force, force the firms to keep Turkish workers or skilled workforce to a limited number. Also, limited local and Turkish-labor resources to work abroad and the high demand for local skilled labor force is another reason for the labor force-

based delays. Because of both the weak labor force and the limited labor force, these issues were considered as significant causes of delay by the participants.

5.7. Delays Related to Construction Site

Of the items under the factor of “Delays Related to Construction Site”;

“Site location and restrictions (Traffic congestion, site access etc.)” and “Geological problems” are two factors evaluated in that title, index results of both factor is moderately important. These two factor is considered in the feasibility phase of projects and in case of occur should be solved by both main parties which are client and contractor. Among this factors “Geological problems” is mainly a big pronlem for infrastructure project and when this problem occurs

Therefore participants does not see these factor item as crucial for causes of delays in the project.

5.8. Exogeneous Factors

Of the items under the factor of “Exogeneous Factors”;

“Permissions from local authorities” has the highest index rate. This item was evaluated as important by the participants. In the majority of delay causes studies related to construction projects, “exogenous factors” were not included in the ranking of the top 10 reasons for the causes of delays, but “Permissions from local authorities” was seen as a significant cause of delay by the participants in the present study. Permissions from various local authorities, whether private or state investment, is required for construction projects.

When we look at the geographies of Turkish firms operate, it is seen that the bureaucratic processes are long and difficult, and state institutions are under-developed. Since these permits are mostly required in the first and final stages of construction, permits, especially on critical issues, extend the start or lead times of the project.

5.9. Discussion

The top 10 causes of delays in overseas projects are gathered under 5 factors: Delays related to consultant, client, contractor, material and equipment and labor. The participants do not see exogeneous and construction site items at the top 10. Exogenous and construction site problems are the least common, and when they occur they affect both the contractor and the client at the same rate. Thus, they can be resolved and they are not the ones that cause the whole project failure. The findings confirm the findings of other studies such as Kazaz (2012) and Mezher and Tawil (1998). The participants do not evaluate these problems as very important even in the projects like in the Middle East, North Asia regions which have harsh climate conditions.

According to participants, the biggest cause of delays stems from “Delays in approval of drawings, materials, etc.” by consultants. As shown in Table 4.2, the participants have taken part in overseas projects mostly in Gulf countries, Russia and Asian countries. The projects undertaken in these countries mostly have high standard qualities, multinational, and involve high level of bureaucracy. Thus, project monitoring and control have more importance than most of the developing countries. Except for large Turkish construction companies, medium-sized Turkish construction companies are not used to these systematic, complex process and because of consultant firms’ quality concern and process slowness, this factor is evaluated as the most important cause of delay. Faridi and El-Sayegh (2006), Al-Kithmaorarseh, et. al. (2009), Gündüz and Abu Hassan (2016) also have found the same results as in this study over this factor.

“Slow decision making or bureaucracy” by clients, “Planning and scheduling deficiencies” and “Cash flow problems / financial difficulties” by contractors and “Unrealistic contract duration imposed” by the clients are coming as another important causes of delays after “Delays in approval of drawings, materials, etc.” by consultants.

The management attitude of the client, who is the decision-making party in the projects, directly affects the time performance of the contracting firm. Because the contracting firms are operating not in their own countries but abroad, the time performance is much more important for the contracting firm’s overseas projects as there are more risks and daily costs. In the construction projects, which consist of interrelated activities, indecisiveness in any item has a chain effect mostly for all

activities. Especially the delays in critical activities affect the duration of the whole project. The decision-making process is prolonged due to the inability of the clients' (mostly outside the construction sector) understanding the importance of the issue, due to insufficient technical knowledge and insufficient cooperation of the consultant firms or clients.

Time management is a very problematic issue because time management, planning and professional project management are a new concept especially for mid-sized Turkish contracting firms and these companies do not give enough importance to accept it as a part of production, but in recent years due to expanding overseas and demand Turkish construction companies started to consider planning as a part of the process. One of the most important reasons for the opening up of many project management, planning and management graduate courses and programs in universities in recent years is the lack of trained staff and increasing awareness about the topic. The project duration is prolonged because the managers, who are mostly used to traditional methods, do not give enough importance to planning and professional management systems and information record.

“Cash flow problems/Financial difficulties” which are under the title of delays due to contracting companies are located in the top five overall causes of delays in the studies in the literature, especially for developing countries such as Turkey. This factor, which has a serious impact on the duration of the project, may be due to delays in the client's progress payments, poor management of the cash flow of the contracting company and the inability to properly control the resources. In other studies, Sambasivan and Soon (2007), Assaf and Al-Hejji (2006), Al-Khalil and Al-Ghafly (1999), Frimpong et al. (2003) state that the delays in clients' payments cause problems in the cash flow and delays in the project of the contracting company.

Although financial power is more important for international projects, in the work of Gunhan and Arditi (2005), financial strength is coming after “project management capability” in ranking for international construction projects. Therefore, the project management capacity and experience of the contracting company can help to compensate and manage financial problems. Looking at the studies in the literature, the most important competing power of the Turkish contractors are the practical management skills and their communication capabilities. The most important factor in

the management of financial problems and the success of Turkish firms in the close geographies is their practical management capacity.

“Delays in material/equipment delivery”, “Organizational problems: Poor coordination between the parties”, “Changes in design, materials or scope”, “Shortages of labor supply” and “Poor workmanship” are another 5 items of top 10 coming in order. Turkish construction companies in overseas projects mostly supply equipment and material from Turkey; the main reasons for this are quality-price efficiency and tax exemptions. However, this issue, while providing a price-quality advantage, becomes an important factor for the causes of delays in the project process when considering logistics planning and customs procedures. This logistics mobility makes professional coordination and communication management much more important. In particular for the middle-sized companies in which hierarchical system and management organization are not formed clearly and logistics is considered as a separate department, the logistics problem leads to serious loss of money, time and quality.

For the final evaluation for this issue, it can be concluded that the first three reasons for delays are human-based factors for which personal or systemic/institutional technical knowledge is important; and all of the labor-related delay factors are important factors that affect the duration of the project.

Among the seven factors (Graph 4.8.), “Delays Related to Labor” is in the first place in terms of importance level. This factor also differs from others with its “important” importance level. We can say both “Delays Related to Client” and “Delays Related to Consultants” lay in the second place since these two items’ index rates are almost the same. Then come “Exogeneous Factors” and “Delays Related to Materials and Equipment” respectively. “Delays Related to Construction Site” and “Delays Related to Contractor” are in the last place with the almost same lowest index rates.

When you look at the importance of the factor groups, it is expected that the labor force, which becomes more important in foreign construction projects, is in the first place. In Kazaz's (2012) article, the workforce factor ranked second. Since this factor is the responsibility of the contracting firm, it can be considered as the reason of the delay caused by the contracting firm. Following this, the two factors “delay related to client” and “delay related to the consultant”, as the consultant is the representative of

the client, these are client-based delay causes and stem from a failure in decision making and process management.

It is hoped that this study will be a good reference for Turkish firms that are operating in the overseas construction sector or other sectors planning to invest in the construction business.

For the future studies it has advised that;

- i. A similar study be conducted for a special region (the Only Middle East or only Russia etc.)
- ii. A similar study be conducted by not only Turkish construction companies but all over the world,
- iii. Since the causes of delays are similar in various studies in the literature, a scale development study with validity and reliability be conducted.



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APPENDICES

Questionnaire Form

Mimar Sinan Fine Arts University
Construction Project Management Master Program

Dear participant,

I am currently a graduate student at Mimar Sinan Fine Arts University Construction Project Management Program, conducting a research project for my master thesis entitled “Causes of Construction Delays in Overseas Projects of Turkish Contractors”. The main objective of this study is to address causes of delays in international projects of Turkish contractors.

Your contribution is critical to the success of this research. Thus, I would appreciate if you could complete this survey. I would like to assure you that your response will be kept confidential and used only for academic purposes.

Thank you for taking the time to complete the survey.

Yours Sincerely,

Kübra BAŞKAPAN
MSFAU Graduate Student
Email: kubrabaskapan@gmail.com

Thesis Supervisor: Assoc. Prof. Dr. Selin GÜNDEŞ
MSFAU Construction Project Management Master Program

Questionnaire

Part 1: General Information

1. Organization type

- i. Contractor
- ii. Consultant/project manager/construction manager
- iii. Subcontractor
- iv. Other (please specify)

2. Number of employees

- i.1-9
- ii.10-49
- iii.50-249
- iv.over 250

3. Your position in the organization

- v. Owner
- vi. Project/construction manager
- vii. Engineer
- viii. Other (please specify)

4. Your experience in overseas construction works

- i.1-4 years
- ii.5-9 years
- iii.10-14 years
- iv.over 15 years

5. Countries of operation in overseas markets (please specify)

- 1.
- 2.
- 3.
- 4.
- 5.

6. Type of projects undertaken in overseas markets (multiple selection allowed)

- i. Residential
- ii. Commercial (offices, shopping malls, etc.)
- iii. Healthcare facilities
- iv. Industrial
- v. Transport (ports, roads & highways, airports, tunnels, bridges)
- vi. Education, sports and culture
- vii. Energy and infrastructure
- viii. Other (please specify)

Part 2: Factors contributing to delays in overseas projects

7. What percentage of overseas projects in general are subject to a delay? *

- i. Up to 10%
- ii. 11-20%
- iii. 21-30%
- iv. 31-40%
- v. 41-50%
- vi. 51-60%
- vii. 61-70%
- viii. 71-80%
- ix. 81-90%
- x. 91% and more

8. For overseas projects you have been involved with; what would you estimate the delays to be as a percentage of the original estimated delivery time?

- i. Up to 10%
- ii. 11-20%
- iii. 21-30%
- iv. 31-40%
- v. 41-50%
- vi. 51%+

9. In which country did you experience delay problems the most? (please specify)

10. Please indicate the importance of the following causes of construction delays in overseas projects.

Please evaluate the following attributes based on:

Importance (the delay impact of the cause on overseas construction project) on a LIKERT rating scale of 1 - 5 as shown below: Please mention rates of Impact next to the cause of delay

Example: cause 3,3

Rating Scale	Not important	Slightly important	Moderately important	Important	Very important
	1	2	3	4	5

11. Delays related to Contractor

- i. Organizational problems: Poor coordination between the parties
- ii. Planning and scheduling deficiencies
- iii. Cash flow problems / financial difficulties
- iv. Estimation problems
- v. Delays in mobilization
- vi. Poor material management or procurement management
- vii. Construction defects and rework due to incompetency of technical staff
- viii. Rarely used / new construction methods
- ix. Delays related to sub-contractor's work
- x. Delays in contractor's payments to subcontractors
- xi. Delays in detecting and correcting deviations from the planned budget, schedule and quality
- xii. Problems related to construction safety

12. Delays related to client

- i. Delays in site preparation
- ii. Work suspension by the client
- iii. Delays in progress payments to contractors
- iv. Changes in design, materials or scope
- v. Contract related disputes or mistakes
- vi. Client's lack of experience in construction business

- vii. Slow decision making or bureaucracy
- viii. Management faults (insufficient coordination among parties by the client)
- ix. Delay in materials to be supplied by the owner
- x. Unrealistic contract duration imposed by the client

13. Delays related to Consultants

- i. Contract management
- ii. Poor quality control and inspection
- iii. Conflicts between the parties
- iv. Delays in approval of drawings, materials, etc.

14. Delays related to Materials & Equipment

- i. Fluctuations in material prices
- ii. Delays in material/equipment delivery
- iii. Modifications in material specifications
- iv. Failures due to poor maintenance of material and equipment
- v. Shortage of materials
- vi. Shortage of equipment

15. Delays related to Labor

- iv. Poor workmanship
- v. Shortages of labor supply

16. Delays related to Construction site

- i. Site location and restrictions (traffic congestion, site access etc.)
- ii. Geological problems

17. Exogeneous Factors

- i. Economic conditions in the host country (Inflation, exchange rate fluctuations, etc.)
- ii. Political environment in the host country (Changes in government regulations or government)
- iii. Adverse weather conditions
- iv. Force majeure (earthquake, war, etc.)
- v. Permissions from local authorities
- vi. Social / Environmental oppositions

18. Other (please specify)

Thank you for your time and effort...



BIOGRAPHY

Kubra BASKAPAN was born in 1990 in Erzurum, graduated Kocaeli University Architecture And Design Faculty, Department of Interior Architecture in 2012. Since graduation she worked in several countries, including Maldives and some of the MENA countries as architect and export manager assistant. Since 2019 January she works as a project coordinator in Qatar.







