

IMPACT OF THE COST OVERRUN FACTORS ON THE PROJECT DELAY IN
CONSTRUCTION INDUSTRY, PAHANG, MALAYSIA.

LING ZHI JIA

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ABSTRACT

This thesis is about impact of cost overrun to the project delay in the project life cycle. This study will focus on the Grade 7 construction companies in the Pahang. 40 project managers and site contractors from the construction industry in Pahang participated in the survey questionnaire. There are two variable in this study which are independent variables (Cost overrun factors) and dependent variable (Project delay). Reliability test is used to identify whether the variable is reliable or not. The result of Cronbach's Alpha for all variables shows that the involved variables are reliable ranging from 0.874 to 0.951. Single mean t-test is used to identify the environmental factor which shows a high value of 4.37. Pearson correlation results indicate that the all the cost overrun factors has a positive relationships with the project delay. Finding in this study is beneficial to employer to understand how important cost overruns factors to project delay, as well as to prevent recurrences from happening in construction industry.

ABSTRAK

Kajian ini bertujuan untuk mengkaji hubungan antara kesan faktor lebih kos dan projek bertanggung. 40 pengurus projek daripada industri pembinaan di Pahang telah mengambil bahagian di dalam kajian soal selidik ini. Terdapat dua pembolehubah dalam kajian ini iaitu pembolehubah bebas (kesan faktor lebih kos) dan pembolehubah bersandar (projek bertanggung). Reliability test digunakan untuk mengenal pasti sama ada pembolehubah boleh digunakan atau tidak. Keputusan menunjukkan bahawa Cronbach's Alpha correlation untuk semua pembolehubah adalah antara 0.874-0.951. Single min t-test telah digunakan untuk mengenal pasti tahap factor alam sekitar yang menunjukkan nilai yang tinggi 4.37. Pearson correlation test menunjukkan bahawa semua pembolehubah bebas mempunyai hubungan yang positif dengan projek bertanggung. Dapatan kajian ini member manfaat kepada majikan untuk memahami betapa pentingnya kesan faktor lebih kos, dan juga mengelakkan berulangnya di industri pembinaan.

TABLE OF CONTENT

	Page
SUPERVISOR’S DECLARATION	ii
STUDENT’ S DECLARATION	iii
ACKNOWLEDGEMENT	v
ABSTRACT	vi
ABSTRAK	vi
TABLE OF CONTENT	viii
LIST OF TABLES	xii
LIST OF FIGURES	xiv
LIST OF ABBREVIATIONS	xv
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Background of Study	2
1.2.1 Study Overview	2
1.2.2 What is Construction Project	2
1.2.3 Triple Constraint	3
1.2.4 Challenges in a Project	4
1.3 Problem Statement	5
1.4 Research Objectives	6
1.5 Research Questions	6
1.6 Research Framework	6
1.7 Research Hypothesis	7
1.8 Research Scope	7
1.9 Operational Definition	7
1.9.1 Cost Overrun	7
1.9.2 Project Delay	8
1.9.3 Project Life Cycle	8
1.10 Significance of Study	9

CHAPTER 2 LITERATURE REVIEW

2.1	Introduction	11
2.2	Cost Overrun	11
	2.2.1 Definition of Cost Overrun	11
	2.2.2 Existing Studies of Cost Overrun Factors	11
	2.2.3 Financial Factors	15
	2.2.4 Management Factors	16
	2.2.5 Construction Items Factors	17
	2.2.6 Environmental Factors	18
	2.2.7 Impact of Cost Overrun to Different Parties	19
2.3	Project Delay	20
	2.3.1 Definition of Project Delay	20
	2.3.2 Project Life Cycle	21
2.4	Impact of The Cost Overrun Factors to The Project Delay	22
2.5	Summary	25

CHAPTER 3 RESEARCH METHODOLOGY

3.1	Introduction	24
3.2	Research Design	24
3.3	Instrument Development	27
	3.3.1 Design of Questionnaire	27
3.4	Data Collection	29
	3.4.1 Population of Study	29
	3.4.2 Sampling	29
	3.4.3 Sampling Technique	29
	3.4.4 Data Collection Process	31
3.5	Data Analysis	31
	3.5.1 Descriptive Analysis	31
	3.5.2 Reliability	32
	3.5.3 Single Mean T-Test	33
	3.5.4 Normality Test	33
	3.5.5 Correlation	33
3.6	Summary	34

CHAPTER 4 DATA ANALYSIS

4.1	Introduction	35
4.2	Descriptive Statistics	35
	4.2.1 Respondent's Demography Analysis	35
	4.2.2 Frequency Of Construction Project	41
4.3	Reliability Analysis	42
	4.3.1 Reliability Analysis for Independent Variables	42
	4.3.2 Reliability Analysis for Dependent Variable	43
4.4	Single Mean T-Test	44
	4.4.1 Single Mean T-Test Result For Level of Financial Factors	45
4.5	Normality Test	48
	4.5.1 Normality Test of Independent and Dependent Variables	48
4.6	Pearson Correlation Test	54
	4.6.1 Correlation Between Financial Factor and Project Delay	54
	4.6.2 Correlation Between Management Factors and Project Delay	54
	4.6.3 Correlation Between Construction Items Factors and Project Delay	55
	4.6.4 Correlation Between Environmental Factor and Project Delay	56
4.7	Summary of Hypothesis Testing	56
4.8	Summary	57

CHAPTER 5 DISCUSSION AND CONCLUSION

5.1	Introduction	58
5.2	Conclusion	58
	5.2.1 Answer for Research Question 1	59
	5.2.2 Answer for Research Question 2	61
5.3	Implications	63
5.4	Limitations	63
5.5	Recommendation	64
	5.5.1 Sample Size	64
	5.5.2 Data Collection	65

REFERENCE	66
APPENDICES	71
A Cover Letter For Survey	71
B Questionnaires	72
C SPSS Output	77
D Gantt Chart for Preparation for Final Year Project	87

LIST OF TABLES

Table No.	Title	Page
2.1	Summary of Cost Overrun Factors Studies by Previous Researchers	13
3.1	Likert Scale for The Level of Agreement of Cost Overrun Factors	28
3.2	Likert Scale for the Effect of Cost Overrun Factors on Project Delay During Each Stage of the Project Life Cycle	28
3.3	Sample Size In a Given Population Size	30
3.4	Internal Consistency of Cronbach's Alpha	32
4.1	Frequency Analysis on Respondent's Gender	36
4.2	Frequency Analysis on Respondent's Race	36
4.3	Frequency Analysis on Respondent's Nationality	37
4.4	Frequency Analysis on Respondent's Education Level	37
4.5	Frequency Analysis on Respondent's Working Position	38
4.6	Frequency Analysis on Respondent's Working Experience	38
4.7	Frequency Analysis on Respondent's Company Qualified Certification	39
4.8	Frequency Analysis on Respondent's Company Age	39
4.9	Frequency Analysis on Respondent's Company Size	40
4.10	Frequency Analysis on Respondent's Company Quality Certification	40
4.11	Frequency Analysis on Construction Project	41
4.12	Reliability Analysis of Independent Variables	42
4.13	Reliability Analysis of Dependent Variable	43
4.14	Single Mean T-Test Result of Independent Variables	44
4.15	Single Mean T-Test Result of Level of Financial Factors	45
4.16	Single Mean T-Test Result of Level of Management Factors	46

4.17	Single Mean T-Test Result of Level of Construction Items Factors	46
4.18	Single Mean T-Test Result of Level of Environmental Factors	47
4.19	Skewness and Kurtosis Test of Financial Factors	49
4.20	Skewness and Kurtosis Test of Management Factors	50
4.21	Skewness and Kurtosis Test of Construction Items Factors	51
4.22	Skewness and Kurtosis Test of Environmental Factors	52
4.23	Skewness and Kurtosis Test of Project Delay	53
4.24	Correlation between Financial Factors and Project Delay	54
4.25	Correlation between Management Factors and Project Delay	54
4.26	Correlation between Construction Items Factors and Project Delay	55
4.27	Correlation between Environmental Factors and Project Delay	56
4.28	Summary of Hypothesis Testing	56

LIST OF FIGURES

Figure No.	Title	Page
1.1	Project Triple Constraint	3
1.2	Research Framework	6
2.1	Project Life Cycle	21
4.1	Result of Financial Factors	49
4.2	Result of Management Factors	50
4.3	Result of Construction Items Factors	51
4.4	Result of Environmental Factors	52
4.5	Result of Project Delay	53

LIST OF ABBREVIATIONS

RH	Research Hypotheses
RO	Research Objective
RQ	Research Question
Sig.	Significant Value
SPSS	Statistical Package for the Social Science

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The inability to finish project within completion time and budget to be a long lasting worldwide problem and is worsening (Ahmed et al., 2002). Angelo and Reina (2005) mentioned that the cost overruns are a risky and crucial problem. They also state that the problems of cost overruns and project delay are become a trend in the worldwide and it is more happened in developing countries (Angelo & Reina, 2002). As in the developing country, the construction industry is continues growing, so the planning and budgeting problem in construction project definitely will happen. It is a common problem of a project is not to be completed on time and within the budget (Apolot et al., 2013). Hence, it is important to determine the factors that contribute to the cost overruns, take action to prevent and reduce these issues in the future.

Cost overruns and project delay are the most crucial problems happen in the construction industry so in order to examine this phenomenon, this study attempts to identify the cost overrun factors happen in the construction industry and investigate the impact of the cost overruns factors to the project delay. This chapter provides general overview of the study; it was covering the background of study, problem statement, research objectives, research questions, scope of study, significant of study, research framework, research hypotheses, and operational definition.

1.2 BACKGROUND OF STUDY

1.2.1 Study Overview

The construction industry is a highly dynamic sector and plays an important role in developing economy of a country (Rahman et al., 2012), it has a significant impact on the economy of all countries (Leibing, 2001). As mentioned by Olawale and Sun (2010), the development of the construction industry contributed to the GDP and the employment of all countries, and construction industry creates a multiplier effect on others industry, for example, manufacturing industry, professional services, and financial services (Ibrahim et al., 2010).

In foreign country, a very comprehensive research done by Flyvbjerg and Holm (2002) state that 9 out of 10 public construction project in Chicago has overrun in the cost and schedule. In 2006, Standish study report shows around 46% of the project, either had cost overruns or it did not meet the requirement or needs of customer and users (Rubenstein, 2007). In addition, researchers from Saudi Arabia, they study that factors of delay in the construction project, found that only 30% of construction projects were finished within the completion date, and the average time overrun was between 10% and 30%.

Nowadays, construction industry of Malaysia is being developed rapidly (Ali and Kamaruzzaman, 2010). However, it is facing chronic problems, such as time and cost overruns, poor worker's performance, poor productivity, over dependent on workers from foreign countries and lack of resource (Rahman et al., 2012). In 2005, about 417 (17.3%) of government contract project in Malaysia which are delayed more than 3 months or abandoned was considered as "sick"..

1.2.2 What is Construction Project

Construction project is not only the construction work, but also included all the planning, designing, management, executing or others work until the end of the construction phase. A construction project can be considered as successful if the project

satisfies the all the requirements on original budget, on schedule, and agreed with the scope as that have been set within the project(Michael, 2010).

1.2.3 Triple Constraint

All projects are carried out under three constraints, which are time, cost and scope. Commonly the constraints are called triple constraint, and they are represented as a triangle as shown in Figure 1.1. These three constraints are significant in every project. Triple constraint is the balance of project's cost, time and scope; it was used to measure whether a project's objective are being met. From the project management perspective, responsibility of project manager is to carry out any construction projects based on scope, cost and time constraints (Taylor, 2004). Most projects do overrun time and cost constraints are failed to meet project's expectations, so that project manager have to take responsibility to prevent it.

The triple constraints have their own respective effect on the project's performance, they have correlation with each others, anyone constraints has bears effect on the other two (Brewer and Dittman, 2010). If a change happens on a constraint, another two constraints also will influence by the changes. The Figure 1.1 shows project triple constraints as follows:



Figure 1.1: Project Triple Constraint

First constraint is cost, which is the source to approve all project including all budget or expenses to deliver the project. For virtually all projects, cost is eventually a limiting constraint; few projects could go over budget without require a corrective

action in the end. Second constraint is time (schedule); it defined as the time used to complete a work task or a project (PMBOK, 2004). Wyngaard van (2012) also explained time is the most struggle constraint to control and monitor in a project as deadline are usually fixed to ensure efficient working and often the required resources are not available when needed. Lastly is the project scope, which is defined as what a project is trying to achieve and accomplish it included all the work involved in deliver the project outcome and the process used to produce (Michael, 2010).

1.2.4 Challenges in a Project

It is clearly that the construction industry has unique characteristic that are not common in other industries. In the construction industry, consists of different kinds uncertainty and unpredictable factors when they are turn out and become more complex, the additional resource, cost and time are needed. Any uncertainty can bring the impact to the productivity level and damages in the workplace.

Cost is a prime factor to measure the project success, especially for the construction projects in the developing country, because construction projects in the developing countries are perform under insufficient resources, always faced problems of shortage materials(Nega, 2008). Generally, a project is considered successful if the project is finished within a stated cost or budget, and also getting done on time and meet the project objectives. Second most important factor that affects the project success is the time to complete the projects; it is always related to the financial losses, due to lack of financial sources to complete the project.

As the construction project increase in size, it is difficult to plan the time frame and project budget will be necessary to complete a construction project (Gould, et al, 2002). This is because of creating a large construction project takes a long time period and usually involves a big amount capital investment.

Generally, most of the construction project was experienced cost overrun and time overrun during their execution phase. Cost overrun will increase the amount money need use to construct a project over and above the original budgeted

amount(Apolot et al., 2013), and it will delay the project status due to project manager and contractors need to find the funds for the following execution work. Time overrun is project cannot complete within the planned schedule, it will bring impact to the project completion date, cost overruns, dispute, and litigation (Arditi et al., 1985). These critical issues are inability to complete the construction projects on time, low quality work and cost overruns.

1.3 PROBLEM STATEMENT

Poor time and cost performance are critical issues facing by today's construction industry in Malaysia, due to construction companies failed to achieve project objective in the targeted time and targeted cost(Al-Najjar, 2008).

The critical issues facing by Malaysia is due to the lack of concern by project manager in the construction issues; and there are less of studied on the impact of the cost overrun factors to the project delay, lack of updated information about how cost overrun factors can bring impacts to the project delay in different stages (Ibrahim et al., 2010).

The statements above can be concluded as both cost overrun and project delay are issues that are directly can lead a project to failure. If the problems are untreated, it will bring unanticipated and unexpected impact to the company as well as the construction industry (Mohamad, 2010). Therefore, project manager and site contractor need pay serious attention to alleviate it (Rahman et al., 2013).

Thus, this study is attempted to highlight the factors of cost overruns in the construction industry, and investigate the impact of the factors of the project delay in the construction industry in Malaysia. Hence, it can help contractor and project manager to understand the importance of cost and time in a project, alleviate financial and time related issues in order to make the project successful.

1.4 RESEARCH OBJECTIVES

This study is aimed to achieve two objectives:

- RO1. To identify cost overrun factors in construction project.
- RO2. To investigate impact of the cost overrun factors on the project delay.

1.5 RESEARCH QUESTIONS

This research attempts to answer the following questions:

- RQ1. What are the cost overrun factors in construction project?
- RQ2. How does the cost overrun factor affect project delay in the construction industry?

1.6 RESEARCH FRAMEWORK

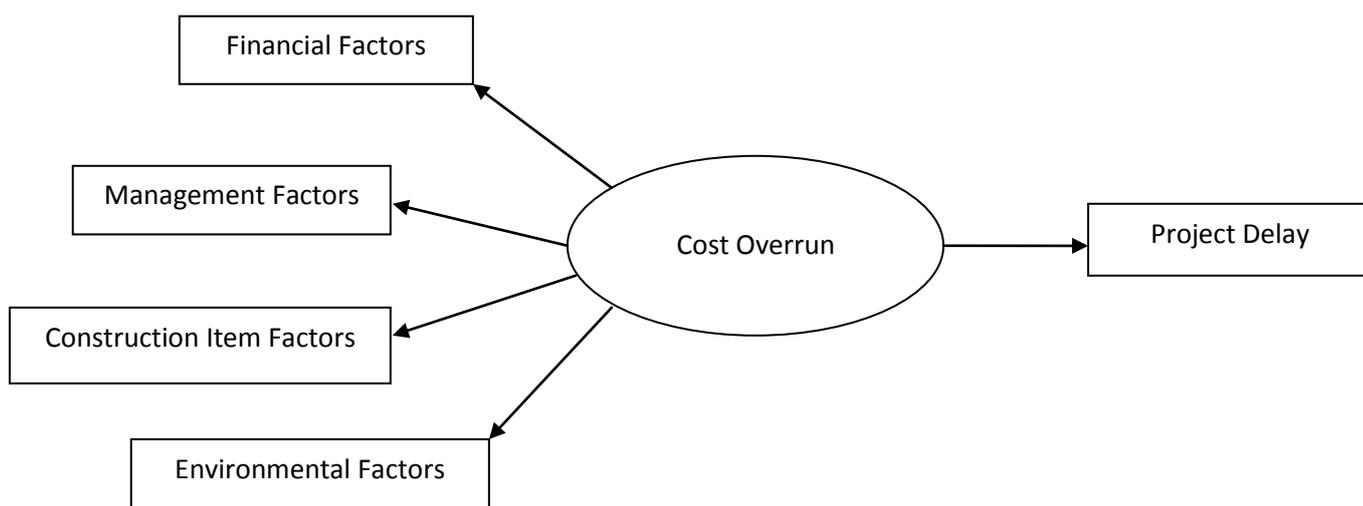


Figure 1.2: Framework shows that Relationship between Cost Overrun Factors and Project Delay.

1.7 RESEARCH HYPOTHESIS

H1: There is a positive relationship between cost overrun caused by financial factors) and project delay.

H2: There is a positive relationship between cost overrun caused by management factors and project delay.

H3: There is a positive relationship between cost overrun caused by construction items factors and project delay.

H4: There is a positive relationship between cost overrun caused by environmental factors and project delay.

1.8 RESEARCH SCOPE

This study is limited to construction industry and conducted among project managers and contractors in order to identify the cost overrun factors and to examine the relationship between cost overrun factors (namely: financial, management, construction item and environmental) and project delay. To carry out this study, the grade 7 construction company in Pahang was chosen to make this study. In addition, the respondents were randomly selected, and questionnaire is distributed by email and fax.

1.9 OPERATIONAL DEFINITION

1.9.1 Cost Overrun

Cost overrun is a condition which the total of money that has been used was greater than the original cost or estimated cost (Frimpong et al., 2003). In addition, cost overrun also defined as an excess of actual cost more than the cost estimated in the budget plan (Al-Nijjar, 2008).

1.9.2 Project Delay

Project delay is those project completion date to be delayed, the project cannot finish within the completion date or schedule Time that exceeds the original schedule, that bring about project delayed, due to project delays at the start or extended during activity duration (Muhwezi et al., 2014).

1.9.3 Project Life Cycle

The life cycle is the predictable pattern of a project. In the project life cycle, consists of 4 stages, which are initiation, planning, execution, and closure. Project life cycle can help deliverables the client's needs, and requirements (PMI, 2008).

Project Initiation

In this phase, the project manager will initiate a project by defining its reason, business goals, and scope. In additional, project manager will also put together a project team, define early milestone, and earlier budget proposal(PMI, 2008).

Project Planning

Once define the project and assemble the project team, the project manager will ready, enter in depth of the project planning phase(PMI, 2008).

Project Execution

The project team can begin executing the project against their assigned tasks(PMI, 2008).

Project Closure

Project closure involves delivering the final product or services to the customer, handing over project documentation(PMI, 2008).

1.10 SIGNIFICANCE OF STUDY

There has been not much research conducted to examine the relationship between cost overrun factors and project delay. So, from this study can be enlighten and inspire people about the cost overruns factors, and its impact to the project delay in the construction industry.

The advantages of this research included produce the statistical result by using SPSS, and it can be the guideline or reference to the project manager, site manager or contractors, to let them understand well how important the impact of the cost overrun factor on the project delay. So, the findings of this study will beneficial to project managers and contractors during conduct construction project.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, the previous relevant literatures were reviewed. It presented the several definitions of cost overrun factors and project delay in order to get a broad indication of the different aspects of this definition. This chapter is plays a very important role to the first objective, which is identifying the cost overruns factors in construction projects. Next, it will generally discuss a review of project delays, which was discussed by researchers in the last few years. Lastly, the impact of the cost overruns factors to the project delay were also discussed in this chapter.

The purpose of this literature review is to understand cost overrun factors. For this reason, this section was reviewed the results of different studies related to the cost overruns in the construction project by previous researchers. The factors that bring about cost overrun are presented along the project life cycle in the construction project (Baloi and Price, 2003). The cost overrun factors have a large impact to the project, therefore contractor and project manager are needed to create a strategic plan to alleviate all uncertainty in the whole project (Al-Nijjar, 2008)

Cost overruns happened in every construction project is assumed a common phenomenon, and the magnitude of these delay and cost overruns varies considerably from project to project. It is essential to identify factors of cost overruns and impact of these factors on the project delay, in order to help decrease and avoid delays and cost increase in any construction project.

2.2 COST OVERRUN

2.2.1 Definition of Cost Overrun

Cost overrun can be defined as when the project objective that have not achieved within the estimated or exceeds the targeted budget in the project plan. Cost overrun is the final cost of a project exceeded the original cost plan (Avots, 1983). In the construction project, cost overrun factors may come from various factors, for example, lack of experience of contractor, frequently changes the structure of the design, inflation of materials, improper budget planning, fluctuation in prices of materials, weather condition, poor project management and supervision.

2.2.2 Existing Studies of Cost Overrun Factors

A team of researcher was carried out a survey by using quantitative methods, they are distributed the questionnaires to the 146 public organizations, and 327 contractors in public projects in Turkey (Arditi et al., 1985). After collected and analyzed the data, they concluded that major factors for cost overruns are inflation material price, followed by changes in design specifications, fluctuation price of materials, underestimation of the cost, and poor project management.

Similar research conducted in the Nigeria by Okpala and Anlekwu (1988), who aim to find out the main factor that increasing projects cost. In the study, they concluded the data collected from different architects, contractors, engineers from different cities in the south of Nigeria, main reasons for cost overruns were price fluctuations, poor contract management, and shortage of materials, finance issues, inadequate project planning, high rental cost fee for equipments and machineries, and others.

In year 1990, researchers found that factors bring about cost overruns in public sector construction project included inadequate planning, supply of raw materials and equipment by contractors, changes of the project's scope, resource constraint, delay of decision making by government, stakeholders, wrong choice of the construction site,

poor organizational structure, labor unrest, natural disaster, and last factors is lack of experience of technical consultant(Morris, 1990).

In addition, Elinwa and Buba (1994) are considered the most common cost overrun factors are inflation of materials, price fluctuation, high rental fee of machineries, and poor budget planning.

In year 1997, a high-rise project was conveyed in the Indonesia, from the related construction project, Kaming found factors would be influencing the cost increase are inflation raw material cost and inaccurate materials cost estimating. In other hand, Frimpong et al. (2003) sent 55 questionnaires to project owners, 40 questionnaires to contractors, and 30 set questionnaires to consultants. According to the data, Frimpong et al. (2003), has found that overall ranking result shows, the major factors that contribute to cost overruns are poor contractor management, monthly payment difficulties from agencies, material procurement, and poor technical performance, inflation of material price.

In 2005, Koushi et al., found that the private residential project in Kuwait had faced material-related problems and financial constraint, they were the major reasons of cost overrun. However, are found that, poor site management and supervision, design error, poor project management assistance, design changes are the most common factors in the construction project in Vietnam.

In the year 2009, a team of researcher found that the factors causing cost overrun in the construction project located in the Gaza were caused by increment of materials' prices due to continuous border closure, fluctuations in the price of building materials, project materials monopoly by suppliers, contractors lack of planning, poor project management, and design error (Al-Nijjar, 2008).

In the 2010, from a research finding, found that among 42 cost overruns factors, mentioned that the lack of experience of contractors, cost of materials, fluctuations in the price materials, design changes and error, improper planning and poor management are the common factors make the project cost increase(Ameh et al., 2010). In the same

year, inadequate quality system was bring impact to the project's profit(He, 2010), such as poor quality. All the factors studies by previous are summarized in the Table 2.1 as follow in the below:

Table 2.1: Summary of Cost Overruns Factors Studies of Previous Researchers

Cost overrun factors	Arditi, et al. (1985)	Okpala & Aniekwu Morris (1990)	Elinwa & Buba (1993)	Kaming et, al (1997)	Frimpong et, al (2002)	Koushi et, al (2005)	Le-Hoai et, al (2008)	Enshassi et, al (2009)	Ameh, et al. (2010)	HE (2010)
Fluctuation price of material	✓	✓	✓	✓	✓			✓	✓	
Materials inflations	✓					✓			✓	
Materials monopoly by suppliers	✓					✓		✓		
Changes in design specifications							✓		✓	
Poor project management, supervision and structure	✓		✓				✓	✓	✓	
Poor contract management		✓			✓					
Shortage of materials		✓								
Inadequate project planning		✓	✓	✓				✓	✓	
Resource constraint			✓							
Delay decision making by government, stakeholders			✓							
Wrong choice construction site			✓							
Natural disaster			✓							
Lack of experience of consultant, contractors, project manager			✓						✓	
High cost machineries		✓	✓							
Inaccurate estimation/ cost underestimation	✓			✓						
Monthly payments difficulties from agencies					✓					