Risk Management Impact on the Legal Challenges of Fast-Track Projects in Dubai

اسة تأثير إدارة المخاطر على التحديات القانونية في المشاريع سريعة التنفيذ

by

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ABSTRACT

This thesis is about the impact of the risk management on the legal challenges of the fast-track construction projects. The focus of the study is to identify the risk factors from different stake holders (client, consultant, contractor and sub-contractor) involves in the execution of the projects and could impact on the legal challenges of the fast track project in Dubai and to develop the operative risk management framework to resolve the risk factors and their impact on the factors of legal challenges. To achieve the goal mixed method of analysis used. Data collected via literature review of books, articles specifically related to fast track projects, legal challenges involves in the fast track project and risk management methods implementation in Dubai construction industries and further questionaries' developed based on the literature review. And questionnaire distributed among the professionals working in the fast-track project as client, consultant and contractors (sub-contractor) and their response analysed using the techniques of statistics. The results demonstrated the significant risks are related either clients or contractor. Finding shows project management team has the knowledge about the risk management but poor implementation of the same. The study shows that poor implementation of the risk management in the fast-track could leads to divesting legal challenges which may affect the project execution. The aim is to establish and prove that effective risk management can reduce the number of legal challenges for successful construction project in the Dubai.

هذه الأطروحة تعنى بدراسة تأثير إدارة المخاطر على التحديات القانونية في المشاريع سريعة التنفيذ. الدراسة تركز على عوامل الخطر التي يتسبب بها جميع المعنيين في المشروع (مالك، استشاري، مقاول أو مقاول باطن)، وتأثير هذه العوامل على التحديات القضائية في المشاريع سريعة التنفيذ في دبي وتطوير آلية عمل لحل عوامل التحديات القضائية.

لتحقيق هذا الهدف تم استخدام خليط من أساليب التحليل. تم جمع المعلومات من مراجعة الكتب المتعلقة بالموضوع، والمقالات الخاصة بالمشاريع سريعة التنفيذ، والتحديات القضائية المتعلقة بهذه النوعية من المشاريع، بالإضافة إلى عمل دراسة إحصائية مبنية على المراجع المذكورة مسبقا.

الدراسات الإحصائية تم توزيعها على المتخصصين من الملاك والاستشاريين والمقاولين العاميلن في المشاريع سريعة التنفيذ، وتم تحليل ردودهم بتقنيات إحصائية. أشارت هذه الإحصائيات أن المخاطر الرئيسية تكون متعلقة معظم الأحيان إما بالمقاول أو المالك.

كما أشارت هذه الإحصائيات إلى أن فريق العمل بالمشروع لديه دراية تامة بكيفية إدارة المخاطر ولكن لديه آلية تنفيذ ضعيفة في المشاريع السريعة والتي قد تؤدي إلى نتائج قانونية وخيمة والتي قد تؤثر سلبا على سرعة تنفيذ المشروع.

الهدف من هذه الدراسة هو برهان و تثبيت أن إدارة المخاطر الفعالة بإمكانها تقليل التحديات القضائية و وتساهم في إنجاح تنفيذ المشارع في دبي.

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CHAPTER I: INTRODUCTION

a) Research Background

The UAE is one best developed nation in the gulf region with massive investment in the field of construction. The UAE construction industry expected to spend over US $315 billion to the construction industries and that's reason of the growth rapid and become the leading industries in the state.

To achieve that success Fast Track project become the top preference of the clients in the region as clients (or investor) want to finish the project early with global standard of the construction. Though fast track projects are challenging for the project management team as it requires additional measures to be deal with challenges regarding time, quality and cost.

Management tools which required to deal with the conventional project management system will not be sufficient to resolve the problems that could face during the execution of fast track project for e.g. time management is very vital to run the fast-track project as poor timing may lead to other delays to cost and quality also crucial to keep the same standard within the given time zone.

The purpose of this study to manage the risk associated in the fast track project with the tools of the enterprise risk management technique to ensure the project deliver as per quality standard within the project schedule time. Most of the companies have not follow the procedure of risk management system and deal the risk management depend on individual judgement and experience from pervious projects (Zhang, Wong and Chen, 2010).

b) Research Problem

Dubai construction industry is very complex and high-level issues of risk than other competitive industries that's why effective risk management is dynamic (Zeng, An and Smith, 2007). Now a day's construction industries in Dubai lack of proper methodologies and risk evaluation with proper risk elimination, reduce and mitigation. Most of the researchers agreed on the recognise of the risk management system as the key elements of the construction projects in the country (Lyons and Skitmore, 2004).

c) Research Aim and Objective

The main objective is to demonstrate how proper implementation of the risk management in the fast track project can minimise the number the number of the legal challenges during the project life.

- To identify the risk factors in the projects in the Dubai
- To investigate the various risk management concept and their implication on the project
- To analyses the significance of fast tracking in Dubai
- To analyses the legal challenges in the fast track project.
- To analyses the impact of risk management on the legal challenges of the fast track with the evaluate the risk mitigation framework and propose the suitable method to control the legal challenges in the fast-track projects.

d) Scope of Research

This research will focus on the evaluation of various risk management method for the fast track project in the construction industry of Dubai, that starts with the techniques and tools of identification of the risks factors and occurrence of its risk events, further the risk factors are assessed with the different tools and techniques of qualitative and quantitative research methods. And further studied about the factors of legal challenges occurs in the execution of the fast track project. After the study of literature reviewing in a form of an online questionnaire to the people who are part of the fast track projects in Dubai through purposive random samplings and further develop the risk management framework for the fast track project.

e) Research Question

The objective is to advance a series of questions for research, which will guide the structure of the research. Question for the research questions are as follows:

1. Determine the risk management factors which can benefit the project management team for the successful execution of the project.
2. Determine the crucial measurement for the legal challenges of the project of the fast track project.

3. Propose a conceptional model which illustrates the relationship between the risk management factors and legal challenges factors in fast track project as independent and dependent variables respectively
4. Explore the practicality and the relation between risk management and its effect on the legal challenges of fast track projects within the professional working environment in the Dubai by conducting a survey among a carefully selected sample frame to analyse the acquired data and support or disprove the proposed hypotheses.
5. Provide a framework of recommendations of how to effectively implement of risk management can reduce the number of legal challenges in the construction industry of Dubai.

The aim and objectives set in this research will be assessed in the conclusion chapter, which will revisit these objectives and illustrate how they have been met within the research.

f) Dissertation Structure

This dissertation has structured as following 6 chapters:

Chapter 1: Introduction

Introduction chapter delivers the background of the research, research problem, aims and objectives. Also clarify the scope of research study.

Chapter 2: Literature Review

Literature review explain the risk management strategies, fast-track project and its legal challenges with the literature definitions to develop the conceptional framework between the legal challenges of fast track project and risk management to enhance further research methodology.

Chapter 3: Research Methodology and Research Framework

This chapter will help to understand the methodology flow of the research. Questionnaire have been designed for data collection based on the study of literature review and data collected used for further analysis.

Chapter 4: Data Analysis, Findings and Discussion

In this section all the collected that have been analysed to gather the findings to get conclusive report and validation of methodology and findings of the literature review.

Chapter 5: Conclusion and Recommendations

This chapter conclude the key findings of the study and provide the recommendations for further research.

CHAPTER II: LITERATURE REVIEW

a) Risk

Literature has offer several definitions of risk, Risks explained as situation which involve exposure danger, possibility of something unpleasant and could be financial lost also (Oxford Dictionaries, 2013). In the context of construction, Risks are unavoidable in the construction site; So, it must be managed proactively with proper risk management (Goh, Abdul-Rahman and Abdul Samad, 2013). Risk is the multi-faced concept which could be occur due to one single factor or combination of multi factors during the process of whole construction life and lack of knowledge to predict the outcomes in the decision-making situation.

Risk may be categories in two different ways, depend on the how risk raise e.g. natural cause, external forces or internal project factors. According to Xenidis and Angelides (2005) risk can be identify into financial, strategic and operational categories, which can further have divided into sub categories e.g. financial related to state economy factor, commercial factor etc. whereas all the procurement, design, rework etc. falls under operational factors. Another researcher Cohen (2004) focus on the physical risk as one of the important risk which must be identify at the initial stage of the project because it couldn't only bring the health & safety concern of people employed in project but also have big impact on the company's reputation, goodwill of people, environmental issue can bring compliance risk to the organization etc. Several researchers have used different breakdown in theirs studies to identify risk, but risk mainly deals as internal and external risk.

Risk is inherent, uncertain and very difficult to deal with without proper project management framework (theoretical and practical approach). The outcome of the risk could be better as well as worse than expected e.g. may lead to project financial lose, business failure, serious accident on site, dispute between the stake-holders (Wang, Dulaimi and Aguria, 2004).

1 Internal Risks

Risk which directly falls under the responsibilities of the project management team are termed as internal risk (El-Sayegh, 2008) e.g. designer, client, contractor, engineer, suppliers etc. Risk generated because of the direct stake-holders (Client/ Consultant/ Contractor/ Sub - contractor Risk) of the construction team are classified in this category for example payment delay to the

contractor (sub - contractor), supplier, design change by client, breaching of contract by any involved party, low quality work, poor productivity by contractor (sub - contractor).

Incomplete or inaccurate details of the design and specifications could difficult to execute on the site and similarly change in the design at last stage also risk for the contract (or sub - contractor).

II External Risk

Any risk which cause by natural, economic, political, natural and cultural factors are classified in this category. Political risk (government) can be change in the guidelines during the project life, war threats and political instability in the region, delay in the approval from the government authorities etc. and the price change in the core materials required is one of the important economic factor which could affect the project budget or shortage from the required quantity e.g. manpower, equipment etc.

Weather, unforeseen conditions, natural disasters etc. are include in the natural risk category of external factors.

III Certainty and Uncertainty in Risk

There are big arguments regarding the similarities between the risk and uncertainty. Many researchers explained risk and uncertainty as different concepts claiming risk can be measured in relations with the probabilities and its impacts, while uncertainty may have defined statistically in terms of probability (Jaafari, A., 2001). While other researcher considers risk and uncertainty are as close as synonymous. Both are invisible and always defined with relative to each another and even differentiate between the risk and uncertainty may not be supportive. Therefore, this study deal with the opinion that risk and uncertainty are fundamentally same entity.

Uncertainty described as cognitive or non-cognitive type. Where Non-cognitive uncertainty formed by physical randomness and when information is limited that means only simple assumptions are possible. And uncertainty in fast-track projects may be avoided by using simple methods e.g. probability and statistical. Other category of uncertainty i.e. cognitive which explained as caused by the poor judgement of the project participants.

b) RISK MANAGEMENT

Risk Management is that management discipline whose scope is to protect the asset and benefits with minimal damages or losses before risk could occur. Whereas PMI (2006) has defined risk management as methodical procedure for recognizing, evaluating and controlling the risk of the project. Risk management reduce the potential threat to the project and can also maximize the performance of the project and organization (Goh, Abdul-Rahman and Abdul Samad, 2013). Project Management Institute's Body of Knowledge (PMIBOK 2006) defines as "risk is an unknown incident or circumstance which, if it happens, can favourable or unfavourable effects on a project's objective." The key objective of risk management system is to recognize all likely risk that could happen in the project. After that the risk consequences based on the previous experience on similar has estimated so that proper responses can be built to deal with it. As project manager.

Another researchers Wang, S., Dulaimi, M. and Aguria, M. (2004) explained that around 20% projects lead to extra cost and time than the planned schedule and cost as project team has failed to identify the risk and its degree in advance and couldn't have proper risk management strategy. Most of the companies has failed to develop the strategies to measure the risk and eventually 80% of the project globally failed.

Wang, Dulaimi and Aguria, (2004) explained the construction risk into three main categories e.g. country, market and project level. The research approach is to identify the impact of one type of risk factor to other risk factors for prioritizing the risk factors for the mitigation process. Further in the details for country category he divided as political and macro-economic strength of the country as main factors which could influence on the project progress at any stage. For the construction industry factors are divided as technical upgraded, innovative approach, understanding of the market competition, proper tendering and contract understanding. In the project level category, risk described as site-based constraint related to procurement, delivery, design change, project schedule, quality and safety issued.

PRAM includes nine stages as starting with the defining, focus, identify the risk events, structure, ownership of the job (or task), estimate, evaluate, manage the risk and plan while PMI risk management framework consist of five stages again starts with the risk planning, to start risk identification and analysis, prepare the response for risk and monitoring and control the risk (Goh, Abdul-Rahman and Abdul Samad, 2013).

Considering the importance of the Risk Management many professional institutes like Project Management Institute (PMI) and Association of Project Management (APM) introduced risk management system for e.g. Project Risk Analysis and Management (PRAM) by Association of Project Management, Risk Management frame by Project Management Institute.

As per AIRMIC, ALARM and IRM (2002) suggest developing the analysis of risk system which may help the organization operation system to work efficiently by recognising the risks and following three states in the risk management strategy:

Figure 1: Risk Management strategy based as captured from AIRMIC, ALARM and IRM (2002)

Every organisation must have proper risk management system and every team must have knowledge of it. As per Ceric, A. (2003) most of the cases project management team are aware with the risk management concepts and its impact on the project delivery but doesn't always intent to implement risk management system in the project execution.

c) RISK MANAGEMENT PROCESS

According to Wang, Dulaimi and Aguria (2004) risk management plan is a recognized and logical procedure of analytically recognizing, analysing and responding to identified risks throughout the project life span. And further they focus on the mitigation of the risk either by eliminating or reducing the influence of that risk activity on project.

The prime objective of the project management is to deliver the project as per agreed scheduled duration within the contract budget and required quality. And it is difficult to accomplish under uncertainty nature of the construction. The risk management process will assist to ensure the project deliverable must accomplish as required.

Risk management is continuing process which run throughout the life cycle of the project, each phase of the project from tendering to final close out of the project. Risk has been addressing with its consequence in all the important phases which help in the decision-making procedure. Sometimes response to risk could raise new risk but it should also be identified, properly analysed and controlled and even certainty in the foreseen events must be convert into uncertainty into risk and manage it. it is important to systematically analysing reasons which affect the fast track project.

According to Cohen, M.W., & Palmer, G.R. (2004) risk management includes the identification of risk, record the risk and further the grouping of risk and then develop the strategies for minimisation or diverting the risk and monitor & control them. Cohen and Palmer (2004) also lists as risk identifications, approximation, analysis of risk, feedback of risk response and surveillance. Shang et al. (2005) has divided the risk management into three mandatory states which includes planning, response and control and Monitor. Whereas in each stage there are precise hedging methods e.g. in planning stages focus will be on the predicting and evaluating the risk with the experience of the project manager and its team, the second stage concentrate to find the best response to mitigate the risk either by avoid or transfer its effect on the project delivery. In the last stage project manager must develop the process of monitoring and control the risk strategy and risk events must be monitor throughout the project and even the risk response also must be monitor.

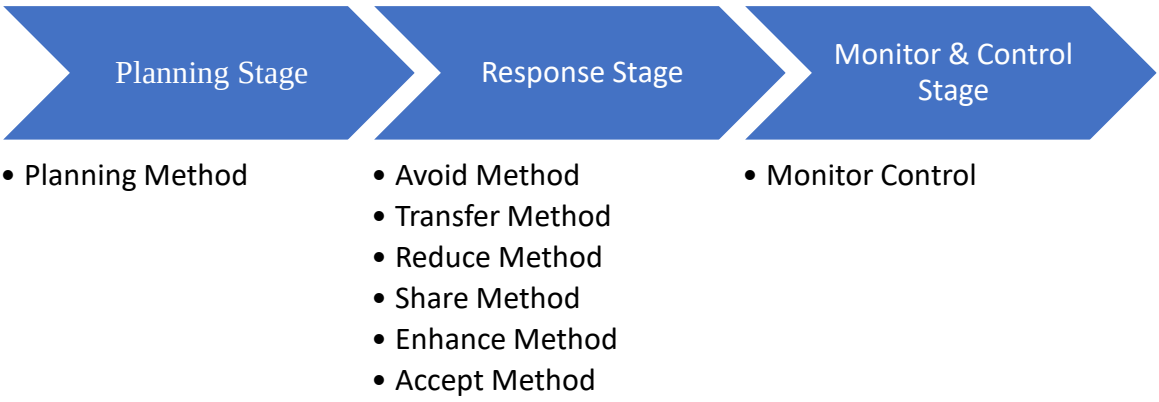

Figure 2: Taylor's (2003) diagram for Risk Management Strategy.

Most of the studies highlight risk identifications, risk analysis, risk response and risk control as important aspects in the risk management method. We will use Ceric (2003)'s frame work for risk management process for our studies as it is close to or studies.

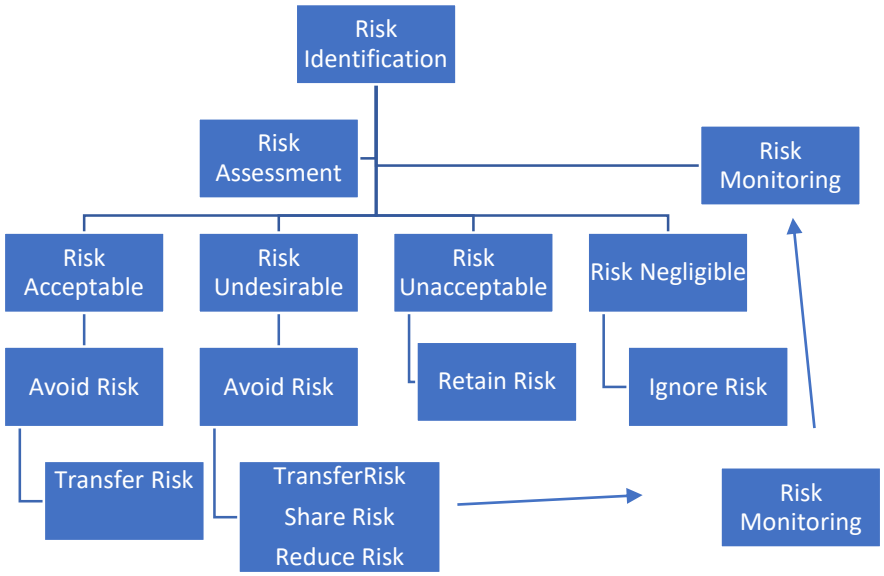

Figure 3: Ceric (2003)'s Risk managment Framework

After the understanding of the risk management process, the next step is to implement of the risk management system into the project. As per Zarooni and Abdou (2000) most of the cases project management team are aware with the risk management concepts and its impact on the project delivery but doesn't implement risk management system in the project execution.

d) RISK IDENTIFICATION

Risk identification phase is considering as most important phase of the risk management process as it provides the foundation on which whole process will built. The basic aim of risk identification to provide the consolidate list of the risks that could have potential impact on the project (Ceric, 2003). Identification of the risks will be based on the experience of the project manager and comprehensive risks list can accelerate the project's goals. There are various techniques that helps in the identification of the risk like Delphi technique, brainstorming, interview questionnaires and expert systems (IRMS). Proper use of the tools and technique for risk management can add the value to the performance of the project and organization. Refer the below table for the wide range of the tool and technique use by other researchers other than professional institute e.g. (Tah and Carr, 2000), (Dey, 2001), (Shen, 1997). Most commonly used tools and techniques are checklist, probability matrices, experience/intuition judgement, brainstorming, sensitive analysis and Meonte Carlo simulations.

1 IRMS

There are many systems for risk management that design to identify the risk in all areas by sharing the information with users and allow them to get the information from the previous projects. IRMS (integrated risk management system) is one of them that helps the project manager in decision making of the project. IRMS works on the integration of the risk management with project management in terms of cost, planning – this is important in the fast track project (Shen, 1997).

In this phase risks are identifying along with risk sources. And IRMS models divide the risks into five level for the fast track project and further divide into local and global issues.

A framework has been produced for the risk, each risk is indicating with code and where the source of the risk can be determined then risk falls under same risk source are classicised by their source. Then risks are given the rating on the base of their impact on the project, that helps the mangers to eliminate the risk, if can't eliminate the risk mitigate it.

II Brainstorming

It open discussion involve all the participants to share their views based on their previous experience for the uncertainty and their possible impacts on the project and share good response from their point of view (Ceric, 2003). The discussion must be led by risk manager or project head to avoid any conflict or personal disagreement and participant's numbers must be limited with some criteria.

III Interviews

Set of structured or unstructured questions design by the project head/risk manager must asked to the participants, participants must get change to prepare for question and letter discuss in detail (Ceric, 2003). For structured questions set-up respondent must answer from the given multiple choice and unstructured question give respondents to answer as per their view.

IV Questionnaires

Questionnaires are like the interview but in the questionnaires, respondent have limited to answer the question within the scope of questions. (Ceric, 2003). Questions can be structure or unstructured depend on the choice of the project manager, but questions must be formulating to get good quality of answer.

V Expert Systems

Expert systems are included to collect the information and experience of the contributors. Depend on expert experience from previous projects information will be collect about any risk e.g. source of the risk, how to mitigate, to develop good risk response (Ayyub and Haldar, 1984). The limitation of this system is very much depending on the respondent expert's information share.

After the identifying the risk and its source, next step is the assessment of the risks by different tools and techniques of the assessment and the selection of the tools for the risk assessment be subject to the experience of the risk manager and project manager.

e) RISK ASSESSMENT

According to El- Sayegh (2008) identification and assessment of the risk in key point on the risk management process. Every project possesses certain amount of risks and its depend on the capability of the project management team (or project manager) to identify the potential risk. However, researcher further elaborate that the focus of the project manager must not only on the identifying the risk but also set-up proper system for the risk identification.

Once the risk has been identifying, risk assessment must be done and record in the risk register. All the risk must be described briefly to avoid any confusion in the future. Risk source is one the key aspect must be record properly and classified by the sources, and risk events which raise the risk also be quantified. Mostly risk activities are interlinked and depended on other activities, so all the interrelated connections also be discussed. Once the risk has been analysed, risk response will be determined to begin the monitoring. Risk can be assessing either by qualitative or quantitative risk assessment.

I Qualitative Risk Analysis

Qualitative analysis technique based on the expert advises, checklists, audits and what if scenarios. Focus is on the consequence and concerned on the prevention of the mishap that could create undesirable results. Other that what-If or checklist there are several methods to assess qualitatively e.g. Risk Management Matrix Table, Hazard and Operability Study (HAZOP), Preliminary Hazard Analysis (PRHA), Consequence Management, Analytic hierarchy Process (AHP), Expected Monetary Value (EMV).

Further influence diagram can be produce by creating verbal statements into numerical logic values e.g. Criterion A is less than, or greater, or equal to criterion B" and information presented in diagrammatically with arrows and shapes. This method more suitable for construction projects where we can select major activities and can develop the strategies accordingly (Al-Momani, A., 2000).

Analytic Hierarchy Process

Analytic hierarchy Process (AHP) considered as key tool for risk manager for decision making. AHP provide demonstration to the decision-making individuals by pair wise comparison of

criteria to decide overall priorities of the project time line (Ayyub and Haldar, 1984). Most commonly used qualitative method by project manager is to issue the guidelines to deal with the situation based on of previous experience of the organization. Another standard method which also based on the previous experience of the similar projects, the project manager (or the organization) will issue the checklist to the project team.

Hazard and Operability Study

Hazard and Operability Study (HAZOP) methods identify the negative events by identifying and cause of the risk events by deviations to minimize the occurrence and impacts. While Preliminary Hazard Analysis (PrHA) analyses the priorities of the risk events and recognize the consequence of the risks and assist the project manager to reduce the consequences and rate of the risk by prioritising events.

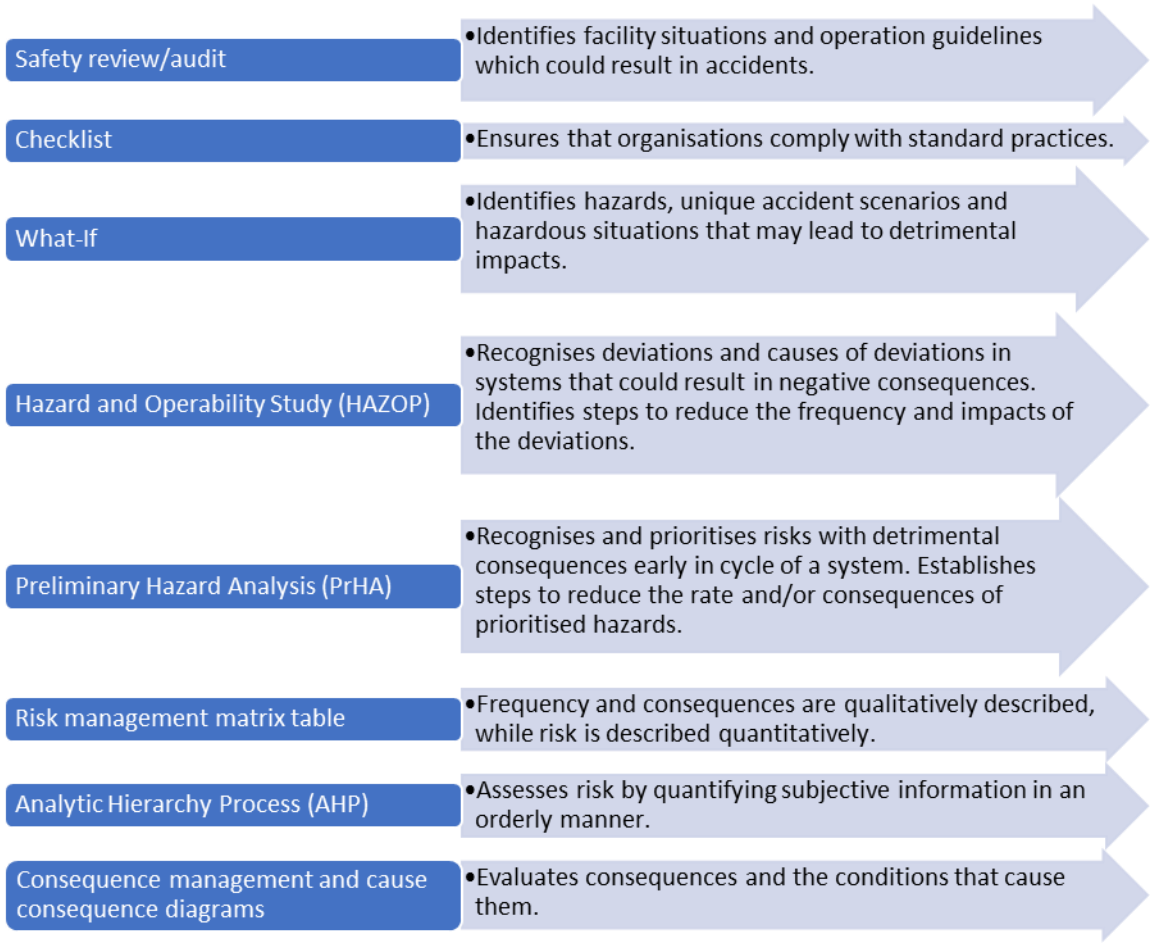

Figure 4: Qualitative Risk Assessment Techniques

Another method of the risk assessment technique is quantitative analysis which is based on the statistical analysis of the risk events.

II Quantitative Risk Analysis

Quantitative analyse is statistical analogous to create the probability and risk event results (Luu et al., 2009). Risk can have analysed by simulation, failure modes, common cause scenario with the information of past event available (Luu et al., 2009). Some methods for quantitative analysis of risk are used presently in construction e.g. assessment (simple), sensitivity analysis and other one is probabilistic analysis, decision trees, important one is Monte Carlo simulations and MERA (Multiple Estimating using Risk Analysis).

As per (Tah and Carr, 2000) "simulation involves replicating the real world from conceived reality models". Simulation can imitate a process over a give phase; mostly helps during early phase of the project e.g. design stage where project manager can decide on either on performance or cost for things which not yet built. Simulation can be applied in vast ranges of public health, manufacturing, business process reengineering, construction to determine the performance of system or process under different conditions (Tah and Carr, 2000).

Simple Assessment

Simple assessment method is based on the arithmetic logics to analyse the risks separately to find their collective possible impact (Jaafari, 2001). This method design for the small-scale projects. In the Process the identified impact of each type of risk is considered together; then added the impact which could use for likelihood planning.

Sensitivity Analysis

Sensitivity analysis mostly determine the unwanted impact on the joined activities of the project. Risk effects and uncertainties are calculated with different parameters that could impact on the project. This method provides graphical representation the change to critical variables that would assist the project manager for decision making.

Another advantage of this method that it will provide specific uncertainties and strength of the project with promptly identify each variable that help in risk mitigation process. Drawback for this method is that it doesn't reflect the occurrence of the event and must depend on the experience of the estimator's prediction. (Jaafari, 2001).

Decision Tree

In this method a tree - shape graphical representation of the risk has been representing in the different branches and other sub-categories. Consequence of each branch can be analysed to determine the risk exposure either by subjective or objective terms. This method aims on the calculating the expected value for each risk response with cost implications variable (Dey, 2001). Another method based on tree structure analysis is success tree analysis which assist the project management team to progress the assessment with proper branch system to understand the risk origin and other events on which that risk can impact.

Monte Carlo Simulation

It is statistical simulation method where the value is selected from each parameter randomly which are impacting the risk exposure and then distribution function is used to determine the probability for that risk. From the previous data and experience risk exposures are compute from specified parameters and their equivalent values. The process for selection will be replicated from 100 to 1000 times till the risk exposure become the nonspecific variable, the whole process must be carried out under the guidance of the risk manager or project manager who have experience on that risk event. Further expected value (EV) of the risk can be calculated along with potential risks without including the risk exposure's probability in the project (Aleshin, 2001).

Multiple Estimating using Risk Analysis (MERA)

This method MERA is more relevant to probabilistic analysis to determine the most likely outcomes level and considered as risk free estimate and maximum risk allowance. Further with the help of MERA, risks can categories into fixed risk with specific outcome and variable risks with multi outcomes. For the probability of occurrence fixed risk cost can produce that will give the average risk allowance and for the maximum risk allowance 90% chances of mitigating risk due to impact of cost. The benefit of the MERA analysis method is to yield relevant estimation with the applicability to the case in the simple manner. However, this method is restricted to complex statistical aspect (if involved) which may reduce the sensitivity of the risk exposer (Jaafari, 2001).

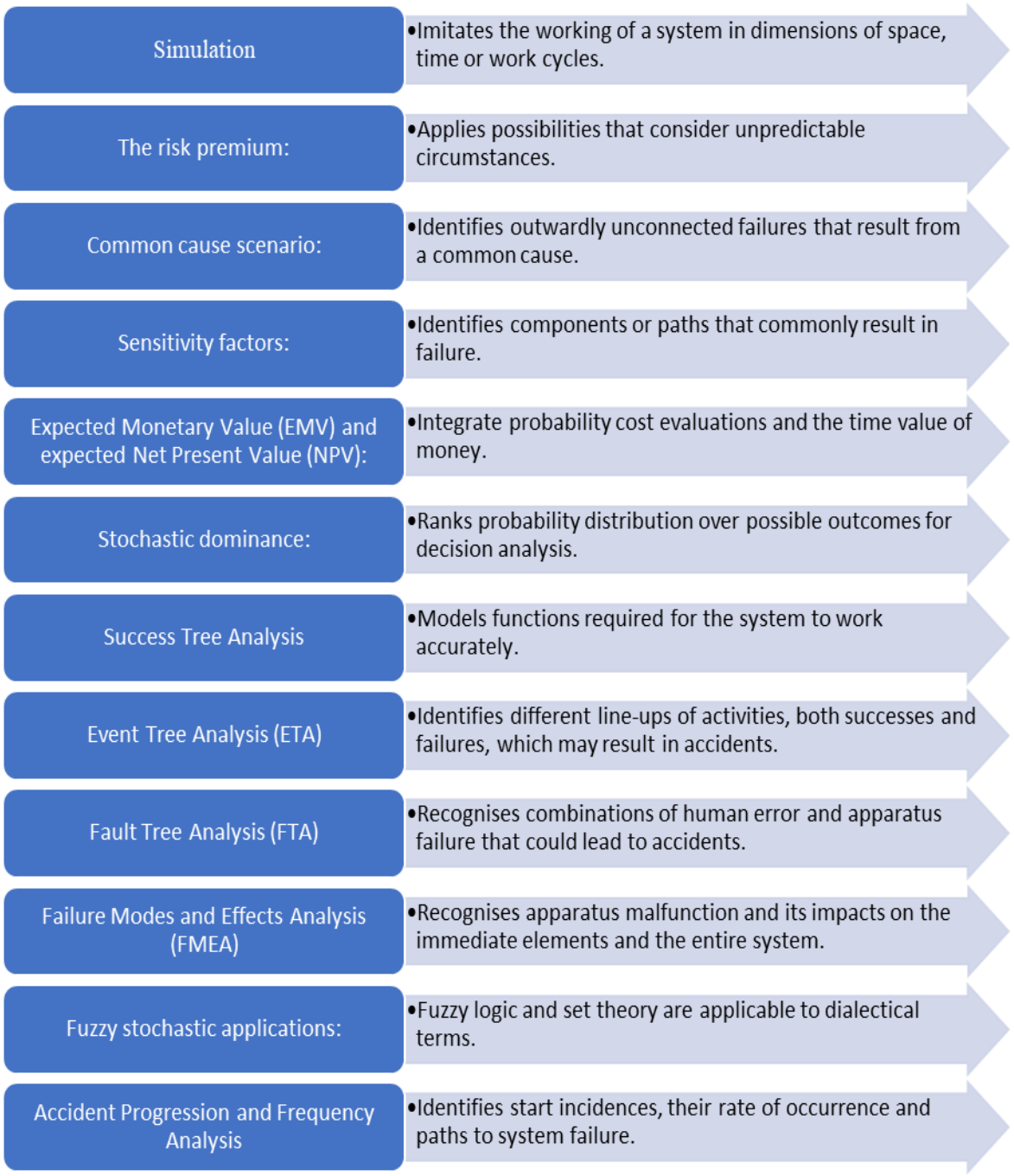

Figure 5 : Quantitative Risk Analysis Tool & Technique

After the analysis of the risk which we identify from the project, the next major step is to prepare the risk response to deal with the risk. Generally, the risk response has been develop based on the appetite of the organisation thus it defers from company to company and region to region.

f) RISK RESPONSE

According to PMI (2006) risk response must be estimated based on the potential effect of the risk identify during the process. Risk response has been classified into further group depended on the impact for example acceptable or unacceptable risk, if the risk acceptable that it must be monitor carefully through the life cycle of project. While the unacceptable risk can be avoided, transferred, reduced or shared depending on the risk influence on the project and must be monitored as there are possibilities of raise a new risk in the process of the risk response.

1 Risk Avoidance

As it says avoid the risk, project management team doesn't have the appetite to allow risk, so the risk must be eliminated. If the risk is inherent risk manager or project manager must study about the risk whether the risk can be avoided without any unfavourable conditions (Rahman and Kumaraswamy, 2002). Many researchers also believe cancel the contract is drastic approach to avoid risk but can include the clauses in the contract regarding the risk sharing to mitigate the risk and its consequence.

II Risk Transfer

Risk can be shift by transfer it other parties e.g. investor transfer their risk to the contractor and contractor further transfer their risk to sub-contractor. And contract or sub - contractor can transfer the risk to the insurance companies (Knecht, 2002). But in the process, it very crucial the stake holders of the project have control on the potential risk events.

III Risk Sharing

If the project team can't be control the risk events that it must be share part with proper calculations of the risk allocation to all the parties involved in the project. The process of Risk allocation distributes the risk between the client and contractor perfectly so that parties can deal with the risk as per apatite.

As per Rahman and Kumaraswamy (2002) if the client transfers all the risk on the contractor that will burden the contractor with liability of the project delivery, so the contract will increase the cost on the contingency and mark-up.

IV Risk Reduction

Risk events are not sufficient potential to share, shifted or avoided by other participants of the projects but still large to avoid them. Such risk events can have controlled either by reducing

its probability or mitigation impact on the project. Some Risk reduction may require early investment but must be lesser than outcome of the result event, it's like the repair of the risk event with the considerably less cost.

V Risk Retention

If the estimated probability of the risks is low or adequate to the project participants than risk can be reserved, and its response not required to do that. But risk manager (or project manager) must not ignore the risk and it must be monitored.

VI Risk Comparison

In this method risks of same categories are compared to analyse its consequence impact so that it will help in the decision making for the project manager. This method is very useful in the fast track projects.

VII Risk Acceptability

This is approach for the risk acceptability like risk seeking, aversive and neutral. Classifying risks into different categories may increase the project management team to accept the risk of certain ranges. Mostly construction companies doing fast-track project select the risk either aversive or neutral for the government venture.

Figure 6: Mearing Risk Acceptability

VIII Risk Control and Monitoring

Reduce the risk exposure and increase the site productivity will support in the smooth running of the projects. In the fast track projects risk should be controlled and monitored from the initial phase of development the execution of the project with the systematic risk management.

g) RISK MANAGEMENT PLAN

Many researchers believed that project management team must develop the risk simulation techniques instead of depending on the intuitive methods. And keep the focus on the risk analysis and risk assessment to develop the risk management system. Ceric (2003) has described the risk management plan into 7 stages:

Stage one – Defining: The objective in this stage is to draft the project objective. The focus will be on the project requirement that will be realistic and in case if there is any challenges or assumption or risk appearing affecting the project's outcomes must also have reviewed.

Stage two – Risk Management Document: In this stage the scale of the risk management and technique to be used during project, assign of the roles and responsibility of the team and all team member must contribute in that.

Stage three – Identification: Risks are unavoidable in the construction industries so proper risk identification techniques must be followed e.g. interview, mind mapping, brain stringing etc. Risk identification helps the project manager to deal with risk actively and proactively.

Stage Four – Assessment: Assessment of the risk can be determined by either qualitative or quantitative techniques. It is important to analysis the risk so that project manager can be take necessary measure to control the risk. And deal with risk accordingly with respect to priority.

Stage Five – Planning: After the identification of the risk, risk manager align with project team must develop a response to achieve the project objective. Project response plan must be affordable, reachable and reasonable to site project team.

Stage Six – Management: In this stage the project has been monitored in due with risk responses and if required it to reassess the risk to maintain the smooth execution of the project.

Stage Seven – Feedback: Feedback is crucial for the future project so that project management can learn from the mistakes (or experience) of the finished project for future assessment of the risk. All the information must record and save in the data (risk register) and available for other project.

h) FAST TRACK PROJECT

On the key aspect for Construction industry to reduce the time schedule for projects to get more profit on life cycle cost and save from overhead cost (Cho and Hastak, 2013). In simple words reduce the float the time from the schedule to move it on Fast Track. According to Kartam (1996) concurrently running with the design and production is one key aspect for the fast-track project as in construction fast track projects starts even before the design finish. And Peña-Mora and Park (2003) states that if project team applied the correct strategic plans from design to selecting right material to the execution on site can reduce project duration by 50%. lesser time to complete the project comparing to the conventional method.

Most of the studies discuss on the overlapping of the activities in the fast track but tight discipline and focused monitoring on each phase and activities are necessary for the success of the project (Peña-Mora and Park, 2003). Fast track project is the accelerated phase of construction where in the conventional construction method one phase begins after the completion of the preceding phase e.g. design and production are conducted successively. Construction activates are overlapping in the fast track project that's another comparison between the conventional and fast track construction as show below figure:

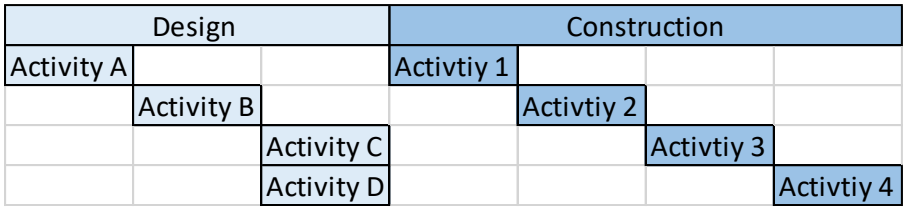

Figure 7: Conventional Construction Method

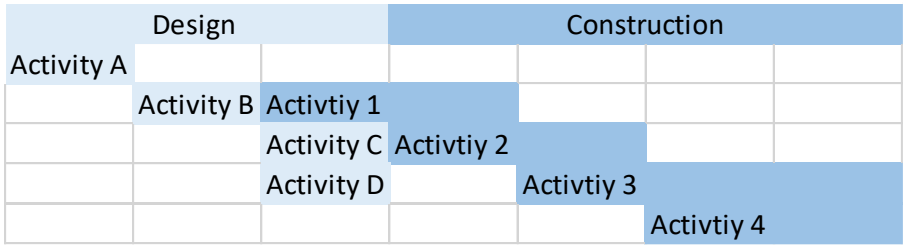

Figure 8: Fast Track Construction - Overlapping

Project Delivery Team

Since construction business is complex in nature because the process for each activity change with the environment and organization and its important for the interest of project success that all the stake-holders must work with common objective by developing the effective and productive work environment by keeping their personal conflicts opinions out. Peña-Mora and Park (2003) also emphasis on the integration of the phases (design and production) with complete involvement of the project manager in every phase of the construction.

Project Manager (risk managers) should have strong understanding between the short-cutting of the project and fast-track project. Short-cutting decreases the project delivery time by cutting or by pass some activities of the project while fast tracking project is optimising the project schedule without any short cut to deliver the project as per project standards. For execution of the fast-track projects many studies suggest that fast communication, effective instruction for the role responsibilities and transfer of the information are key factors (Mahdjoubi and Yang, 2001).

Project manager and other key members in the team's experience is important for the smooth execution of the fast-track projects. (Peña-Mora and Park, (2003) urges that the project management team members with experience of alike projects are effectivity run the project with previous experience to mitigate/control the risk quickly in favour of the project. Team members can increase the worth by implementing the lesson learnt on the similar risk on the previous projects.

Project Managers must investigate the project schedule with appropriate use of resources, anticipating the danger, identify the project schedule with correct knowledge if the critical path and their dependencies. Project responsibilities to ensure to deliver the project as per required quality, cost and time.

Effective communication is explained as the exchange of information to control the risk by discussing its nature, cause, magnitude and impacts. For the successful risk management, the communication must be two ways to maximize the input and communication level. Risk manager (or project manager) must decide where the risk is acceptable or not and must encourage to discuss with experienced team for better analysis and enhance to develop risk response.

i) LEGAL CHALLENGES IN THE FAST-TRACK PROJECT

According to the Intuition of structural engineer (1999) project manager should have proper understanding of the measuring the project delivery for the successful. According to Cho et al (2000) due rapid changes during the fast track project like changes or omission of design, change in the material order, and claim for the implementation of these rework causes legal issues in the fast-track project. If there is no adequate contractual agreement and inappropriate risk management strategy between two stake-holders leads to legal problems and report from U.S federal facilities councils (2007) also shows that 33% of fast-track projects compare to 7% in conventional construction project have more claims.

According to Moazzam, Dehghan and Ruwanpura (2011) following six factors are the most critical factors which could affect the project cycle and to be monitored from bidding stage to through life cycle of the project.

- Cost estimating, and cost overrun
- Design errors
- Damage delay
- Change of orders
- Rework and modifications
- Overlooked Work

I Cost estimating, and cost overrun

For deciding the fast track project, it is important to have proper analysis of time-cost impact on project with trustworthy decision-making tools and technique to avoid any failure; this one the reason most of project manager hesitate to take decision without proper risk management system (Cho, K. and Hastak, M., 2013).

Estimating the construction cost of the fast track project is one the significant task of the project life because of the uncertainty of the preceding activity. According to Rahman and Kumaraswamy (2002) traditional cost-estimating method won't assist much in the decision making as the accuracy of the cost estimation depend on the quantities of the project if data is unavailable e.g. during conceptual phase projects the cost-per-gross floor area method, without

considering the risk (form the experience of previous projects) and their possible impact on the other variables also.

According to Wang (2000) the project performance for the fast track project can be perceived in terms of triangle is cost over/Under Run, schedule Slip/Gain and Technical Performance/sub- performance, explained in the blow picture. Time-cost impact is an important deciding factor for the project management team to decide the weather go with the project as fast track project or normal conventional construction project. Any late change in the design which one of common practice may affect time, cost and quality of the project as the delivery (or production) of the material and reworks on the site.

According to Wang, S., Dulaimi, M. and Aguria, M. (2004) the project performance for the fast track project can be perceived in terms of triangle is cost over/Under Run, schedule Slip/Gain and Technical Performance/sub- performance, explained in the blow picture.

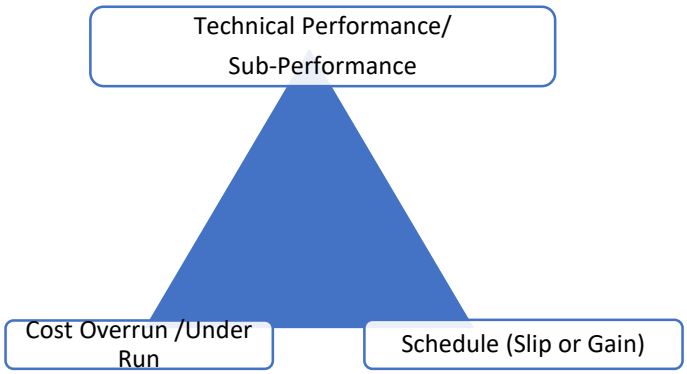

Figure 9: Wang (2000) Risk Consequences

The slow and high cost of the traditional construction methods introduce the fast track project which peruse the project on better pace with maintaining the quality and quantity of the project standard. The fast track method may also increase in the cost of the project due to duration reduce put burden on the over-time and re-work during construction (Cho, K. and Hastak, M. ,2013).

Because of incomplete data and information e.g. plans, specifications etc. in the initial phase leads result to inaccurate cost estimating and increase cost overrun risk to the project. Risk events such as delay in the material, low productivity, change in weather, any economic change may lead to consequences on the project schedule and will ultimately impact on the overall budget of project. For deciding the fast track project, it is important to have proper analysis of

time-cost impact on project with trustworthy decision-making tools and technique to avoid any failure; this one the reason most of project manager hesitate to take decision without proper risk management system (Cho, K. and Hastak, M. ,2013). Because of incomplete data and information e.g. plans, specifications etc. in the initial phase leads result to inaccurate cost estimating and increase cost overrun risk to the project.

II Design errors

The information from the client at the initial stage is very crucial and must be accurate as error in early stage may lead the project in wrong decision. For the experience contractor the early package must be study thoroughly to check if any incomplete drawings and specification in the bid which can impact on the next phases of the construction (Moazzami, Dehghan and Ruwanpura, 2011) and must be reported and record throw officially channel. Any late change in design may affect the delivery (or production) of the material, sometimes reason for the wastage of the material, reworks on the site. To start with procurement contractor (or sub-contractor) must read the drawings and specifications of the project thoroughly before the placing the order and monitor the delivery of the material, it's most common problem for the contractor to keep track on the original and new revision on the project contract (Mahdjoubi and Yang, 2001).

Shen (1997) explained the main reason for the delay in the project is due to incomplete information or incorrect design that could also follows the frequent changes unrealistic design time. In fast track project the contractor starts building the foundation or structure of the project even without the complete of the finishes design. When the activities have been carried on the site and discover the error or omission in the design details, the decision must be made on site with proper coordination with consultant or else it will impact on the quality and duration of the project. Another typical example for rework is the change in the interior design of the area e.g. electrical, mechanical systems finishing which can lead to another demolish or construction as per new requirement (Khoueiry, Srour and Yassine, 2013).

III Damage delay

It is one of the frequent issue in the fast track projects is the schedule of the program due to claim in the delay damages due to design change, late approval and rework. Change may come for many reasons client request for design change, omission or inclusion of certain factors, error in the construction execution, sometimes delay in the procurement. Many research also

argue about the techniques of risk management as one technique can't always appropriate for each situations or phase of the process (Moazzami, Dehghan and Ruwanpura, 2011) and further discuss to use selected available techniques and tools assign as per the requirement of resource and risk events in line with project objectives.

IV Change of orders

Regarding the changes during the project which is important factor; it's mostly depend on the contractor some of the contractor accept the changes, so it may increase their budget and get some additional time for the project handover while other contractors. Both participants are accountable for the changes during the project so it's very important to agree on the changes limit as it beneficial for them, as changes bring more money to the client but also increase the schedule time of the project. According to Peña-Mora and Park (2003) this entailed the procurement and site execution of the initial stage. Due to inevitable design changes of the overlapped activities results the more number of the change order in the fast track projects. As per (Peña-Mora and Park (2003) material management consist of planning of material, vender section, purchasing receiving, and distribution. Before we got material on site all the constraints must be dealing to avoid any delay in the delivery or re-order e.g. change in design drawings, change in the supplier (material type), proper measurement of the material required and lacking any of these points can create difficulties to the site execution.

For the contractor (or sub-contractor) scope of work are incomplete due to overlapping or interface of various points and that must be complete and letter stage which build pressure/burden on the contract to complete the project on the schedule. And project manager must have the good control on the process so that project manager can assign the priorities accordingly to project requirement and monitor the process if any risk occurs, it must be control at first occurrence as it can put huge impact on the project delivery and help in saving potential float in the procedure. So proper planning and tracking of the material is required along with the engineering and construction (Mahdjoubi and Yang, 2001).

V Rework and modifications

According to Al-Momani, A. (2000) delay is considered as the main obstacles for the construction industries worldwide and could cause major risks to the project. Generally, in the fast track project constructions start before the completion of the design and results to

incomplete drawings and specifications will cause unavoidable rework and modification in the upcoming phases of the construction.

It may affect the quality of the finishes product of the job, best way to avoid the rework suitable provision for final finishes must be provide in the initial designing phase. Fast track project constructions start before the completion of the last phase design and results to incomplete drawings and specifications will cause unavoidable rework and modification in the upcoming phases of the construction which could impact on the quality of the project.

According to Love et al (2009) rework is an unnecessary effort or work performed to redo or correct execution of a task (Khoueiry, Y., Srour, I. and Yassine, A. 2013) and to avoid rework, it is important to provide suitable provision for the services in the initial design phase for finishing work. Starting of the downstream activity without proper information of the preceding finish will leads to rework, because of the change in the preceding activity which impact on the downstream activity (Khoueiry, Y., Srour, I. and Yassine, A. 2013). As the project dead line remain intent, will increase the work load on the contractor (or sub–contractor) to finish the re-work with parallel to match the timeline which could lead the unsafe work, tiredness and cause the safety hazard on site and it will impact on the quality of the project. Starting of the downstream activity without proper information of the preceding finish will leads to rework, because of the change in the preceding activity which impact on the downstream activity (Khoueiry, Y., Srour, I. and Yassine, A. 2013).

VI Overlooked Work

Knecht (2002) emphasis on the identification of the project is feasible for fast tracking, all the possible stake holders must have clear understanding on the project and its procedure. All the stake-holders (client, consultant, contractor) must aligned for the sake of the project. And the alignment of the people within in the organization also required for proper and open communication vertical down to the project members.

j) Contractual Review

To deal with legal challenges of the fast track projects it's very crucial to have proper understanding of the contracts documents and all its clauses and provisions. There are no standard documents to specify the provision for any projects its change project to project but institutes like American Institute of Architects (AIA), the Associated General Contractors of America (AGC) and FIDIC (International Federation of Consulting Engineers) have set up

some standard forms of agreement which are commonly used between different contracting parties. But many researchers enhance there are no specific contract provisions for the fast track project. According to Fisher Jr. (1990), there are no provisions even in the AIA forms that deal with fast track projects or are even distantly related to the specifics concern raised during the fast track project life cycle. Although most fast-track projects are performed in a design-build delivery system and are governed under its contract documents, design-build contract documents do not quite fit for fast-tracking. Another researcher Saltz (2007) also backs the argument, "It is not unusual for design-build contracts to be used in fast-track situation but the forms do not really contemplate the fast-track construction and must be modified to accommodate that situation".

Contract Type

Selection of the contract in fast track project is the key factors for the project success. According to the Project Management Body of Knowledge (PMBOK) Guide-Fourth Edition (2008), contracts generally fall into one of the three following types:

- Fixed-Price or Lump-Sum contracts
- Cost-reimbursable contracts
- Time and Material (T&M) contracts
-

Pedwell et al., (1998) finds the effects of fast-tracking challenges on total project budget for different type of contract and their contractual arrangement. And his research was conducted in the oil and gas industry and as more than 20 trades and/or 15 subcontractors were involved, the project was considered complex.

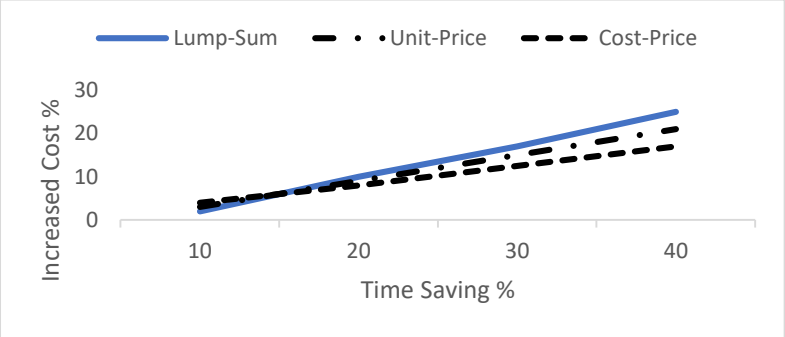

Figure 10 : Adopted from project capital cost and contracting strategy (Pedwell et at. , 1998)

The results show that fixed price contracts are not much suitable for the fast-tracking, either for complex or noncomplex projects.

k) RISK MANAGEMENT IN THE FAST TRACK PROJECT

Project Manager (or Risk Manger) must anticipate the amount of the risk that can accepted according to their risk appetite. According to Moazzami, Dehghan and Ruwanpura, (2011). After that risk has been monitor. It new risk rise (even from the risk response) the process will repeat again from the assessment to the mitigation of the risk.

Risk management is focus on the reducing the risk event in a project and guides the project team to retain the project attributes by consistent performance, monitoring and evaluation are aligned. And Fast Track are used to reduce the project length; float time between the activities almost disappear however, it could have negative impact on the performance of the project also because required time to understand the constraints is reduced and will add the uncertainties, risks and costs on that activities.

As per Cohen, M.W., & Palmer, G.R. (2004) risk management method can be categories as naïve, novice and mature. In naïve type project managers are not aware about the risk management procedure, novice project management team establish risk management system in the initial stage of the project but couldn't structure any generalised risk management approach or that project where management is the important part of the project's process falls under mature risk management categories. Risk communication of the project must be two types internal or external. Internal risk will communicate with stakeholder of the project and key person include the client and consultant whereas the external risk communication dealt with local authority's body for the public interest.

As Xiang et al. (2012) explained the life cycle of the construction project involved many participant's client, consultant, contractor, suppliers, sub-contractor, government administration, advisory bodies etc. but three key participants are client, consultant and contractor. And further Xiang et al. (2012) focus on the relationships between the client and contractor as one of the principle for successful delivery of project; it provides the transparent transaction of information, communication, assistance. As dispute of between the client and contractor sometimes breach the contract also and ultimately impact on the project delivery.

Signing a contract is a two way selection system where both client and contractor must consider the qualifications each other before bidding; as contractor must checked the credibility, financial strength, capacity and past project outcomes and similarly the owner (investor) also justify the qualification of the contractor based on its previous performance, quality,

management, qualification of the management team, service, quality of equipment and productivity and understanding of the fast track project. Despite dealing with all the possibilities, the client and contractor can't control the final output and confronted with possibility of the risk events. More important is the focus on the project objective for the benefits of the both parties.

The identification of the project is feasible as fast tracking or not also vital for all stake holders, so every stake holder must develop clear empathetic approach on the project (Moazzami, Dehghan and Ruwanpura, 2011). And client to ensure the capabilities of the contractor (or sub-contractor) to dealt with rapid changes in the fast-track projects.

Many researches have been carried out by many researchers to understand the reason for risk factors e.g. Zaneldin (2006) described the common issues related to change order and client related delays and El- Sayegh (2008) also identify the top ten key factors of delay in UAE construction. Assaf et al. (1995) identified 56 details factors with details survey in construction projects e.g. payment delay, design changes, late approval from the engineer, quality of contractor, relationship from point of view client, contractor and consultant. In Thailand another researcher Ogunlana et al (1996) discussed about the risk factors for the developing countries related to the client and consultant role in the project from the initial phase to project delivery. Rework, change in the design and procurement delay are most common problems on the fast track project though these are not specially for the fast track project, but the frequency of similar problems will increase in these types of project compare to conventional construction project.

Reports from the survey conducted in Hong Kong with 83 expected reasons of delay and further divided them into two groups; first group related groups i.e. owner, contractor and consultant and second group focus on the project-based cause. And further reports stated five major delay factors as poor management and inappropriate supervision, site environments, delay in decision making, reworks due to customer necessities Chan & Kumaraswamy (1997). A quantitative research on 130 government projects in Jorden summarised the major factors of delay as delay in approval by either engineer or client, lack of resources on site, reworks or changes on site from initial stage (Al-Momani, 2000).

According to Sambasivan & Soon (2007) the ten (10) major delay reasons were deficiency in contractors works in general, client's financials and settlement of payment issues, materials availability, internal coordination and communications etc. They highlighted six (6) effects i.e.

time and cost exceeding, disputes & litigations and complete closures cases. Alaghbari et al. (2007) debated that commercial problems were the key factor and as the second most important reason initiating delays in developments in Malaysia.

Frank et al. (2010) has detail studied to find the causes of risk in the construction industry in Ghana and important contestants are client (37 organizations), consultant (54 organizations) and 39 representatives of the contractor. And the report explained almost 32 probable causes of delays which were identified from the literature review and interviews and further the factors divided into 9 groups. The report concluded that the commercial and financial group factor are top ranked for causing risk events in projects. According Zhang, Wong and Chen (2010) risk factors got most concern is client's cash flow problem of the risk followed by poor relationship, breach of contract (by either party), and for the contractor factors are labour, material and equipment productivity, qualified employees are main risk factors.

Researchers emphasise the importance to select the risk measurement technique must align with the project nature, anticipated risk, complexity of the project (Faridi and El-Sayegh, 2006). The most commonly used methods for the risk measurement in the fast track project are deterministic risk measuring methods and probabilistic measuring methods El-Sayegh, S. (2008). All the methods for measuring risk include risk analysis and risk simulation to determine the variety of variable by apply on dynamics system framework to assist in the decision making.

Calculating risk with deterministic methods includes the checklist, data precision (risk register), ranking and assumption technique. It describes the risk characteristics in qualitative terms by fishbone diagram, flowcharts and event tress. While probabilistic methods calculate the risk on the sensitive of the cost implication on the project. Another important measuring technique is Monte Carlo which is mostly used to determine the uncertainty of the project with the decision tree. This is multi-criteria decision-making methods also used to find the alternative depending on the result of risk assessment El-Sayegh, S. (2008).

Even project management team are aware of risk managements system but doesn't implement the risk management idea in the project execution. In some previous studies based on UAE by Zaneldin (2006) explored about risk management methods were ignored, particularly the initial stages of project, even applying the assessment of risk during the estimation phase provide the better budget assumption and hence more informed decision-making.

i) RISK MANAGEMENT FRAMEWORK FOR FAST TRACK PROJECT

Based on the experience and abilities project manager may decide the technique to determine the risk event must replicate data from previous project stored from the lesson learnt of the previous project to utilize for the similar kind of project in the future. Boussabaine and Kirkham (2008) suggest in his studies to follow the traditional stages of risk management method that includes planning, identification, assessment, response and monitoring of risk events (or risk response) as integrated life cycle risk management framework concluded in five equally important as explained in below diagram:

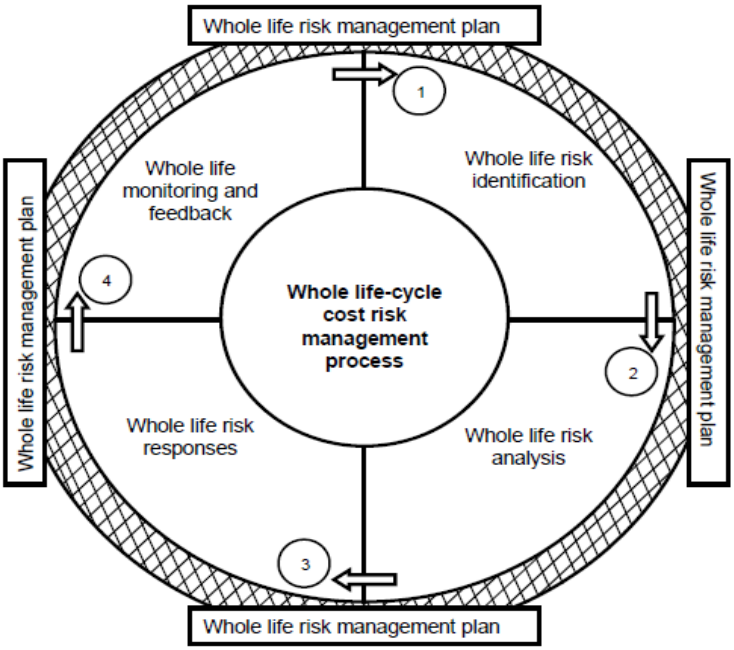

Figure 11 : Life Cycle of Risk Management Framework

Boussabaine and Kirkham (2008) also urge on the role of the project management in the risk management process as it starts with the identifications of the risk events in the initial stage of tendering and estimating and follow with respect to each activity involved. Project manager responsible to ensure that the risk assessment of the organization must be discussed according to risk appetite of the organisation to evaluate the risk evaluation to prepare the risk response for the mitigation of the risk. And monitoring of the risk throughout the project life cycle also key responsibility of the project manager or assigned risk manager. From the conclusion of the various studies following risk factors has been identified as crucial factors for the success of the project.

S N.	Risk Factors	Risk	Reference
1	Client Factors	Delay in the payment	Faridi, A. and El-Sayegh, S. (2006), Fugar, F. D.-B. (2010), Sambasivan, M., & Soon, Y. (2007), Al-Momani, A. (2000), Alaghbari, w., Kadir, R. A., Azizah, S., & Ernawati. (2007), Cohen, M.W., & Palmer, G.R. (2004), Zhang, L., Jaafari, A. (2001), Wong, W. and Chen, P. (2010), Faridi, A. and El-Sayegh, S. (2006), Shen, L. (1997).
2		Unrealistic planning schedule	
3		Improper intervene during construction	
4		No clear scope of work	
5		Change of design	
6		Site Obstacles (access, size, existing, services)	
7		Breach of contract with contractors	
8		Dispute with contractor	
9		Delay in getting Permits (NOC's)	
10		Sudden bankruptcy	
1	Consultant	Defective Design	
2		Contradictions in design and specifications	
3		Changes by engineer	
4		Delay in drawings and documents approvals	
1	Contractor	Poor Quality Work	
2		Low Productivity of labour	
3		Low productivity of equipment	
4		Unpredicted technical problem during site execution	
5		Use of defective material	
6		Incompetence of contractor (understanding of the fast track project)	
7		Lack of qualified staff	
8		Leaving of qualified staff from contractor organization	
9		Unsafe work on site	
1	Sub-Contractor	Poor performance	
2		Poor management	
3		Breach of contract	
4		Dispute between the main contractor and sub-contractor.	

Figure 12 : Risk Factors

CHAPTER III: RESEARCH FRAMEWORK AND RESEARCH METHODOLOGY

The previous chapter develop the understanding about risk management and its impact on the fast track projects. Now moving forward from literature review will discuss the research methodology and data collection process used in this study. Hypotheses have stated for this study then investigation has been carried to find the solutions for research questions, both research methods (quantitative and qualitative) have been implemented in the study.

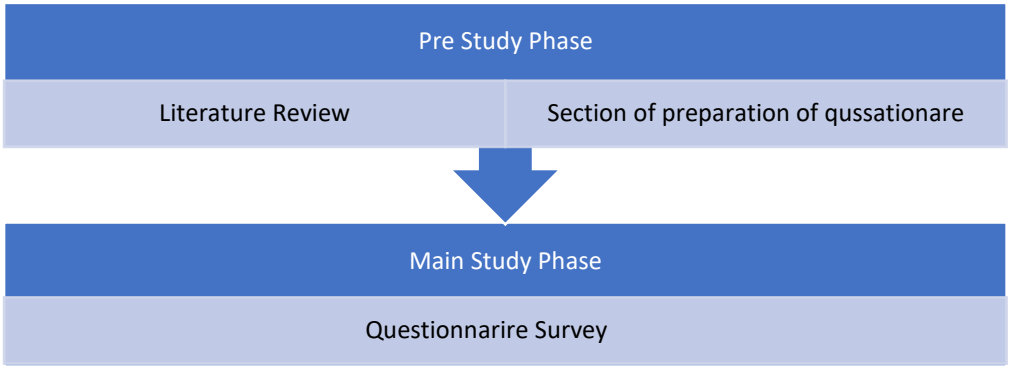

Figure 13 : Risk Framework and Methodology

a) Research Methodology Flow

Research methodology have following four steps to carry out study:

- Step One- Literature Review
- Step Two- Comparative Analysis
- Step Three – Questionnaire Survey
- Step Four- Data Analysis

Step One- Literature Review

Brief study about the risk management and its impact on the different phase of the fast track project and approach to identify the all the possible risk factors that can influence on the successful execution of the project.

Step Two- Comparative Analysis

Step two is analysis all possible risks and classify them base on different project phases of fast-track project.

Step 3 – Questionnaire Survey

The main aim for survey to collect the perceptions of range participants working on the fast track project. In this step, a set of question has been designed to get the feedback from the experienced people who part of the fast track projects is.

Step 4- Data Analysis

SPSS and MS excel are used to analyse the data gathered from the question are presenting in simple format of statics, graph, pie chart etc. The SPSS (statistical package for social science) and MS Excel are tools for the data analysis for the study with three parts: descriptive statistics, frequency analysis and last one is heat map. All the items (or sub-items) have been converted into relevant variables. And then answer were coded into labels and enter as valuable for analysis.

Descriptive Statistics

The descriptive statistics utilise to conclude the demographic data gathered from the contributors which present in different type of chart. The bar charts and distributors frequency table are explained the basic information about the respondents.

Frequency Analysis

Frequency analysis measured the central tendency within the data by the methods of mean, mode, variance, percentile and median. It deals with number of occurrence of the result data.

Heat Map

In the frequency the best tool to show the levels and ranking is called as heat map. It’s a graphical diagram of the result data which can represent in different colour and shape. The main reason for using heat map is quite useful to represent data in different colour shades and useful to understand bioinformatics in more details.

b) Research Framework

To visualize the research framework of risk influence on the success of the project execution based on the result a reviewing the literature.

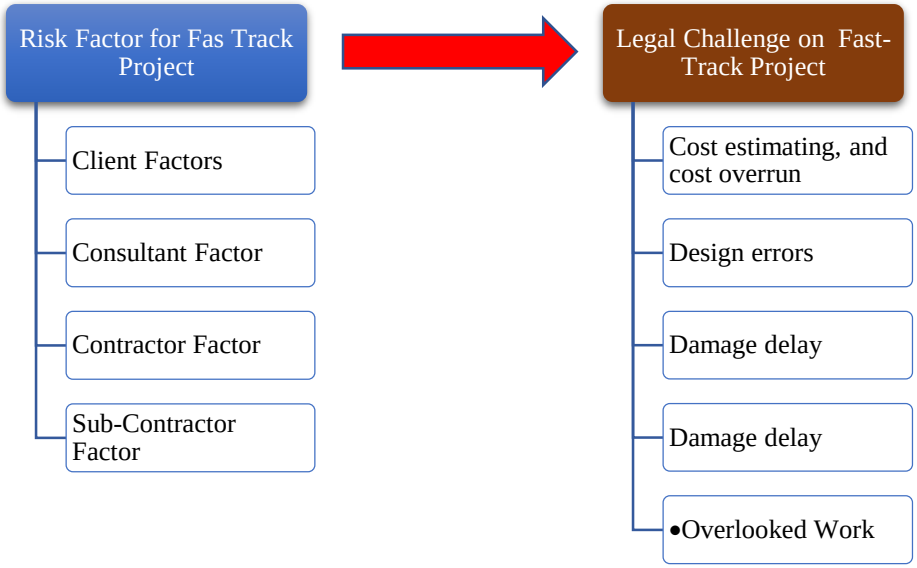

Figure 14: Research Framework

The risk factors which can influence the project success are divided into four categories e.g. client, consultant, Contractors and Sub- contract and these factors are further divided into further details factors related to each category. To analysis the influence of these factors on the risk related to deliver the project successfully must be measured with risk exposer on cost, time and quality.

Questionnaire

Questionnaire is powerful tool for collecting the data which can used for the number of people (with same questions). Further to the data collected from the literature review, the aim was to collect the primarily data for the study to find the influence of the risk factors on the success execution of the fast track project.

Research Sampling

People involved in the sampling group are professional and working in the similar kind of project and personally involved in the different phase of the project. According to Bernard (2007) explains about the specific feedback or data grounded on the information of the

individual or experts of the field, the best way to choose the sampling group is purposive sampling. It can be bias can lead to unreliable or limited results in the purposive sampling.

So, it is very critical to illuminate the bias in the finding of the research to avoid any interpretation on the conclusion. To get more dependable results, both type of techniques is used e.g. purposive and random to integrate Bernard (2007) As time limit this researcher used study within three companies based in UAE which are involved in the fast track project.

Delivering/Collection Questionnaire

The participants were briefed about the purpose of the finding of the study and privacy has been guaranteed. Survey question send to 150 people including 30 offline survey and remaining to the online survey portal. Out of 150 only 53 copies return as complete full only.

CHAPTER IV: DATA ANALYSIS, FINDING AND DISCUSSION

After getting the result from the survey responses data were analyse using SPSS. First section has analysed the demographic of the respondent with overview of the background. In the analysis risk management factors (client, contractor, sub-contractor and consultant) are considered as independent variables and legal challenges of the fast track projects (claims for delays or changes) as dependent variables. To check the reliability and consistency of the data reliability analysis has been executed and with the correlation analysis the link between the risk management factors as independent variables and legal challenges for the fast track project as dependent variables. Further data analysis with regression analysis to conclude the strength of relationship of the variables (dependent and independent).

a) Demographic Analysis

The survey was focused on the construction professionals who have experience of working on fast track projects as stakeholders either client, consultant or contractor. Followed survey samples data provided the information from 52 respondents from the different background of the construction industries. The distribution of the response is fairly broad instead of focusing any specific stakeholders, samples shows highest number of respondents 25 (out of 52) are working as contractor whiles others ae either working for client or consultant.

Table 1: Respondent's company works as

		Frequency		Percent	Valid Percent	Cumulative Percent
Valid	Client	13		25	2513/100	25
	Consultant	9		17.30	17.30	42.3
	Contractor	25		48.07	48.07	90.37
	Sub-Contractor	5		9.61	9.61	100.0
	Total	52		100.0	100.0	

Regarding the experience of the respondents 20 (out of 52) have experience of more than 10 years that provide strength to the reliability of the findings and strengthen the outcomes from the research, while other 26 respondent's e the experience of mid-career between 3-10 years in the construction field.

Table 2: Respondent's Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3 Years	6	11.5	11.5	11.5
	3-5 Years	17	32.7	32.7	44.2
	5-10 Years	9	17.3	17.3	61.5
	More 10 years	20	38.5	38.5	100.0
	Total	52	100.0	100.0	

While talking about the position of the respondents in their respective field of construction, site-based participants have the largest section with 42% of the overall participants which help to understand the risk sources which are raised during construction phase. And 23% respondents are works in senior management level. The skewedness of the obtained data in the distribution of the field helps for more strength of the outcome.

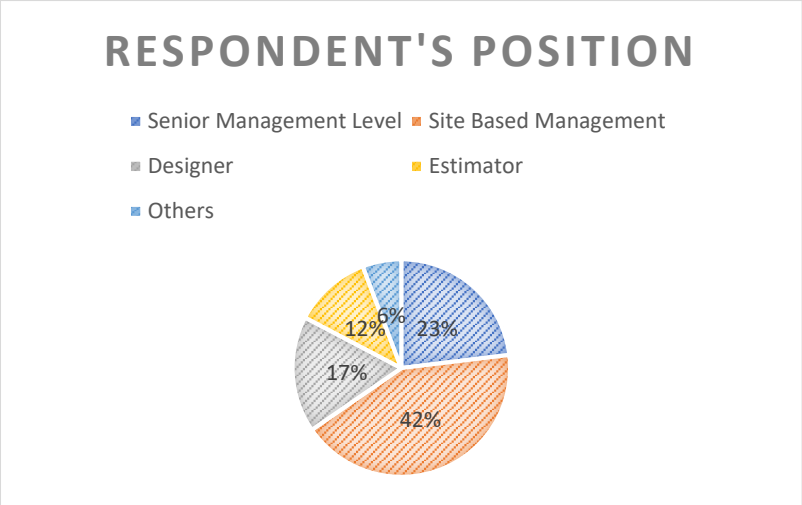

Figure 15: Respondent's Position

After the understanding of the respondent demographic with their work experience, work field etc. Now the following step is demonstrating the reliability of the collected data.

b) Reliability Analysis

In reliability, test technique Cronbach's Alpha is used to determine the reliability of the factors of risk management (e.g. client, consultant or contractor) and factors of legal challenges in fast track project's performance.

According Lund Research (2013) if the questionnaire has to be measure on the scale of Likert that Cronbach's is most frequently used technique by the researchers that give focus on the finding of scales reliability. Acceptable score for the reliability is 0.70 but higher test score considered as good output.

And outcome of reliability test is 0.958 (Cronbach's alpha) which is above 0.70 that indicates good reliability and acceptable for the risk management factors and legal challenges of the fast track factors and therefore no necessity of deletion to execute improved alpha's value.

Table 3: Cronbach's Alpha Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.958	33

Further the Split Half method was also conducted, the below figure shows the Guttmann split half coefficient value 0.828, which is nearby the overall Cronbach alpha's value i.e. 0.958, thus confirm reliability of variables.

Table 4: Split Half Reliability

Reliability Statistics

Cronbach's Alpha	Part 1	Value	.953
		N of Items	17[a]
	Part 2	Value	.902
		N of Items	16[b]
	Total N of Items		33
Correlation Between Forms			.742
Spearman-Brown Coefficient	Equal Length		.852
	Unequal Length		.852
Guttman Split-Half Coefficient			.828

After understanding the reliability of the factors, next step following the reliability is the factor analysis to understand the behaviour of the variables and factor.

c) FACTOR ANALAYSIS

To identify the interrelation of the factors and the variables, researcher led the factor analysis; to find the simple set of variables in the research. Factor analysis also significant to find the multidimensional behaviour of variable and factor. The risk management factors comprise of 27 items and legal challenges of the fast project comprise of 5 factors. Following criteria is being used to analysis the factors:

Firstly, the minimum point of loading is 0.50 for any factor.

Secondly, each must have minimum two items.

Finally, the remaining items are not assembled in the same factor will have low-loading.

Following mathematical data shows the factor analysis for risk management factors and legal challenges of the fast track respectively:

Table 5: Rotated Component Matrix

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
Delay in the payment	.385	.271	.738	.142	.036
Unrealistic planning schedule	.345	.334	.184	.176	.667
Improper intervene during construction	.253	.349	.378	.154	.709
No clear scope of work	.410	.406	.344	.364	.386
Change of design	-.021	.820	.164	.076	.242
Site Obstacles (access, size, existing, services)	.334	.252	-.038	.691	.346
Breach of contract with contractors	.210	.287	.278	.795	-.011
Dispute with contractor	.205	.423	.246	.503	.432
Delay in getting Permits (NOC's)	.397	.520	.171	.492	.204
Sudden bankruptcy	.591	.199	.237	.465	.163
Defective Design	.132	.842	.259	.113	.107
Contradictions in design and specifications	.263	.861	.088	.230	.106
Changes by engineer	.176	.873	.059	.142	.100
Delay in drawings and documents approvals	.328	.859	.081	.130	.127
Poor Quality Work	.661	.352	.243	.263	.240
Low Productivity of labour	.788	.322	.243	.106	.166
Low productivity of equipment	.839	.236	.133	.181	.112

Unpredicted technical problem during site execution	.553	.157	.024	.366	.507
Use of defective material	.811	.158	.215	.301	.023
Incompetence of contractor (understanding of the fast track project)	.725	.170	.344	.062	.198
Lack of qualified staff	.746	.093	.398	.256	.209
Leaving of qualified staff from contractor organization	.718	.216	.247	.152	.328
Unsafe work on site	.603	-.056	.304	.469	.271
Poor performance	.379	.300	.762	.218	.197
Poor management	.442	.214	.691	.080	.401
Breach of contract	.328	.059	.609	.571	.194
Dispute between the main contractor and sub-contractor.	.572	.045	.516	.246	.416

Table 6: Rotated Component Matrix

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
Claim for inaccurate cost estimating and cost overrun	.851	.001	.332	.330	.178
Claim for design errors and omissions	.886	.283	.133	.179	.263
Claims for delay damages	.130	.920	.254	.143	.219
Claims for change orders	.395	.370	.216	.313	.749
Claim for rework and modifications	.327	.409	.792	.241	.193
Claim for Liability of overlook work	.457	.230	.273	.751	.312

Following the factor analysis, the next step is to proceed for the correlation analysis to examine the relation between the variables (independent and dependent). For this analysis risk management factors are considered as the independent variables and dependant variables are legal challenges of the fast track projects to understand the impact of the factors on each other.

d) CORRELATION

In the correlation study the coefficient of the correlation was used to determine the main strength of a linear association between two variables. And this is specified by ‘r’ which is generally described based on the following guideline (Lund Research 2013)

- Weak - 0 to 0.2
- Moderate – 0.3 to 0.6
- Strong – 0.7 to 1

And regarding the P- value; if the value is less than 0.05 statically significant.

As explained in the below table of correlations the Pearson correlation values demonstrates strong strength with client, consultant and contractor's factors and moderate strength with sub-contractor's factors. The values of the correlations analysis show that there is higher correlation between the client factors of risk management and legal challenges factors, although the correlations still significant for consultant and contractor's factors with -.044, -.017 repetitively.

The results acquired show that the hypotheses presented previously are accepted, since there is a significant correlation between all the Independent Variables and the Global Dependent Variable. The null hypotheses are rejected

Table 7: Correlations

Correlations

		Client Factors	Consultant Factor	Contractor Factor	Sub Contractor Factor	Legal Challenge Factor
Client Factors	Pearson Correlation	1	.723**	.802**	.804**	-.006
	Sig. (2-tailed)		.000	.000	.000	.969
	N	52	52	52	52	52
Consultant Factor	Pearson Correlation	.723**	1	.516**	.465**	-.044
	Sig. (2-tailed)	.000		.000	.001	.759
	N	52	52	52	52	52
Contractor Factor	Pearson Correlation	.802**	.516**	1	.813**	-.017
	Sig. (2-tailed)	.000	.000		.000	.907
	N	52	52	52	52	52
Sub-Contractor Factor	Pearson Correlation	.804**	.465**	.813**	1	.124
	Sig. (2-tailed)	.000	.001	.000		.380
	N	52	52	52	52	52
Legal Challenge Factor	Pearson Correlation	-.006	-.044	-.017	.124	1
	Sig. (2-tailed)	.969	.759	.907	.380	
	N	52	52	52	52	52

e) REGRESSION

The regression analysis was used to find the relation of the risk management factors variables based on the value of the legal project performance variables. The below results display the R^2 values as .178 indicate that there is decent degree of goodness to fit the regression model. The F value show in the below figures shows 1.631

Table 8: Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.178[a]	.032	.012	4.55189

a. Predictors: (Constant), Risk Management Factor
b. Dependent Variable: Legal Challenge Factor

In order to assess the value of the percentage of which the independent variable causes the variance in the dependant variables the R Square and Adjusted R Square values are obtained. The figure below indicates the R Square Value as 0.032 and the Adjusted R Square value as 0.012. These two values are very close, which confirms that the variance in the Global DV is an implication of the Global IV.

Table 9: ANOVA a

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.784	1	33.784	1.631	.208[b]
	Residual	1035.985	50	20.720		
	Total	1069.769	51			

a. Dependent Variable: Legal Challenge Factor
b. Predictors: (Constant), Risk Management Factor

The next step is to check the direction of the relationship between the IV and the DV factors. In order to do that, the Beta factor is obtained as per the table below. The acquired value based on the data analysis is 0.178. Since the Beta value is positive, this indicates a positive relationship in which the Global DV is enhanced through the implementation of the Global IV. This further strengthens the Hypothesis which asserts that the Global IV further enhances the Global DV (construction project success in the Dubai).

Table 10: Coefficients a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.353	2.661		6.522	.000
	Risk Management Factor	.031	.024	.178	1.277	.208

Table 11: Dependent Variable: Legal Challenge Factor

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	18.6037	23.9572	20.6538	1.17883	52
Residual	-12.76243	6.07104	.00000	4.42563	52
Std. Predicted Value	-1.739	2.802	.000	1.000	52
Std. Residual	-2.768	1.317	.000	.960	52

The figure below shows the normal curve, and maps the regression line obtained by the slope of the Beta value (showing positive relationship between variables) against the survey responses.

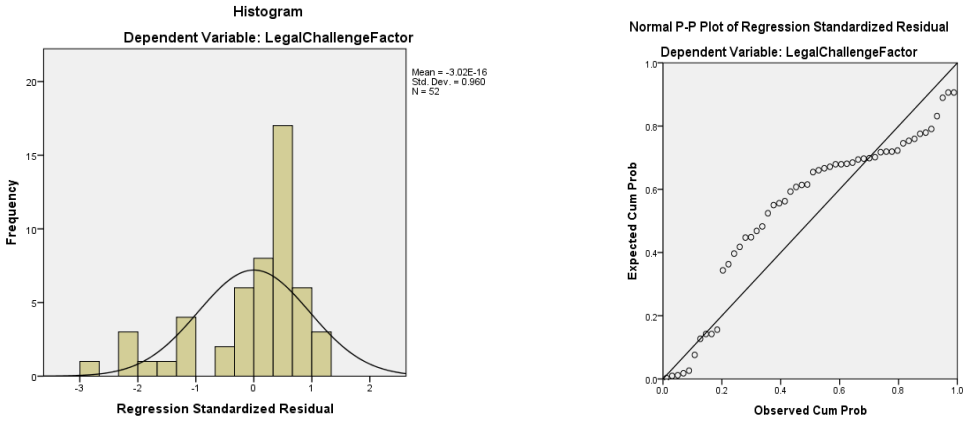

Figure 16: Regression Standardized Residual

The survey and the quantitative data analysis on SPSS thus prove that risk management implements increase effective in the legal challenges of the fast track project in the Dubai. This conclusion was formed based on the Reliability Analysis, Correlation Analysis, and Regression Analysis, which all proved the significance and the direction of the positive relationship between the dependent and independent variables. The data analysis shows that there is a positive relationship between the variables, and that this positive relationship is further magnified when the combination of all the eight specified independent variables are implemented together as the project management soft skills, rather than factoring in one of these soft skills as independent variables individually.

CHAPTER V: CONCLUSION AND RECOMMENDATIONS

a) Discussion

As described in the beginning of the research, the main aim of this research is to explore and confirm the positive relationship between the risk management factors and its impact on enhancing the legal challenges of the fast track projects in Dubai's construction industry. The aim of this research, as discovered previously, is to achieved completion of the objective which are discussed below.

The following analysis will illustrate how the individual research objectives which were outlined in the Introduction have been met.

Objective 1: Determine the risk management factors which can benefit the project management team for the successful execution of the project.

Firstly, the research studies the context of the proposed relationship between the risk management factors and legal challenges factors of the fast track project. The section of the literature review explains the significant of the implementation of the risk management in the construction project. The context of the construction sector is also explored, explaining how construction projects require the proper risk management required for the execution of the fast track project. For this reason, it is apparent that Dubai construction projects require a significant amount of coordination and relationship building between the different stake holders (client, consultant and contractor) of the construction projects. and entities which are involved in each project. Project manager experience play significant role on measuring and developed the response, to bring the risk management as mature. For deciding which technique to be used for risk management depend on the prospective of the site management team and their experience and phase (start, middle or end) of the project when risk raise and source of the risk event. Thus, the project manager is the key role for proper coordinate between all the entities and guide the project team in the right direction of the project's objective. The literature review included analysis which was based on several previous studies of the interpersonal and risk management models which includes all the factors that could impact on the project delivery from the initial stage of the tender to the final handover back to client, risk management require thorough observation during the whole life span of the project. In the conclusion of the literature review on this matter, 27 risk factors are proposed under four key stake holders e.g.

client factors which involves all the risk events raise due to the involvement of the client decision and other are client, contractor, sub-contractor factors as per their involvement in the project. All the proposed factors are considered as the independent variables which can enhance the success of construction projects in the Dubai.

Objective 2: Determine the crucial measurement for the legal challenges of the project of the fast track project.

Second part of the literature review section analysis the key factors of the legal challenges of the fast track which raise during the life span of the project. From the previous researches explained how the reworks due to the changes of incomplete design could impact on the quality, times and sometimes increase cost than normal projects. An effective material management can enhance the proper resource utilization, correct sequence and improvised production of site. Project manager involvement require from the estimating phase of the project to analysis the missing details and requirement of the future work provision to minimize the rework and damages as the work start before the finish of the design in the fast track project. The concept of design/build helps the contractor and consultant to work together on the fast track project is to accelerate the project sequence. The best way to execute the fast track project is proper coordination between the contractor, consultant and client. The balance collaboration between the engineer and contractor will decide the faith of the fast track project and we conclude 6 important legal challenges as cost estimating, and cost overrun, design errors, damage delay, change of orders, rework and modifications and overlooked Work and these six legal challenges of the fast track project considered as dependent variables which were further examined in the research.

Objective: 3 Propose a conceptional model which illustrates the relationship between the risk management factors and legal challenges factors in fast track project as independent and dependent variables respectively

Following the literature review, a conceptual model was proposed as a diagram which demonstrates risk management factors and legal challenges of fast track factors. And the literature concluded as the independent and dependant variables relationship examined further in the research. The conceptual model shows that the implementation of the twenty-seven (mentioned previously) risk management factors, will decrease the consequence of legal challenges (six factors) which leads to the project success. The conceptual model proposes a

positive relationship in which the legal challenges of the fast track projects in the Dubai is directly proportional to the implementation of the risk management factors effectively. The set of hypotheses reflect the conceptual framework, since they state that there is a positive relationship between variables and dependent variable. The Global Hypothesis summarises this by stating that a project manager who implements the risk management effectively can control the legal challenges for the successful construction project in the Dubai.

Objective 4: Explore the practicality and the relation between risk management and its effect on the legal challenges of fast track projects within the professional working environment in the Dubai.

In the next step research objective was to support the relationship proposed between the risk management factors and legal challenges of the fast track projects. This was achieved through the completion of a quantitative analysis obtained through the conduction of a survey among a selected sample frame conducted among professionals from the construction industry who have experience of the fast track project at various role of either senior management level or site level, design, estimated, client's/client representatives, contractors, and consultants. All the variables are included in the survey which were concluded at the end of the literature review. Following that, the data was analysed into SPSS which includes a demographic overview, reliability analysis, factor analysis, correlation analysis, and regression analysis. The results of the data analysis confirm the positive relationship between the risk management factors and legal challenges of the fast track project. The research hypotheses were thus all approved.

Objective 5: Provide a framework of recommendations of how to effectively implement of risk management can reduce the number of legal challenges in the construction industry of Dubai.

Following the approval of the hypothesis which states that the implementation of risk management factors will further control the prospects of a legal challenges of the fast track project in the Dubai construction industries. Conclusion of this research work is illustrate with framework of recommendations below. The set of recommendation which are proposed are there in the following Section 5.3.

b) Recommendations

As illustrated in the research progress diagram in the first chapter of Introduction, the research begins with the completion of the literature review, the demonstration of a conceptual model illustrating the research aim, the conduction of a quantitative analysis, and the proposal of a set of recommendations. These recommendations are derived from a combination of the research findings and are proposed as follows.

- Contractor must properly implement the risk management in the fast track project to control the project execution with increased awareness amongst the management team about risk events and its impact on the project.
- Fast Track project must be monitored throughout its life cycle either by Risk manager or project manager to observe the critical activities, feedback is given promptly to ensure changes are applied as quickly as possible. Risk categories must manage to assure that the project will delivery on time and within the assigned budget and standard, will defiantly please the client.
- Involvement of the project manager from the initial stage of the project to have better understanding of the project to the end.
- Key stakeholder's client/contractors/consultants must be cautious before selecting the risk concepts and manage them accordingly to project requirement e.g. as sources, priority, impact, and probability among others. Sub-contractor risk should be given extra attention to avert potentially devastating effects on the project execution.
- The fast track project is likely to have a massive impact on the Dubai's construction industry. Construction practitioners must focus on modifying the organisational structure when dealing with fast-track projects to ensure flexibility in the decision making and alternative plans, effective communication within the company and with client also and that risk management must implement in all parallel processes of the project.

Applying the above-mentioned recommendations will simplify the execution of the fast track projects and develop the company standard strategies with the awareness of the risk management implementation and regular practice among the project team will raise the standard of construction. In the standard practice of construction organization, the risk management strategies must be implemented to work towards the common objectives of the

project team. And by applying these recommendations will assist the organization to develop the help the brand within the market.

Therefore, any organisation who adopt the standard of risk management approach will achieve an edge over its competitors in the market. It is significant that clients (or owner) always choose the contractor who have better standard within the company and professional approach towards the project. Organization offering risk management practice on all aspects of the fast track projects process will definitely make more success in the construction field. Following results from the survey that's show that all the respondents considered the requirement of the risk management in the fast track projects.

Table 12: Do you think it is necessary to implement risk management in construction projects?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	52	100.0	100.0	100.0

c) Conclusion

This research was conducted to understand the importance of risk management implementation as key factor for the success of fast track projects. Generally, the nature of the fast track project which require control monitoring and data from the previous experience to maximize the profit of the project. A project manager must have awareness of the risk management system to work towards common objectives of the project as combined unit (with all the stakeholders).

It also important that the project management to realise potential of implementing the risk management in their project. Further the literature review discussed about the legal challenges of fast track projects which include six factors as crucial to analysis as it explains how the delays raise in the fast track projects. Conceptual model was developed to understand the correlation between risk management factors and legal challenges of fast track project as independent and dependent respectively. Quantitative analysis has been carried out on the basis of hypotheses set and further conduct the survey with the construction professional of different roles who have experience of working on fast track project and collected data from 52 respondents which was analysed by using SPSS software to confirm the values for assertion provide in the hypotheses.

And positive relationship of risk management and legal challenges of fast track project was established. Further regression analysis illustrates the implementation of the risk management

effect enhancing legal challenges of fact track project. And finally based on evaluated data recommendations was summarise for the beneficial of the construction to initiate the risk management strategies in the organization.

Recommendation for Future Studies

- Although the purpose of this study to define the risk management in the fast track project in Dubai, but couldn't attempt it due to time and methodology limitation. Another limitation was the participants who one type of project so couldn't get the information from different type of construction project. In the future study, researchers can use census to collect data from all construction companies in Dubai.
- The research couldn't differentiate construction projects base on scale (big or small), financial, practice methods on site, type of risk management system as every project have different challenges in terms of project budget, timeline of project, and nature of risks event raised. Future researcher must examine the concepts and findings that could equally applicable to all types of projects.
- Most of the participants are from site based contractor but could add more participants from the client and consultant background who can also strength the data collection for better outcome. Future research can also focus on the other working department and different role in the fast track project.
- Another aspect for future research, researcher may concentrate on modern concepts of risk management.
- Though the risk management in the construction projects are similar around the world but this research sample are focus only to Dubai construction, therefore findings can't be generalised to other construction industries, though the research method may be replicated and its recommended that the study must be repeated in future.

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APPENDICES

Questionnaire Survey

Dear participants,

Risk management Impact on the lega challenges of fast-track projects – A questionnaire survey

My name is Mohd Zaki and I am a student at the British University of Dubai. As part of my master degree program, I am conducting a study survey about risk management implementation in fast–track construction projects could lead to legal challenges in Dubai. I kindly invite you to take part in this survey by filling the questionnaire for me, as you have been involved in the fast-track as being credible consultants, contractors or owner representatives with experience of fast-track construction projects.

It will take about 30 minutes to complete the questionnaire and all you need to do to answer the questions is simply follow the given instructions. Your participation is strictly voluntary, and all responses will be treated as anonymous. Do not ponder over whether your answer is right or wrong. Whatever you write will be treated with great confidentiality. The findings, if published, will summarise the responses of the sample as a whole; individual answers will not be identified.

Please note that filling this questionnaire will be taken as your informed consent to participate in the study. Your contribution is highly appreciated. Thank you for taking the time to respond to the survey. I look forward to working with you.

Yours sincerely,

Risk management in fast-track construction projects in the UAE

(A questionnaire survey)

Instructions:

- ✓ Please answer all questions.
- ✓ Tick (X) the relevant answer where applicable.

Section 1: General Information

Your company works as:

- Client
- Consultant
- Contractor
- Sub-Contractor

Respondent's Position:

- Project Manager (Senior Management Level)
- Engineer (Site Based Management)
- Designer
- Estimator
- Others

Respondent's Experience:

- Less than 3 Years
- 3-5 Years
- 5-10 Years
- More 10 years

Size of the projects Respondent's involves:

- Less than 100,000 AED
- 100,000-500,000
- AED 500,000-1,000,000 AED
- More than 1,000,000 AED

How many fast track projects has your organization undertaken?

- 0-10
- 11-20
- 21-30
- More than 31

How common are fast track projects in the Dubai?

- Rare
- Few
- Many
- Very frequent

Will fast-tracking be used in the near/far future?

- Yes
- No
- Not Sure

Do you generally implement risk management in your projects?

- Yes
- No
- Not Sure

Do you think it is necessary to implement risk management in construction projects?

- Yes
- No
- Not Sure

Section 2: Assessment of Risk Management Factor

How likely the risk management factors can influence the legal challenges of fast-track project?

Please base your assessment on the scale of: 1=very low 2=low 3 =moderate 4= high 5= very high.

S No.		Risk	Impact/Probability of the Risk Factor				
			1	2	3	4	5
1	Client Factors	Delay in the payment					
2		Unrealistic planning schedule					
3		Improper intervene during construction					
4		No clear scope of work					
5		Change of design					
6		Site Obstacles (access, size, existing, services)					
7		Breach of contract with contractors					
8		Dispute with contractor					
9		Delay in getting Permits (NOC's)					
10		Sudden bankruptcy					
11	Consultant	Defective Design					
12		Contradictions in design and specifications					
13		Changes by engineer					
14		Delay in drawings and documents approvals					
15	Contractor	Poor Quality Work					
16		Low Productivity of labour					
17		Low productivity of equipment					
18		Unpredicted technical problem during site execution					
19		Use of defective material					
20		Incompetence of contractor (understanding of the fast track project)					
21		Lack of qualified staff					
22		Leaving of qualified staff from contractor organization					
23		Unsafe work on site					
24	Sub-Contractor	Poor performance					
25		Poor management					
26		Breach of contract					
27		Dispute between the main contractor and sub-contractor.					

Section 3: Assessment of legal challenges in fast-track projects

How likely risk in fast track projects will lead to legal challenges?

S No.	Risk	Impact of Legal challenges factors of fast track project				
		1	2	3	4	5
1	Claim for inaccurate cost estimating and cost overrun					
2	Claim for design errors and omissions					
3	Claims for delay damages					
4	Claims for change orders					
5	Claim for rework and modifications					
6	Claim for Liability of overlook work					

End of questionnaire

Thanks

Zaki Mohd

Reliability 's Item Statistics

Item Statistics

	Mean	Std. Deviation	N
Delay in the payment	3.40	1.272	52
Unrealistic planning schedule	3.60	1.159	52
Improper intervene during construction	3.37	1.085	52
No clear scope of work	3.31	1.422	52
Change of design	3.92	1.152	52
Site Obstacles (access, size, existing, services)	3.37	1.121	52
Breach of contract with contractors	3.06	1.259	52
Dispute with contractor	2.83	1.248	52
Delay in getting Permits (NOC's)	3.19	1.314	52
Sudden bankruptcy	2.83	1.543	52
Defective Design	3.35	1.266	52
Contradictions in design and specifications	3.54	1.146	52
Changes by engineer	3.52	1.321	52
Delay in drawings and documents approvals	3.63	1.372	52
Poor Quality Work	2.88	1.381	52
Low Productivity of labour	3.13	1.299	52
Low productivity of equipment	2.94	1.349	52
Unpredicted technical problem during site execution	3.04	1.171	52
Use of defective material	2.65	1.370	52
Incompetence of contractor (understanding of the fast track project)	3.33	1.324	52
Lack of qualified staff	3.08	1.412	52
Leaving of qualified staff from contractor organization	3.02	1.336	52
Unsafe work on site	2.83	1.368	52
Poor performance	3.58	1.226	52
Poor management	3.50	1.260	52
Breach of contract	2.94	1.290	52
Dispute between the main contractor and sub-contractor.	3.33	1.324	52
Claim for inaccurate cost estimating and cost overrun	3.92	1.064	52
Claim for design errors and omissions	3.42	.723	52
Claims for delay damages	3.27	1.012	52
Claims for change orders	3.56	.802	52
Claim for rework and modifications	3.02	1.000	52
Claim for Liability of overlook work	3.46	.851	52

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Delay in the payment	104.40	658.873	.709	.956
Unrealistic planning schedule	104.21	663.425	.704	.956
Improper intervene during construction	104.44	664.252	.739	.956
No clear scope of work	104.50	645.431	.821	.955
Change of design	103.88	676.418	.485	.958
Site Obstacles (access, size, existing, services)	104.44	668.957	.631	.957
Breach of contract with contractors	104.75	665.525	.611	.957
Dispute with contractor	104.98	660.137	.703	.956
Delay in getting Permits (NOC's)	104.62	652.986	.775	.956
Sudden bankruptcy	104.98	646.098	.743	.956
Defective Design	104.46	665.234	.612	.957
Contradictions in design and specifications	104.27	665.926	.669	.957
Changes by engineer	104.29	665.817	.575	.957
Delay in drawings and documents approvals	104.17	657.322	.676	.956
Poor Quality Work	104.92	647.759	.812	.955
Low Productivity of labour	104.67	651.675	.806	.955
Low productivity of equipment	104.87	653.531	.746	.956
Unpredicted technical problem during site execution	104.77	664.848	.672	.957
Use of defective material	105.15	651.348	.766	.956
Incompetence of contractor (understanding of the fast track project)	104.48	655.784	.726	.956
Lack of qualified staff	104.73	648.436	.784	.956
Leaving of qualified staff from contractor organization	104.79	653.190	.759	.956
Unsafe work on site	104.98	658.490	.661	.957
Poor performance	104.23	655.240	.797	.956
Poor management	104.31	652.766	.814	.955
Breach of contract	104.87	657.217	.724	.956
Dispute between the main contractor and sub-contractor.	104.48	651.353	.794	.956
Claim for inaccurate cost estimating and cost overrun	103.88	696.967	.155	.960
Claim for design errors and omissions	104.38	699.575	.175	.959
Claims for delay damages	104.54	697.861	.148	.960
Claims for change orders	104.25	706.466	-.008	.960
Claim for rework and modifications	104.79	699.111	.126	.960
Claim for Liability of overlook work	104.35	702.505	.079	.960

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Delay in the payment	52	1	5	3.40	1.272
Unrealistic planning schedule	52	1	5	3.60	1.159
Improper intervene during construction	52	1	5	3.37	1.085
No clear scope of work	52	1	5	3.31	1.422
Change of design	52	1	5	3.92	1.152
Site Obstacles (access, size, existing, services)	52	1	5	3.37	1.121
Breach of contract with contractors	52	1	5	3.06	1.259
Dispute with contractor	52	1	5	2.83	1.248
Delay in getting Permits (NOC's)	52	1	5	3.19	1.314
Sudden bankruptcy	52	1	5	2.83	1.543
Defective Design	52	1	5	3.35	1.266
Contradictions in design and specifications	52	1	5	3.54	1.146
Changes by engineer	52	1	5	3.52	1.321
Delay in drawings and documents approvals	52	1	5	3.63	1.372
Poor Quality Work	52	1	5	2.88	1.381
Low Productivity of labour	52	1	5	3.13	1.299
Low productivity of equipment	52	1	5	2.94	1.349
Unpredicted technical problem during site execution	52	1	5	3.04	1.171
Use of defective material	52	1	5	2.65	1.370
Incompetence of contractor (understanding of the fast track project)	52	1	5	3.33	1.324
Lack of qualified staff	52	1	5	3.08	1.412
Leaving of qualified staff from contractor organization	52	1	5	3.02	1.336
Unsafe work on site	52	1	5	2.83	1.368
Poor performance	52	1	5	3.58	1.226
Poor management	52	1	5	3.50	1.260
Breach of contract	52	1	5	2.94	1.290
Dispute between the main contractor and sub-contractor.	52	1	5	3.33	1.324
Valid N (list wise)	52				

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Claim for inaccurate cost estimating and cost overrun	52	2	5	3.92	1.064
Claim for design errors and omissions	52	2	5	3.42	.723
Claims for delay damages	52	1	5	3.27	1.012
Claims for change orders	52	2	4	3.56	.802
Claim for rework and modifications	52	1	5	3.02	1.000
Claim for Liability of overlook work	52	2	5	3.46	.851
Valid N (list wise)	52				