Study of Practices in Qualitative Risk Assessment, Project Time Management Tools & Techniques, Time & Cost Overrun

Ar. Hrushikesh A. Tarkasband and Prof. Ar. Sanjay D. Joshi
M. Arch (Architectural and Construction Project Management),
SPSMBH's College of Architecture, Kolhapur

Abstract

It is essential to study the practices adopted in different regions for qualitative risk assessment in project and time management and measures taken to overcome the failures in overall project management. It can be learnt from such a study that whether the construction companies are following the project management tools and techniques for effective execution of the plan in completion of the project successfully. Different regions follow varied aspects of project management dependent on the resource availability, costs and labor work culture in the respective region. Certain regions may discover new models specific to their problems and introduce the same for effective realization of solutions. Identification of the risk factors affecting the project well in time is important so as to tackle with such risk factors.

Study shows that there is lack of usage of risk assessment tools and techniques during construction project management and hence affects on project time management, costs and labor intensive. Also it increases the risks during project execution and has hazards on health and safety. Time overrun and cost overrun are the main issues arisen due to improper project management.

Keywords: *Qualitative risk assessment; Tools & techniques; Project management; Time management; Safety*

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1. Introduction

Risk assessment has become an important aspect of the construction industry's project management strategy. A qualitative risk assessment method is required for data-deficient construction and those with inadequate knowledge of ecological interactions. Where there is little data and understanding about the construction sector, the qualitative risk assessment method can help project managers and teams establish solid management strategies. Identifying risks, analyzing and evaluating the risk, and controlling the risk are all part of the risk assessment process.

In the construction business, project time management technologies and strategies play an important role. The use of appropriate project management tools and procedures is critical to the success of project management. It has been discovered that a lack of awareness and knowledge of tools and processes causes delays as well as financial loss. Many failures have happened in a significant number of contracting organizations in the last few years, according to local practices, making it critical to analyze existing project management techniques. In the construction business, it has been recognized that project management is becoming increasingly crucial. This paper is intended to explore the project time management practices used by public owners, contractors, builders & end-users and to identify the major obstacles towards the efficient utilization of those practices.

2. Practices

1. Qualitative Risk Assessments in Project Management in Construction Industry:

It is found that risk management is one of the most important areas in the construction project management process. In practice, as a rule, in addition to quantitative risk assessment, qualitative risk assessment in construction is also always

used. This article provides a qualitative risk assessment and definition of complex risks in the construction sector. We fulfill our responsibilities in construction risk management and propose algorithms to solve related problems in the construction sector.

Each country has its own characteristics, which determine the risk created by the right construction, the potential value, and the likelihood of the investor losing out on the construction project risk and without properly managing it. The cost of construction varies in different countries and mainly depends on the project risk. The risk problem can be considered as a cost factor that depends on the investment up to the construction limit. In order to adequately assess the risks as a practical tool to assess the level of risk for an elevated facility, the most likely and common types of risks are considered. The risk-based approach to the construction business needs to focus on construction-specific issues such as classification, construction and construction risk assessment in order to be relevant to the study of construction. The goal of this study is to develop a risk analysis model that allows determining the investment value of a risk by taking into account the probability and potential consequences of a risk reduction.

Qualitative risk assessment mainly identified the risks, analyze it then divide into three parts that is low, medium or high risk. After that qualitative risk assessment tried to control risks. So indirectly qualitative risk assessment get impact & reduce on cost & time overrun.

2. Risk Assessment of Construction Project in India:

The risk assessment of construction projects initiated by government, private and non-government organizations is studied. Considering the delivery system, risk assessment criteria are listed considering project process life cycle identification, planning process, analysis process, classification process, monitoring process, control process and construction project communication process.

The risk factor in the construction industry is very high. The life cycle of construction materials is full of various risks. Risks come from many sources. Moreover, the size and complexity of construction materials is increasing, increasing the risk. Risk management is an operational process that involves defining sources of uncertainty that include risk identification, risk analysis such as predicting the outcome of an uncertain situation, etymology of reactions in light of the expected outcome, and outcomes and risks based on the feedback received.

As a result, questionnaires were prepared and distributed to the concerned builders. Based on the various study materials, authors formulated the objectives of this study as follows, to find out the various risk factors in construction projects, like delivery System on the project, identifying process in project life cycle, planning process, analysis process, classification process, monitoring process, controlling process, communication process, construction project success. Questionnaires are developed on the fields marked above and are distributed to the concerned people and collected after some time. In result & discussion nine tables are identified as specified topic above.

Risk assessment must be included as an important part of projects to be successful; Project risk identification and assessment is an important process for projects. Study identifies processes in the pre-project phase, defines risk appetite, corporate risk culture and top manager support in construction projects. This study determines the planning, design phase, contractor selection and site mobilization phase, risk, corporate risk culture, adequate follow-up allocation, top manager support risk analysis process that determines ownership of risk assessment in construction projects.

It is clear that risk assessment have important role in construction industry. After risk analysis risk can be controlled. This is part of risk assessment.

Table 1: Mean and std. Deviation to construction project success.

	Descriptive Statistics				
		N	Mean	Std. Deviation	Rank
1	Cost	95	1.6000	0.57242	12
2	Time	95	1.7474	0.65181	8
3	Quality	95	1.4421	0.54021	13
4	Client satisfaction	95	1.6737	0.67544	6
5	Employee satisfaction	95	1.6211	0.65524	7
6	Building user satisfaction	95	1.7053	0.68220	5

7	Project safety	95	1.4211	0.59392	10
8	Cash management	95	1.7368	0.68743	4
9	Design goals	95	1.6000	0.64247	9
10	Organization with benefits	95	1.8211	0.75764	2
11	Country infrastructure benefits	95	1.7368	0.58729	11
11	Profits earned margin	95	1.8632	0.75245	1
13	Environmental standards and performance	95	1.6632	0.69360	3

3. Risk Assessment of Construction Projects in Bangladesh:

Assessing risk and its proper management is a matter of great concern. Improper risk management can cost a project a lot of money. The main focus was on assessing the different types of risks arising in the project and the main risk factors. Finally, according to this study, increase in material cost, increase in labor rate, delay of project, short duration of tender, lack of experience, loss due to fluctuations in construction materials inflation, improper planning and budgeting etc. These are the highest risk factors.

Construction workers need to pay attention to risk mitigation as it has an impact beyond the cost and time of the project. Properly assessed risk monitoring and control may be a good omen to reduce the likelihood of time and cost or to reduce the likelihood of project failure. The risk management process begins with an initial identification of the relevant and potential risks associated with the construction project. In addition, risk analysis and assessment is the process between risk identification and management. Once the risks of a project have been identified and analyzed, the appropriate approach can be adopted to treat the risks. The purpose of the risk management process is not to remove all risks from the project. Develop an organized framework to help decision makers manage risk, especially when working critically and effectively.

In methodology the two types of questionnaires were developed. The first part contains general information such as the type of company, experience, value of their project, etc., and the second part contains construction risk factors to evaluate. The risk factors of this study were classified into four major categories: (a) financial risk, (b) management risk, (c) technical risk and (d) environmental risk. The survey questionnaire is designed to provide evidence of the departmental behavioral approach to construction risk construction sites. The principle of risk significance (RS) is used. Many public and private construction projects have been abandoned due to mismanagement and lack of response to related risks. In terms of individual risk, the increased physical cost was the biggest factor and its risk index (RI) value was twice that of the nearest risk factor i.e. e.g. Increase in labor rates. Other risk factors include delays in the project, short tender or bidding time, lack of experience, losses due to fluctuations in construction materials inflation, improper planning and budgeting. Risk assessment has important role in financial factors. Risk assessment can be handled by team work including from labors to engineers. Risk assessment should be focused before starting the project which is beneficial in construction industry.

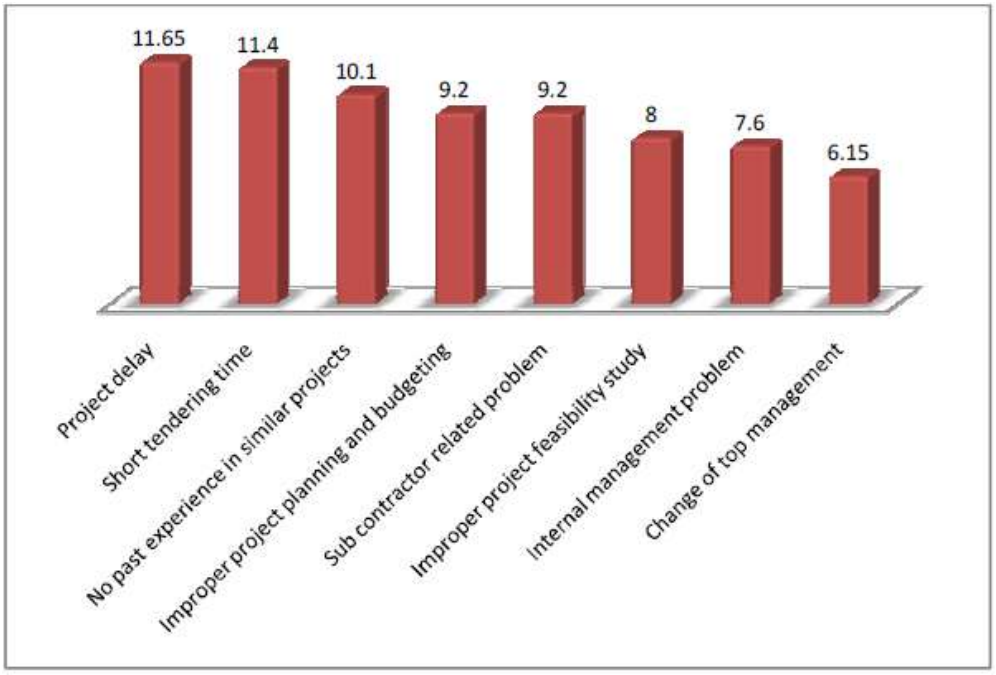

Figure 1: Management risk

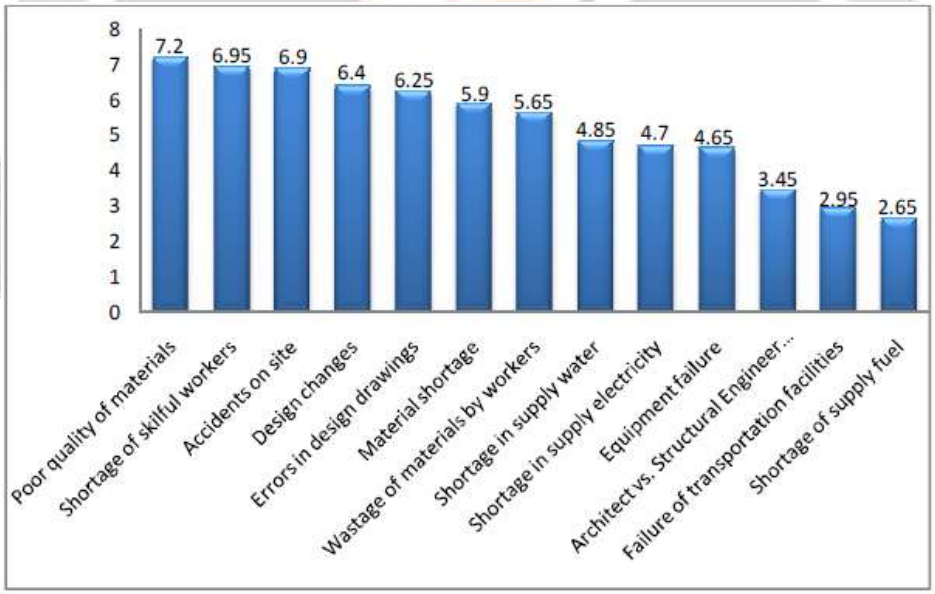

Figure 2: Technical Risk

4. Introducing a New Risk Management Model to the Saudi Arabian Construction Industry:

Traditional risk management practices help contractors deliver projects on time and on budget while meeting quality expectations. Studies have shown that client decision making is a major cause of risk to projects. A new risk management model is proposed that can minimize client decision making and enable clients to use experts, thereby improving the quality and efficiency of projects.

Researchers define risk as unforeseen or unexpected reasons that lead to negative deviations from project time and cost expectations. Project delays and time constraints are the result of measures and risk reduction. Time is considered to be the most frequent and serious problem in construction projects. This study found that the worst cause of project failure is risk management practice. Furthermore, the researchers found that there is a clear lack of risk management practices in Saudi Arabia that recognize the impact of risk factors due to the involvement of clients and consumer agents in the construction process. It was recognized that most serious risks in the early stages of projects are caused by clients. Such risks are related to inadequate decision making by inexperienced clients.

The procedure of methodology has the following steps: 1) Traditional risk management model that identify the main features and activities in the construction industry; 2) The event model that explain how the traditional risk management system creates project risk; 3) Decision-making as a source of risk that prove it increases risk; 4) New risk management model that find decision less system. There are separate figures which indicate above models in easy & detail form.
This suggests that decisions based on a lack of information can lead to risks that lead to unrealistic expectations. When the buyer's project manager tries to control, manage, and direct the contractor, not only does the situation escalate but confusion can also arise, increasing the risk problem through decision making. Expert contractors using this model adoption structure are recommended to use it with the help of robust measurements that justify their skills. The contractor in the structure of this distribution should be able to explain the risk to the buyer's unrealistic expectations, existing limits, and other stakeholder risks beyond their control. Contractors should be held accountable for how they plan to mitigate these risks.
There should be awareness of project management system. The owners, clients, contractors should be well knowledge about project management & relative with time management. There should be use of project management, time management & risk assessment in current practice. So it will be beneficial for all.

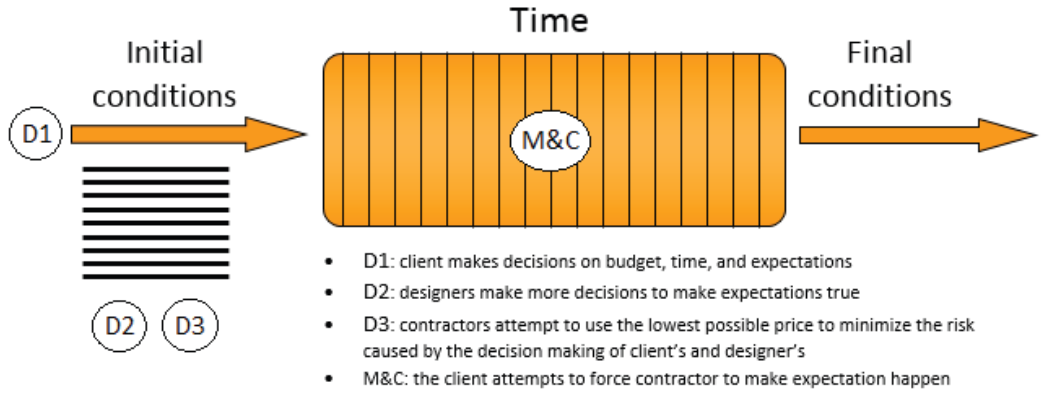

Figure 3: Existing risk management model [Kashiwagi, D. (2015)]

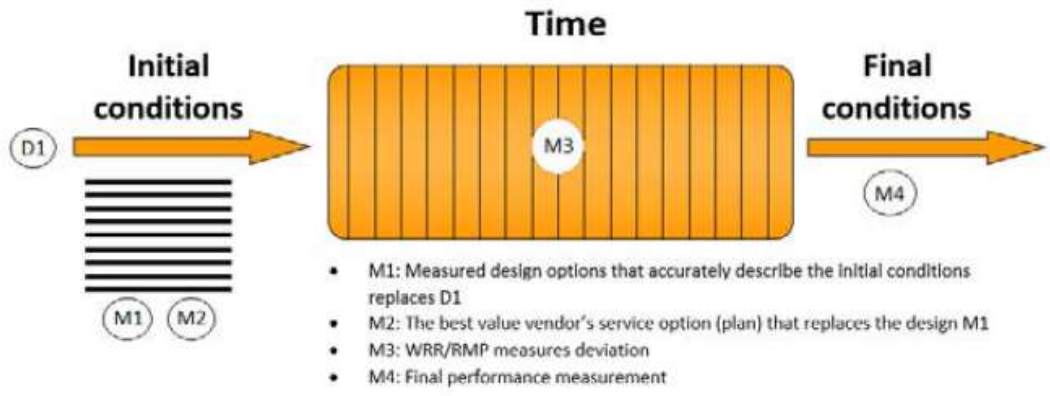

Figure 4: New Risk Management Model [Kashiwagi, D. (2015)]

5. Identification and assessment of risk factors affecting construction projects:
For all parties involved in the construction project, cost savings and time performance as owners, contractors and subcontractors are required. The main reasons for disputes in construction projects include delays and failure to complete work within the specified cost and time frame. Delivery time of a project is as important a factor for the owner as it is for a contractor. Unexpected increases in costs and delays in construction projects are caused by the owner, contractor, environment, etc. in which several types of risk factors can arise simultaneously. Cost overrun and schedule overrun affect not only the construction industry but also the economy as a whole. The objectives of the research presented in this paper are to identify study and evaluate the impact of factors that affect the contingency of cost and time.

Risk management has become a mandatory requirement for construction projects. The risk management process includes hazard identification, risk assessment and risk control. Risk is assessed by qualitative methods and quantitative methods. Risk management is a systematic process of identifying, analyzing and responding to the risks of a project and involves maximum probability and its consequences. There are many sources of uncertainty in construction projects including the performance of construction parties, availability of resources, environmental conditions, participation of other parties, agreements, etc. As a result of these resources, construction projects may face the problem of delays in the completion of the project. The main success indicators of the construction management system include project and cost, time, planned budget and completion within required quality, safety and environmental limits within the period. These delays will have a negative impact on quality, budget and may be the safety of a project. Therefore, cost and time contingency assessment is seen as a key factor in achieving a successful construction project.

In research methodology there are performed using the distribution of potential developed by Crystal Ball Software. Factors affecting cost and schedule overrides are identified and discussed using literature review and expert opinion. A questionnaire survey is conducted to collect the effect of each component. In development data & chart, this research defines the definition of cost and schedule overruns analysis is the process of identifying and evaluating contingency factors. In data collection, data is collected through a meaningful questionnaire and structured interviews to gather information on case study projects. A survey is conducted in the form of a questionnaire to compile the cost and schedule of work on construction projects in addition to the cost and schedule in addition to the risk factors and probability of occurrence in each project.

Risk assessment matrix is mainly used for the study. Risk assessment matrix mainly depends upon two bases, one in probability & next is impact. According to that risks divided in five parts as very low, low, medium, high & very high. In this paper, by using this matrix cost impact & schedule impact are seen. So it is found that cost & schedule overruns have great impact in construction industry. To overcome from the above problem risk assessment have main role in construction industry.

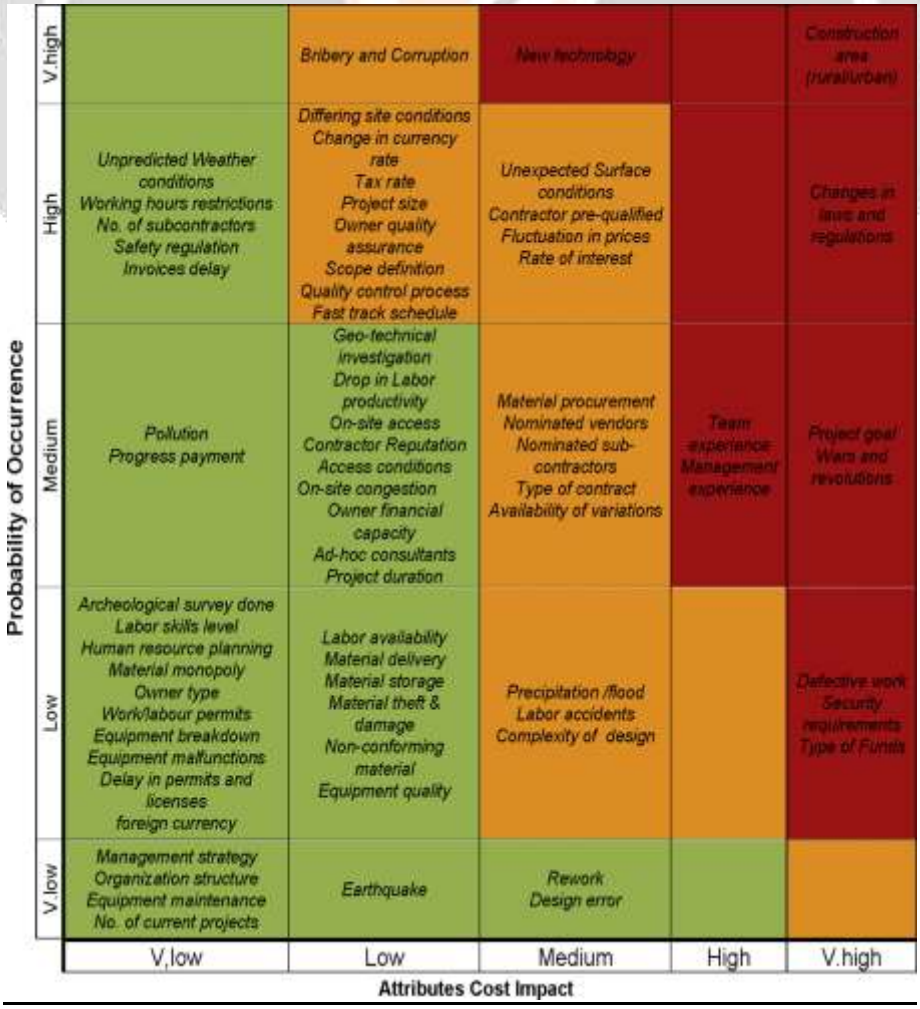

Figure 5: Heat map concerning attributes COST impact [El-Karim M. A. B. A., et. al, 2015]

6. Distribution of Responsibilities and Applicability of Risk Assessments in Construction Safety:

Safety and health anniversaries are a trend in today's construction industry. Safety management systems (SMS) are being incorporated into construction management plans and are mandatory in most countries. Risk Assessment (RA) is one of the sub-components under safety management system. A risk assessment is a systematic set of action statements to explain the safest way to work before a site works. Risk assessment is effectively serving in construction sites to identify and mitigate the underlying risk. However, effective practice of risk assessment due to human behavior, irresponsibility, negligence or ignorance is challenging, resulting in accidents. Therefore, timely personal interpretation and appreciation of risk assessment is essential.

Due to the dangerous and imaginary nature of accidents in the construction sector, it is necessary to reduce accidents and increase safety. Risk Assessment, its activity is a process of identifying risks and undergoing treatment. The individual work initiatives that break down its micro-components and experienced panel of professionals include managers, engineers, supervisors, workers and safety and health experts who have extensive hands on work site experiences and are reviewing them for risk. Risk assessment and risk management is essential for construction project management at the work site level and risk assessment is also one of the essential elements in a successful safety management system. Risk assessment is mandatory at all construction sites, especially for height works. "Falling from a height" is a significant type of fatal accident in the construction industry. On the contrary, negligence and lack of knowledge are the main causes of accidents.

It is found that risk assessment is the part of safety management system. According to risk management percentage of accidents are minimized. There should be safety precautions of labors for work at height so that accident will be prohibited. Construction skill training is important for to protect accident on construction site.

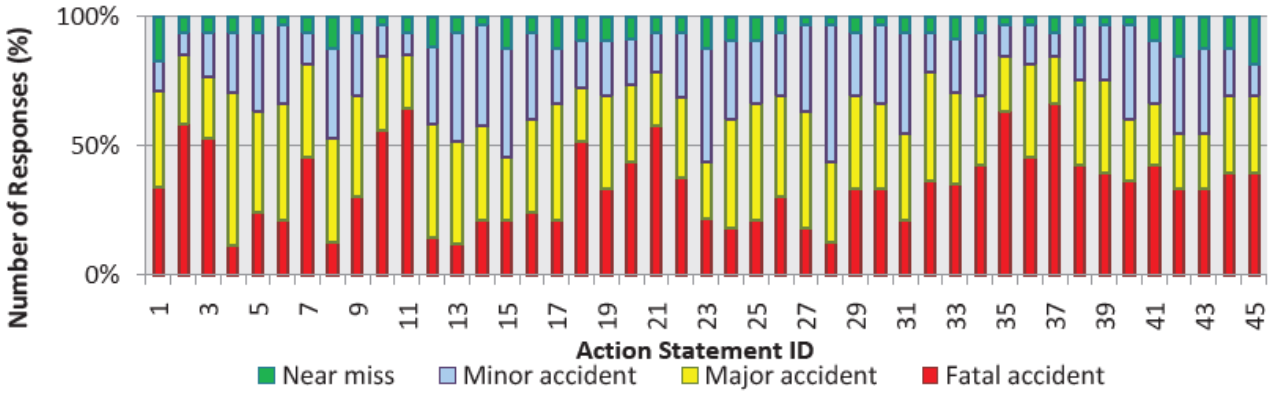

Figure 6: Expected Probability of accident severity

7. Comparative Study of Time Management Practices in Construction Industry between Kedah and Kelantan:

As per information that effective time management is very important to ensure the success of any project. Thus, without proper control of time, the project will be delayed and the budget will be exceeded. Many such techniques and software can be adopted to control time in construction projects. Therefore, this study is to evaluate the effectiveness of various techniques of time management and software package applied.

Time management is an important criterion for successful completion of a project. Unfortunately, the construction industry is experiencing the weaknesses of wasting time which has led to a large amount of time being wasted. Exceeding this time is the result of bad and ineffective time management. Therefore, effective time management is very important as it can help in overcoming the problem of overtime and completing the construction project in approximate time. There are various methods and software packages have been developed for time management. Therefore, this study focused on evaluating the time management effectiveness methods and software package adopted in construction management.

Time management is the use of various methods and techniques to ensure that projects are completed on time. Time slows down when the actual progress of the construction project is slower than planned. Effective use of available time

management techniques and software packages can reduce this problem of overlays as discussed in the following sections.

A. Time Management Techniques/Methods

These include: 1) Gantt Bar Chart, 2) Critical Path Networks/Method, 3) Milestone Date Programming Techniques, 4) Program Evaluation and Review Technique (PERT), 5) Elementary Trend Analysis/Line of Balance Method (LOB) 6) Precedence Network Diagram, 7) Simulation

B. Software for Time Management

These include: 1) Primavera Project Planner, 2) Microsoft Project, 3) Asta Power Project, 4) Microsoft Excel, 5) Project Commandar, 6) Deltek Open Plan

Data collection & analysis were fulfilled by using questionnaire survey. A total of 100 questionnaire sets were distributed randomly of which 59 responses were received back. After results & discussions authors form three tables. First table include category of state, type of organization, category of organization, project undertaken, procurement strategy, size of project. Choosing the right and effective time management techniques and software to control project time is very useful. The study assessed the level of effectiveness of techniques and software packages for time management applied in the construction industry. The two main findings of this study are as follows:

A) CPM, Gantt Bar Chart, PERT and Milestone are generally adopted and are considered very effective for managing construction time.

B) Primavera, Microsoft Project &, Microsoft Excel are the most common and effective software packages used in the construction industry for both states.

It is clear that project time management tools & techniques have great importance to overcome on cost & time for well benefits.

Table 2: Effectiveness of time management techniques

Time Management Techniques	Kedah		Kelantan	
	AI	Rank	AI	Rank
Gantt Bar Chart	2.00	2	2.43	2
CPM	2.63	1	2.71	1
Milestone	1.79	3	1.86	4
PERT	1.42	4	1.97	3
LOB	1.21	6	1.23	7
Precedence Network Diagram	1.29	5	1.51	5
Simulation	1.13	7	1.43	6

8. The practice of time management on construction project:

The quality of time management on construction projects is generally low. Therefore, an effective time management for a construction project is important to manage the risk of a project being delayed. The objectives of this study are to evaluate the respondents' participation in the planning of the construction work, to examine how the progress records are kept and to identify the process of monitoring the progress of the construction industry. To achieve these objectives, thirty questionnaire sets were distributed to the respondents there.

Construction is facing many problems and one of them is time management problem which delays the completion of the project. According to Westland, time management is the process of recording and controlling the time spent by project staff. These delays can be due to poor time management, selection of procurement methods, stakeholder involvement, poor planning of construction work, lack of implementation of software, poor site record and so on. Exceeding costs, litigation, litigation and abandonment of the project altogether. The quality of time-management on construction projects is generally poor. Lack of a coherent and formal approach to problems, lack of clear rules and guidelines on how records are kept and organized, difficulties in ensuring consistency of reports from various responsible persons, inexperienced staff and others, etc. were important to project control. Time management

techniques need to be identified and identified to improve the risk of delayed projects so that the risk of project delays can be minimized. Successful project management insures the completion of the project on time, within budget and with project features. So that the management staff has a clear understanding of time management and they can stop them quickly. Stakeholders need to know their roles and responsibilities.

It is found that without proper project management delay will occur that is time overrun & cost overrun will form. So to avoid this problem use of proper project management is useful.

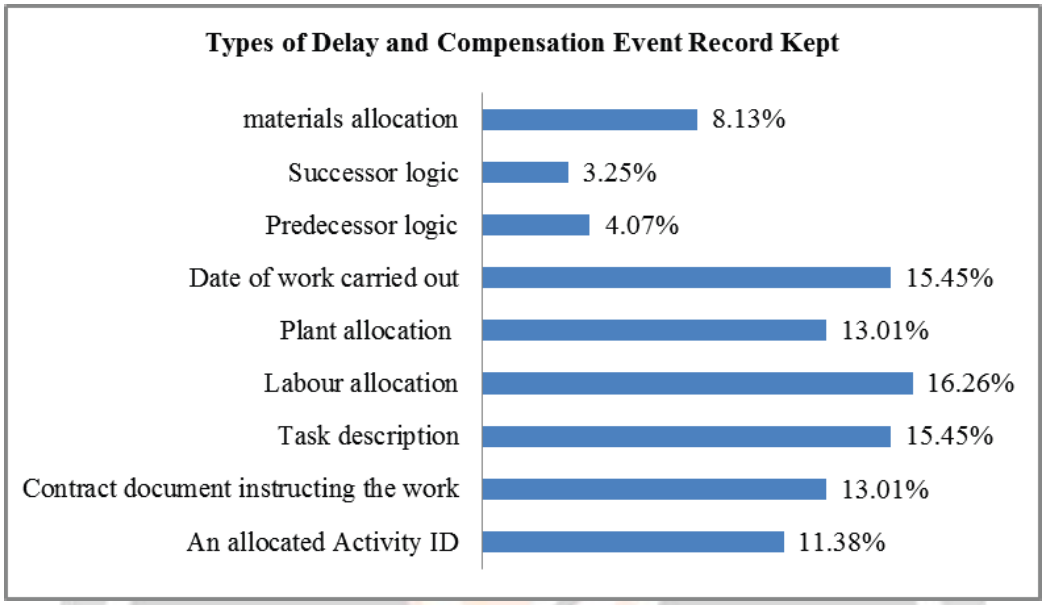

Figure 7: Type of the progress report kept in the company

9. Project Management and Its Tools in Practice in the Czech Republic:

Problems of project management and project management tools in practice in the Czech Republic are studied. The preamble describes the essence of project management and features its main tools. The results of this project are summarized and compared in terms of observation of project findings, success of project implementation, awareness of project management tools, use of project management tools including software tools, project management knowledge and why some projects have causes that is execution failed.

Project management plays an irreplaceable role in the management of every modern private, public and non-profit organization. According to the Institute of Project Management, project management is the use of knowledge, skills, tools and technology to meet the needs of the project. Project management refers to the planning, organizing, monitoring and control of all aspects of a project and the management and leadership of all involved in achieving project objectives safely and in compliance with the criteria of project, objectives, time, performance and quality. The success of project management depends on the application of appropriate project management tools. Project management involves a lot of tools and techniques. The range of project management tools is growing, focusing on tools that help to implement basic project criteria effectively, i.e. reduce project objectives, quality, duration and budget and associated risks, but the tools that make it possible to implement more parallel projects. The fact is that the higher the rate of project management skills, the higher the chances of successful implementation of these projects and also their effectiveness.

The increasing awareness and widespread use of project management tools will result in increased quality and effectiveness of the projects being implemented. Although the survey focuses on knowledge of project management and its use and the tools of various organizations, its findings cannot be generalized to all types of organizations as they are directed to medium-level and large-scale organizations.

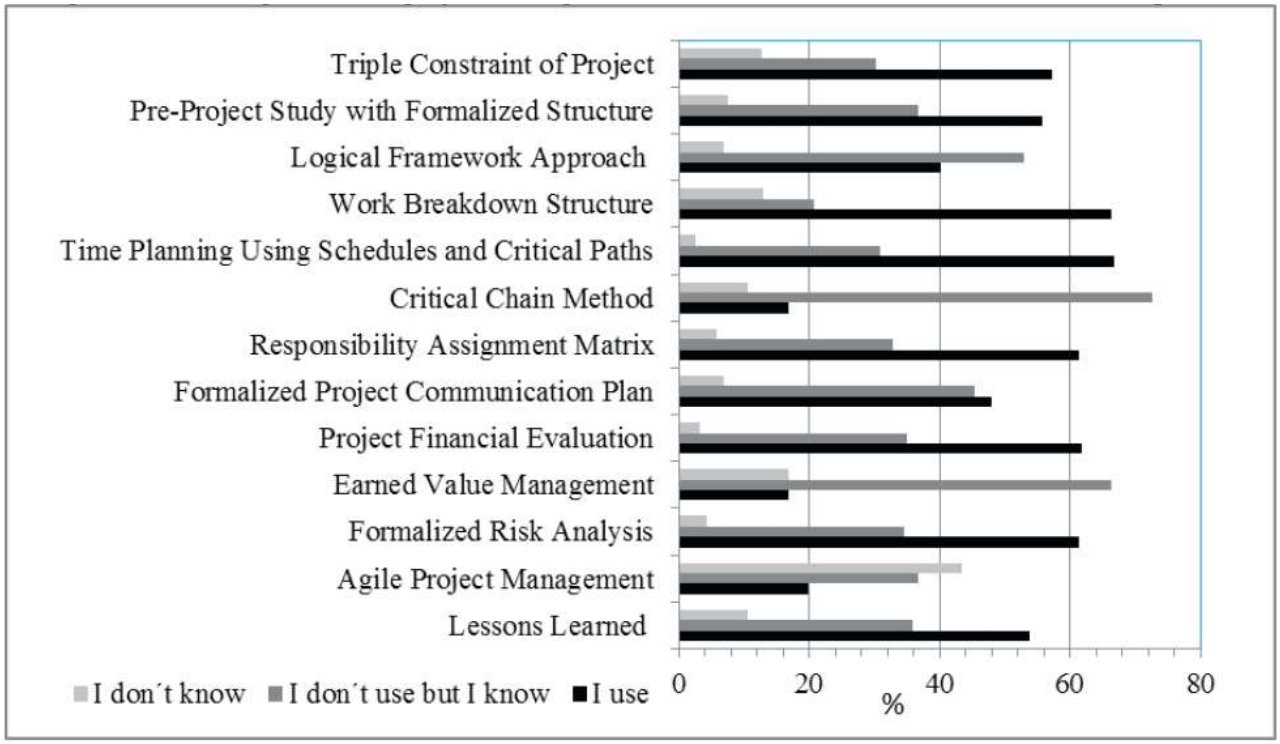

Figure 8: The cognizance of project management tools and their utilization in the Czech Republic
Source: Created on the base of (International Project Management Association CZ, 2012). [Kostalova J. et. al, 2014]

10. Application of Project Time Management Tools and Techniques to the Construction Industry in the Gaza:

The study purpose is to examine the level of use of project time management tools and techniques by public owners and construction contractors in the Gaza Strip. The results of the survey indicated that contemporary project time management tools and techniques are not widely used among local contractors and owners. Lack of knowledge of sub-contractors and awareness of the importance of project time management tools and techniques are still major hurdles towards efficient use of such tools.

The increase in the number, size and complexity of the projects has made project management more important in the construction industry of the Gaza Strip. There are found that in addition to the lack of planning and the poor performance of both public owners and contractors, they have also left their mark in the project management industry. The fictitious success or failure of large contractors, delays in the postponement of important projects, and the low quality of some projects paint a vague picture of the methods used in project management.

They selected and identified seven time management tools and techniques as the most popular tools among others. These tools include work breakdown structures, bar charts and linked bar charts, critical path method, resource leveling, schedule crashing, and schedule updating. The researchers concluded that the most important obstacle in the implementation of project management tools is the lack of knowledge of project management techniques. In methodology this study has been done through survey questionnaire. In survey it has been found that there is a very weak relationship between the number of employees of the responding organizations and the use of time management tools and techniques. However, project managers are more concerned about rating time management tools and techniques. This can be explained because project managers are more aware and knowledgeable of these tools. The most important barriers reported by employers are lack of trained staff, lack of knowledge of the importance of project management tools and techniques, and lack of experienced local consultants to help implement project management tools and techniques. Contractors consider the lack of knowledge and skills of a subcontractor to be the most obvious obstacle, in addition to the owner's trust. The construction industry in the Gaza Strip does not seriously consider the implementation of project management tools and techniques. Therefore, it is difficult for both the owner and the construction contractor to take practical measures to take advantage of the use of management tools and techniques.

Table 3: Relationship between type of organization and obstacles, non-efficient implementation of PMTT

Obstacles		Organisation						Pv
		Contractor		Owner		Total		
		No.	%	No.	%	No.	%	
Lack of top management commitment	Yes	8	13	10	44	18	22	0.003*
	No	52	87	13	57	65	78	
Lack of well trained employees on PMTT	Yes	25	42	14	61	39	47	0.117
	No	35	58	9	39	44	53	
Increasing the cost of implementation	Yes	15	25	8	35	23	28	0.373
	No	45	75	15	65	60	72	

11. Causes of Time Overrun in Construction of Building Projects in Pakistan:

The increased period in developing projects is a serious problem in developing countries. It is to find out the main reasons for the delay in construction of building projects and possible mitigation measures. Financial problems facing the contractor, inexperience of the contractor, weather effects, late material delivery, and design errors, shortage of skilled workers, ineligible sub-contractors and errors in timing were identified as the main reasons for spending too much time on construction projects.

Exceeding the construction time is the change between the period of the actual contract at the time of tender of the project and the period of the final contract of the person whose construction project was completed. Increased time constraints on construction projects such as budget overrun, low productivity, expiration of contracts, poor performance due to slow pace of work and disputes among construction stakeholders can have many negative consequences. The construction industry is not famous for the completion of projects over time. Due to ignorance of recent analysis of time, many construction projects failed to complete in the given period.

In previous studies in this paper, reasons for overtime include payments, lack of materials, changes in prices of selected items; poor site management and bank address issues. 16 reasons for the delay are identified, including the top 5 examples: financial problems for the contractor, contract management, site maintenance, lack of planning, and material delays. The authors surveyed selected experts in the construction industry by distributing questionnaires. The findings of this survey indicate that the main reasons for time overrun are design changes, inadequate planning and scheduling, changes in project scope, inadequate project duration and shortage of skilled workers. In research methodology the study was divided into two phases. The main eight causes of time overrun are as Financial Issues Faced by Contractor, Inexperienced Contractor, Weather Impact, Delay in Supply of Materials at Site, Mistakes in Design, Shortage of Skilled Labor, and Incomplete Subcontractor & Errors in Time Estimation. After statistical analysis, the main reason for the time overrun was found as financial issues faced by the contractor, inexperienced contractor, weather impact, delay in supply of materials at site, mistakes in design, shortage of skilled labor, incompetent subcontractor, and errors in time estimation. The findings of this study will help stakeholders control the causes of time lapse.

Thus time overrun should be controlled by using proper time management tools & techniques. Also after use of qualitative risk assessment, hazards & accident should be prevented which control time overruns in site of construction industry.

Table 4: Causes of Time Overrun

Rank	Identified Causes	RIW Value
1	Financial issues faced by contractor	0.834
2	Inexperienced contractor	0.831
3	Weather impact	0.812
4	Delay in supply of materials	0.783
5	Mistakes in design	0.769
6	Shortage of skilled labour	0.761
7	Incompetent subcontractor	0.688
8	Errors in time estimation	0.511

12. Cost Overrun in Construction Projects in Indonesia:

Most construction projects in Indonesia suffer more than difficulties. An unexpected increase in expenditure can create many problems in the project. Therefore, every stakeholder in the project must have a good knowledge of the factors that contribute to the reduction or reduction of project costs. The purpose of this study is to identify the factors that increase project costs and, as understood by the owner and contractor, to analyze the factors that most impact the cost reduction in construction projects in Indonesia.

According to some previous studies, it was agreed that completion of projects on time and planned budgets are the key to success in construction projects. Unfortunately, the main problem facing most construction projects in developing countries is related to the decline in spending on projects. Exceeding costs usually results from financial risk. However, the factors that exceed costs are not only financial problems but also more complex. Construction project management, control system, manpower, project forecasting, financial difficulties and scope of work and objectives were of inferior quality.

In methodology questionnaires were formed. The information in this research was obtained by distributing questionnaires to respondents who were owners and contractors. In general, this research was divided into two phases: (1) Identifying factors causing cost overrun in construction projects in Indonesia and (2) Analyzing and ranking factors causing cost overrun in construction projects in Indonesia. After using these phases results & discussions were concluded. There were fifteen factors were identified. For taking output from three tables result was formed. Analysis of the results shows that rework was the most influential factor in the construction projects going beyond cost. The researchers noted that the high cost of construction projects depends on the stages of planning, coordination and controlling. This means that a good planning phase will reduce the incidence of work in the construction project.

Fifteen factors, according to the study, caused costs to exceed construction projects i.e. site availability delay; site conditions; social site conditions; change order; rework; subcontractors' and/or vendors' performance; approval/permit delay; inaccuracy in budgeting, scheduling and resource planning; materials price fluctuations; rules and regulations; owner's additional requirements; inflation; delay in payment; weak cash flow and bad weather.

Thus it is found time management is the major role for controlling cost overrun. So there should be use of time management tools & techniques which are partly involved to minimize cost overrun. Another part to minimize cost overrun is risk assessment. Risk assessment is important part used in pre-planning, which reduces hazard before planning in construction industry.

Table 5: Descriptive Analysis of Cost Overrun Factors

Factors	N	Minimum	Maximum	Std. Deviation
Site availability delay	50	1.000	5.000	1.245
Site conditions	50	1.000	5.000	0.974
Social site conditions	50	1,000	5.000	0.884
Change order	50	2.000	5.000	0.990
Rework	50	1.000	5.000	1.106
Subcontractors' and vendors' performance	50	1.000	5.000	1.264
Approval/ Permits delay	50	1.000	5.000	1.118
Inacurracy in budgeting, scheduling and resource planning	50	1.000	5.000	0.986
Materials price fluctuations	50	2.000	5.000	1.124
Rules and regulations	50	1.000	5.000	0.995
Owner's additional requirements	50	2.000	5.000	0.978
Inflation	50	2.000	5.000	1.046
Delay in Payment	50	1.000	5.000	1.166
Weak cash flow	50	1.000	5.000	1.111
Bad weather	50	1.000	5.000	1.049
Valid N (listwise)	50	1.000	5.000	1.245

3. Conclusion

Study of the practices and cases in various developing countries has shown that the project and time management is affected by certain uncontrolled factors. The use risk assessment tools and techniques are often neglected while construction and the workers are unaware of health and safety hazards. The contractors are avoiding using the tools and techniques to identify the risks at the beginning of the project to save costs and time. Such avoidance in turn is causing time overrun and cost overrun until the completion of the projects and inducing unforeseen delays in the work. The factors become uncontrollable once there is collapse of the project plans due to non-following of project management tools and techniques.

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