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To Study the Factors Affecting Contractors Perspective in RiskManagement

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Abstract--Risk management is an integral part of any construction industry particularly in a developing country where there are massive construction projects tobe handled in the future. An effective risk management method can not only help contractors to understand the types of risks they might incur in different phases of a project, but will also facilitate them in management of those risks. Construction projects is a mission, undertaken to create a unique facility, product within thespecified scope, quality, time and cost. The main objective of this study are to investigate whether contractors perspective in risk management and if it is being considered then how it is being practiced. Also, to determine the risk evaluation techniques and risk factorswhich contractors consider and the strategies which theydesign, implement and control to eliminate or mitigate the impact of risk in projects. The construction industryis often considered as risky business due to its complexity, strategic nature, and the nature of its business activities, processes, environment, and organization. Risk in construction has been the object of attention because time and cost overruns associated with construction projects. An intense literature review was conducted to determine the risk techniques, risk factors and risk management actions that are suitable for construction industry.

Keywords: Risk management factors, Identification risk; Construction industry; Construction management

I. INTRODUCTION

The construction industry is often considered as arisky business due to its complexity, strategic nature, and the nature of its business activities, processes, environment, and organization. Risk in construction has been the object of attention because of time and cost overruns associated with construction projects. The construction industry is very poor in terms of coping with risks in projects, resulting in the affection of projects objectives like time, cost, quality, and scope. The execution of risk management techniques is very less in the construction industries compare to other lack of knowledge.

Risk management can be generally described as a systematic means of observing areas of risk and identifying how these risks should be treated. It is a management tool which aims at determining the causes of risk and uncertainty, evaluating their impact, and creating appropriate risk management responses. An effective risk management method can not only help to understand the types of risks to be faced, but also in managing these risks that might occur in different phases of a project. Due to its growing significance, today, risk management has been accepted as an essential requirement in most industriesand for which a set of techniques have been created to manage the impacts that might be brought by the potential risks. Construction projects can be extremely complex and fraught with uncertainty. Risk and uncertainty can potentially have damaging consequences for the construction projects. Therefore,the risk analysis and management continue to be a major feature of the project management of construction projects in an attempt to deal effectively with uncertainty and unexpected events and to achieve project success. Construction projects are always unique and risks arise from a number of the different sources. Construction projects are inherently complex and dynamic, and involving multiple feedback processes. In order to fulfill the projects better, the project management was created and its general concept is the use of knowledge, skills, tools and techniques necessary to meet the needs and expectations of stakeholders. Project management is the art of directing and coordinating human resources and materials throughout the life of a project by using modern management techniques of which the most important

objectives include the reduction of cost andtime and improving the quality of the projects. However, the project at any time is confronted with obvious and hidden risks that may have a significant impact on the cost and time. Therefore, in order to maximize the positive events and minimize the consequences of disasters, the risk management emerged as one of the key areas in the project management. Much of each country's capital, especially in developing countries is devoted to the construction projects and infrastructure and a factor ineconomic growth and development in any society is the success in the implementation of construction

The necessary data to be collected for this study from various secondary data like the journals, books, internet. From the data collected, the various risks related to contractors in construction projects willbe determined.

II. LITERATURE REVIEW

Xiaohong Huang 2010 proposed an analysis of the selection of project contractor in the construction management process. Construction contractors have big influences upon projects and their successes. Therefore, it is quite critical to select a qualified contractor in the process of construction management. A competent construction contractor is one of the in dispensable conditions of a proper process and completion of a construction project. There are several theoretical frameworks or models applied in the evaluation of contractors. And there are some practical criteria for selecting an appropriate contractor. This paper analyzed the relevant theoretical methods for contractor evaluation and examined the actual criteria for the selection of contractors. The selection of construction contractors are very often conducted during tendering. Tendering indeed gives a client a choice in awarding contract a company whichproposes the lowest price and short construction cycles, but usually they do not allow to precisely evaluate a tenderer. At the same time there are more and more procedures in which the decisive criterion ofchoosing a tender is the price. In recent years, most clients made use of such a method. On the other hand,the research results show that the cheapest tenderers often have problems with completing the project. Accepting the lowest price is the basic cause of the project completion problems because very often lowering the price means lowering the quality. It is true in some cases. The above conditions make that itis especially important to properly evaluate the contactor's capabilities.

Anita Rauzana 2016 proposed the effect of the risk factors on the performance of contractors in Banda Aceh, Indonesia. In the implementation of construction projects, contractors often face the risk factors that affect the performance and hinder the success of a construction project. Construction projectis a mission, undertaken to create a unique facility, product or service within the specified scope, quality, time, and cost (Chitkara, 2004). Many contracting companies that grows and develops in Banda Aceh, therefore, the contractor should be able to maintain itsperformance in order to compete with other contractors. The purpose of this study is to identify risk factors that have a frequency of occurrence is veryfrequent in the implementation of construction projects in Banda Aceh. Risk factors reviewed are a risk factor in the implementation of construction projects in general. The collection of primary data collected through the distribution of questionnaires tothe respondents that having the small qualification in Banda Aceh. Performance of contractor is a result of work accomplished by the contractor in carrying out aconstruction project.

Shuaibu Saminu, Raj Prasad , V. Thamilarasu et.al… 2015 proposed a study of various factorsaffecting risk management techniques in constructionproject: A case study of India. Risk management is animportant step which should not be neglect or ignore in every project. Because of various risk involved in construction, it is difficult to maintain time, cost and quality as planned. Project undertaken in the construction sector are widely complex and have oftensignificant budgets, and thus reducing the riskassociated should be a priority for each project manager. The main purpose of this paper is to identify the key risk factors that affect construction project. Questionnaires has been prepared incorporating of 50 difference questions after which questionnaire survey was conducted where the questions has been focused based on (component of questionnaire) the respondents were selected based on their susceptibilityto the risk.

Akintola Akintoye 1997 proposed risk analysis and management in construction The paper describes, on the basis of a questionnaire survey of general

contractors and project management practices, the construction industry's perception of risk associated with its activities and the extent to which the industry uses risk analysis and management techniques. It concludes that risk management is essential to construction activities in minimizing losses and enhancing profitability. Construction risk is generally perceived as events that influence project objectives of cost, time and quality. Risk analysis and management in construction depend mainly on intuition, judgement and experience. Formal risk analysis and management techniques are rarely used due to a lack of knowledge and to doubts on the suitability of these techniques for construction industry activities. Organizations from many industries have recognized the increasing importance of risk management, and many companies have established risk management departments to control the risks they are, or might be, exposed to. The construction industry and its clients are widely associated with a high degree of risk due to the nature of construction business activities, processes, environment and organization. Risk in construction has been the object of attention because of time and cost over-runs associated with construction projects. Although, Porter, Healey and Perry and Hayes have expressed risk as an exposure to economic loss or gain arising from involvement in the construction process; Mason and Moavenzadeh have regarded this as an exposure to loss only. Bufaied describes risk in relation to construction as a variable in the process of a construction project whose variation results in uncertainty as to the final cost, duration and quality of the project.

Wisnu Kurnia Praja 2023 proposed factors affectingthe effectiveness of contractors all risk insurance claims: A study of state owned contractors in Indonesia Risk affects the productivity, performance, quality, and cost constraints of construction projects; such risk can be managed by transferring it to contractors' all risk (CAR) insurance claims. While several studies have attempted to determine the efficiency of CAR insurance in construction projects, the phenomenon model needs to be more comprehensively developed to provide contractors with strategic steps that can enhance the effectivenessof using CAR insurance to manage risk. The study aims to find out the factors that affecting the effectiveness of contractors' all risk insurance claims of state-owned contractors in Indonesia Accordingly, this study used partial least squares structural equationmodelling to overcome the shortcomings of the previous approaches used. It analyzed 33 claims data from 25 construction projects and compiled five internal/external factors: knowledge and experience of claims and the supporting role of contractor organizations (internal), and insurers, brokers, andinsurance products (external). The analysis results found that the knowledge and experience of claims and insurance product factors had the most influence on claim success (β = 0.419 and 0.371, respectively). Interestingly, these factors were significantly influenced by roles and supporting organizations (β = 0.478 and 0.791, respectively). Overall, synchronizing purchased insurance policies with risk registers can increase insurance effectiveness. The findings extend the efforts to optimize the use of CAR insurance in construction projects for contractors.

Mohak Patel, Dr. Jayeshkumar Pitroda, Prof. J.J Bhavasar et.al…2016 proposed to study the factors affecting contractors perspective in risk management. The construction industry is often considered as arisky business due to its complexity, strategic nature, and the nature of its business activities, processes, environment, and organization. As the most common and typical project types, construction projects have several characteristics such as time limit, specific objects, financial constraints and economic requirements, special organizational and legal conditions, complexity and systematic characteristics. For that each construction project itself is a complex system. Risk in construction has been the object of attention because of time and cost overruns associated with construction projects. The various risk factors will cause different severity of the consequences. The study aims also to investigate the effectiveness of risk preventive and reductive methods. Moreover, the usage of risk analysis techniques is addressed.

Mohak Patel, Dr. Jayeshkumar Pitroda et.al…2016 proposed the factors affecting project managers perspective in risk management of residential construction projects in Gujarat. The construction industry is often considered as a risky business due to its complexity, strategic nature, and the nature of its business activities, processes, environment, and organization. Risk in construction has been the object of attention because of time and cost overruns

associated with construction projects. The various risk factors will cause different severity of the consequences. Risk management is a system which aims to identify and quantify all risks to which the business or project is exposed so that a conscious decision can be taken on how to manage the risks. Managing risks in construction projects has been recognised as a very important management process in order to achieve the project objectives in terms of time, cost, quality, safety and environmental sustainability. The study aims also to investigate the effectiveness of risk preventive and reductive methods.

Rehman Akhtar 2019 proposed risk management in construction projects: perspective of contractors and owners. Construction industry considers risk management as a critical management process, aiming to realize the project objectives in terms of time, cost, safety, quality, and sustainable environment. The construction projects are initiated in environments that consist of various interconnected activities, therefore, risk and uncertainty are always there. To this aim, a methodology was developed to discover and analyze the key risk factors, risk prevention and mitigation methods and risk analysis techniques from perception of contractors and owners in Pakistan. Questionnaire was designed and distributed among contractors and owners working on variety of projects. To achieve the objectives, the data was collected from 311 contractors and 190 owners. The analysis reveals that the most severe risk factors according to perspective of owner is defective design and not coordinated design, while most severe risk according to contractor is financial failure and awarding design to unqualified designers. Furthermore, the owners and contractors tend to consider the subjective judgment as the most effective way of risk prevention method. According to the contractors' and owners perspective, close supervisionof the subordinates, and increase in the working hours was the mainly effective mitigative technique for minimizing negative impacts. The contractors and owners of projects are widely associated with a high degree of risk due to nature of construction projects. Some risks that negatively affects construction industry of Pakistan are: unable to complete project ontime, injuries/ accidents on site, construction delayed specifically due to weather conditions, price hike of materials and labour, construction approval issues, and defective design, among others.

Bon-Gang Hwang 2012 proposed public private partnership projects in Singapore: Factors, critical risks and preferred risk allocation from the perspective of contractors. Public private partnership (PPP) procurement was introduced into Singapore in 2003, and 10 PPP projects were successfully completed and have been in operation. This study aims to examine the critical success factors as well as the relative importance of positive and negative factors influencing the attractiveness of PPP projects in Singapore, and to identify the critical risk factors and preferred risk allocations for PPP projects in Singapore. The questionnaire survey results indicated that negative factors were more affir ative than the positive factors, and that 23 risk factors had significantcriticalities. Eight risks would be preferably allocatedto the public sector while 19 risks could be assigned tothe private sector. 11 risks were preferred to be sharedby both parties and the allocation of four risks depended on project circumstances. The findings of this study provide valuable information for organizations that intend to participate in PPP projectsin Singapore. The concept of PPP was introduced to Singapore in 2003 when the first PPP contract was awarded by the Public Utilities Board (PUB) for a desalination plant (Gunawansa, 2010).

Mohammad Taghipour, Fatemeh Seraj, Mohammad Amir Hassani, Sharareh Farahani Kheirabadi et.al…2015 proposed risk analysis in the management of urban construction projects from the perspective of the employer and the contractor. Imbalance between anticipated and actual progress in the development of urban construction projects suggests that there are many obstacles and risks which not only causes the urban management be unsustainable, but the reconstruction and development of urban space is also seriously threatened. In this study, the library research on issues related to the riskof construction projects was done, then some interviews were conducted with experts and managers informed and involved in the projects, and finally questionnaires were distributed to identify and classifythe impact of the risks of the implementation of the construction projects. After analyzing the data, the results indicated that the experts listed the most significant risks as the delays in the payment of contractors' claims and statements due to the lack of handling financial instruments, the governance of

relationships rather than rules in the tenders resulting from employer actions, low commitment to the quality of work provided by their subcontractors, failure to complete the detail engineering by foreign contractors on time, weaknesses in contractors' financial resources, and offering lower prices than reasonable by contractors to win the tender. All of these require special attention and other kinds of risks are important at the next level. Finally, the solutions for eliminating or reducing risks in high- risk areas have been offered to provide tran quility for contractors and employers.

III. RESEARCH METHDOLOGY

1. SITE VISIT

For the successful of project visiting minimum four construction site and data collected was done by the construction observation and personal interviews for contractors. Visit the site and collect data after analysing. The collecting data from site using primary and secondary methods.

2. DATA COLLECTION

Data collection was done by observing the construction and also through a personal interview. Most of the interviews were taken from the contractors of construction organisation as their data were most reliable. The method in collecting data was both qualitative and quantitative from both primary and secondary sources. Primary data was collected through interviews, questionnaires and observation. Secondarydata was obtained by thoroughly studying and investigating documents obtained from organisations and experienced people. Those secondary data collected could be:

Written documents

- Report related to risk management
- Internet
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3. QUESTIONNARE SURVEY

The structured interview questionnaire is shown in Appendix I. The questionnaire was testedwith pilot survey for clarity, ease of use, and value of the information that could be gathered. The questionnaire survey is divided in to two parts. The first part consists of general information like type of company, experience, value of their project. And the second part consists of the risk factors effecting contractors perspective in risk management.

4. ANALYSIS DATA

Analysis of data and result of the studyare provided in this chapter with their explanation anddiscussions. This chapter represents the effect of contractors perspective in risk management to analyserisk factors and point out factors affecting, using AHPmethod, which contribute to risk. Collection of data from construction industry and study the contractors risk then analyse using AHP method. All analysis andcharts are done and drawn by Analytical Hierarchy Process.

A. ANALYTIC HIERARCHY PROCESS (AHP)

The Analytical Hierarchy Process (AHP) is a decision-aiding method developed by Saaty (1980). It aims at quantifying relative priorities for a given set of alternatives on a ratio scale, based on the judgment of the decision - maker, and stresses the Importance of the intuitive judgments of a decision-maker as well asthe consistency of the comparison of alternatives in the decision-making process . The strength of thisapproach is that it organizes tangible and intangible factors in a systematic way, and provides a structuredyet relatively simple solution to the decision- making problems

B. USES AND APPLICATIONS OF AHP

- AHP is targeted at group decision making, and is used for decision situations, in fields such as government, business, industry, healthcare and education.
- Rather than prescribing a "correct" decision, the AHP helps decision makers find the decision that best suits their goal and their understanding of the problem. It provides a comprehensive and rational framework for structuring a decision problem, for representing and quantifying its elements, for relating those elements to overall goals, and for evaluating alternative solutions.
- Users of the AHP first decompose their decision problem into a hierarchy of more easily comprehended sub-problems, each of which can be analyzed independently. The elements of the hierarchy can relate to any aspect of the decision problem—tangible or intangible, carefully measured or roughly estimated, well or poorly understood— anything at all that applies to the decision at hand.
- Once the hierarchy is built, the decision makers evaluate its various elements by comparing them to each other two at a time, with respect to their

impact on an element above them in the hierarchy. In making the comparisons, the decision makers can use concrete data about the elements, and they can also use their judgments about the elements' relative meaning and importance. Human judgments, and not just the underlying information, can be used in performing the evaluations.

- The AHP converts these evaluations to numerical values that can be processed and compared over the entire range of theproblem. A numerical weight or priority is derived for each element of the hierarchy, allowing diverse and often incommensurableelements to be compared to one another in a rational and consistent way. This capability distinguishes the AHP from other decision making techniques.
- In the final step of the process, numerical priorities are calculated for each of the decision alternatives. These numbers represent the alternatives' relative ability to achieve the decision goal, so they allow a straightforward consideration of the various courses of action.
- While it can be used by individuals working on straightforward decisions, the AnalyticHierarchy Process (AHP) is most useful where teams of people are working on complex problems, especially those with high stakes, involving human perceptions and judgments, whose resolutions have long-term repercussions.

C. STEP BY STEP PROCEDURE OF AHP

STEP 1: Model the problem as a hierarchy containing the decision goal, the alternatives for reaching it, and the criteria for evaluating the alternatives.

STEP 2: Establish priorities among the elements of the hierarchy by making a series of judgments based on pairwise comparisons of the elements. For example, when comparing potential purchases of commercial real estate, the investors might say they prefer location over price and price over timing.

STEP 3: Synthesize these judgments to yield a set of overall priorities for the hierarchy. This would combine the investors' judgments about location, price and timing for properties A, B, C, and D into overall priorities for each property.

STEP 4: Check the consistency of the judgments.

STEP 5: Come to a final decision based on the results of this process

D. HIERARCHY IN AHP METHOD

An AHP hierarchy is a structured means of modeling the decision at hand. It consists of an overall goal, a group of options or alternatives for reaching the goal, and a group of factors or criteria that relate the alternatives to the goal. The criteria can be further broken down into sub criteria, sub-sub criteria, and so on, in as many levels as the problem requires. A criterion may not apply uniformly, but may have graded differences like a little sweetness is enjoyable but too much sweetness can be harmful. In that case, the criterion is divided into sub criteria indicatingdifferent intensities of the criterion, like: little,medium, high and these intensities are prioritized through comparisons under the parent criterion, sweetness. Published descriptions of AHP applications often include diagrams and descriptions of their hierarchies. The design of any AHP hierarchywill depend not only on the nature of the problem at hand, but also on the knowledge, judgments, values, opinions, needs, wants, etc. of the participants in the decision-making process. Constructing a hierarchy typically involves significant discussion, research, anddiscovery by those involved. Even after its initialconstruction, it can be changed to accommodate newly-thought-of criteria or criteria not originally considered to be important; alternatives can also be added, deleted, or changed. To better understand AHP hierarchies, consider a decision problem with a goal tobe reached, three alternative ways of reaching the goal, and four criteria against which the alternatives need tobe measured.

I. CONCLUSION

This study aims to factors affecting contractors perspective in risk management by the construction site. Questionnaries are prepared for the specified data collection for the success of the project. This questionnaries are developed with Analytical Hierarchy Process (AHP). AHP method is the decision-aiding method developed by Saaty (1980). It aims at quantifying relative priorities for a given set of alternatives on a ratio scale, based on the judgment of the decision - maker, and stresses the Importance of the intuitive judgments of a decision-maker as well asthe consistency of the comparison of alternatives in the decision-making process. This process is used in questionnaries. These data from questionnaire survey

measure the factors affecting contractors perspective in risk management on construction industry.

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