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DILEMMAS IN CONSTRUCTION PROJECT DUE TO SCARCE RISK ANALYSIS

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Abstract

In this study, the authors try to compute the importance of risk management in construction industries and try to validate that risk management is a vital tool to manage the project for this purpose about 150 questionnaires were distributed to stakeholders with a response rate of 66% thereby achieved acceptable for the construction industry. 86 % of respondents were over 30 years of age. While 67 % of respondents were having experience of over 10 years in construction. Maximum of the respondents were at the key positions in their organizations. Results of the survey have vividly shown that the construction industry faces many challenges and uncertainties. The trends are that as the business environment grows more complex and dynamic, the risks and uncertainties which construction organizations face also get complex and significant.

Keywords: risk management, construction industries, uncertainties.

I. Introduction

The Project Management Institute avowed that "risk management comprises planning, identification, analysis, response planning and controlling of risk on a project". Researchers reasoned that in recent times, sound risk management is a crucial determinate of the success of a project, based on project performance measurement, due to growing time and cost pressure [IV]. Another researcher underscored the importance of risk analysis and management as part of the decision-making process in the construction industry [VI]. One researcher established that risk management was widely accepted as a vital tool to manage projects [X]. Hence risk management forms a critical element in project management. Knowledge of modern management is very essential in managing construction projects, understanding the design and the construction process.

There is specific set of objectives and constraints in construction projects such completion of project in a required time frame [V]. Construction is a costly activity and many people, in an attempt to reduce the cost, become penny-wise and pound-foolish. In the construction industry, change is inborn. The main things which a project fails to attain are the three most important factors including timelines, cost and quality targets [I]. One must not be surprised as there may be a deficiency of perfect engineers and perfect designs. More so the behavior of nature is always unpredictable. All these generate the possibility of disasters, risks and failures. Modifications and alterations become the need of the hour. These may help in changing the status [IV]. These modifications and alterations, once used with some logic and principles become risk management. By the application of these principles of risk management, engineers can get better and effective management. Risk and uncertainty affect Cost, Time and Performance. Compromises on either of one out of these three factors will affect the other two factors [III]. Normally compromises are made on the cost which will push the project into trouble. Therefore, proper risk management is required to sail through the project. And the deficiency of risk management can put the project in peril [VI].

II. Needs Assessment.

Contractors, sub-contractors, suppliers, and Project Managers are the main stakeholders in construction. There is a need to provide stakeholders with some handy knowledge of risk management. Stakeholders will be provided with:

- Identification of problems because of inadequate risk management.
- Understanding how insufficient/inadequate risk management can cause problems in construction projects.
- How we can thwart these troubles.
- A tool/set of recommendations to recover from the failure.

III. Problem Statement.

In construction projects, main considerations of Cost, Time and Performance are likely to be subjected to risk and uncertainly. Any intrinsic or extrinsic changes in these considerations will get the project into trouble. The lack of risk management, or even an insufficient risk analysis, can put construction projects in jeopardy. There is a requirement to focuses on troubled projects in construction due to inadequate and insufficient Risk Management, to make them successful. Deficiency in risk management is always a disaster. In most, the construction companies' risk is not given due consideration and therefore fails to plan a contingency for troubled projects. As result, the three variables of a project; time, cost and scope get in trouble. A large number of studies are available on risk management but there exists a gap for specifically this study and therefore needs this effort to fill in the gap. Construction projects

are unique by nature and few interesting ones are complex too. They frequently take place over an extended period and demand the engagement of a wide range of resources, including people, finance, facilities, materials and intellectual property. Projects have normally defined objectives or an end-state. This provides the persons involved in the project with a clear vision. Following are the normal effects if risk management is ignored

- Delay in project
- Increased costs
- Loss or reduction of profit
- Damage to the brand/reputation
- Closing down of the project

IV. Objectives / Benefits.

- The objective is to find out reasons as to why construction projects fail due to inadequate risk management and what could be the best practices to overcome failure.
- To identify the significant risks and their importance in organizations

V. Methodology and Adopted Method.

Quantitative study was carried out. Both primary, as well as secondary data sources, were used in this research. The primary data was obtained from the questionnaire.

- **Data Collection Method.** The questionnaire was circulated to different respondents and while distributing, the respondents were briefed about the questionnaire as well as its intent. Furthermore, the questionnaire was distributed on google forms and survey monkey.
- **Reliability and Validity**. The questionnaire was validated by Cronbach alpha and by SPSS. Furthermore, the questionnaire was duly approved by the supervisor before distribution. The questionnaire is given in Annex-A
- **Response**. 100 responses were returned / collected, while 150 were sent / distributed. The response rate of 66% thereby achieved acceptable for the construction industry. 86 % of respondents were over 30 years of age. While 67 % of respondents were having experience of over 10 years in construction. Maximum of the respondents were at the key positions in their organizations.

VI. Discussions, Recommendations

- **Discussions / Comments on Survey Results (Question 27 & 28).** The survey results are summarized in ensuing paras. 23 x risk factors enumerated in the questionnaire which can affect risk. They were

assessed for their significance and allocation to the owner, contractor, or both without any specific order. Risk Significance and Risk Allocation are the two main factors. The take on these factors by the respondents are described below.

- **Permits and ordinances.** 23% considered it important while 67% considered it significant. The results indicate that the owner, as well as the contractor both, should be responsible for this risk. These must be understood and followed in true letter and spirit.
- **Lack of Scope of work definition.** 29% considered it important while 68% considered it significant. Whence the aim, objective, or goals of the project are either unclear or wrong, the risk will be undertaken by the owner. At the same time if the contractor does not understand the goal, then the contractor shall be responsible to bear the risk. Having clear requirements and objectives is essential. Else projects can easily face problems.
- **Delays in obtaining site access**. 53% considered it important while 42% consider it to be significant. The owner is responsible for this kind of risk. Owners always have intentions to push projects for saving their money and time. This is very risky and has all the chances to jeopardize project objectives.
- **Labour, material, equipment availability**. 76% considered it important while 23% consider it to be significant. The result shows that this risk belongs to the contractor, as he has to arrange all these for the execution of the project.
- **Labour, material, equipment low productivity**. 69% considered it important while 28% consider it to be significant. It is an important risk for the contractors as it was his responsibility to get the job done through all these. If he fails to produce desired output from them, he has to face the music.
- **Defective design**. 71% of the respondents considered it important while 22% consider it to be significant. The result indicates that the owner must take this risk. Defective designs include incomplete or non-constructible designs. As for how can the owner employ the contractor on such a design before getting satisfaction through a designer or consultant.
- **Changes in work**. 14% considered it important while 83% consider it to be significant. As per the result, the owner is the only person who could be responsible for this risk. The owner must have done all preliminary satisfaction before asking the contractor to start the work. Once the work is started now any desire to change shall have cost to be paid. And the owner has to pay for that.

- **Unforeseen site conditions**. 7% considered it important while 90% consider it to be significant. The results show the risk be allocated to contractors. Once the site has been allocated and contractor has taken over the site, now it is the complete responsibility of the contractor to handle it. He should have considered all pros and cons before actually taking over the site.
- **Unexpected inclement weather**. 46% considered it important while 48% consider it to be significant. This is an external risk that is beyond the control of the owner and contractor. This kind of risk is and must always be shared.
- **Quality problems of material**. 51% considered it to be important while 43% consider it to be significant. It is a low-importance risk. The contractor is responsible for achieving the desired quality.
- **Changes in government laws and regulations**. 4% considered it important while 93% consider it to be significant. It is also a kind of external risk that is beyond the control of the owner and contractor. The result shows that the owner and contractor collectively shall handle it.
- **Labor strikes and disputes**. 12% considered it important while 80% consider it to be significant. Since laborers are selected and employed by a contractor, the contractor shall be responsible for any wrongdoing of labor. The survey indicates contractor responsible for this risk.
- **Accidents during construction**. 6% considered it important while 88% consider it to be significant. This is a significant risk for the contractors. However, the owner may also share the loss.
- **Inflation and changes in prices**. 16% considered it important while 46% consider it to be significant. The survey indicates that the allocation of this risk is not constant. It is dependent on the financial situation of the country. If the inflation rate increases, the Owner takes a risk. The contractor takes this risk if the inflation rate is low. Likewise, the importance of this risk is also dependent on inflation, more inflation; more will be its importance.
- **Contractors' incompetence**. 21% considered it important while 76% consider it to be significant. Incompetence is a personal trait. Every person is responsible for his traits, may they be good or bad. The result of the survey makes the contractor responsible for this risk. But the owner will be penalized for the poor selection of a contractor.
- **Change order negotiations**. 59% consider it to be significant. As per the survey, the owner and contractor share this risk.

- **Delays in 3rd parties**. 54% considered it to be significant. As per the survey, the owner and contractor share this risk.
- **Lack of coordination with subcontractors**. 97% consider it to be significant. The results show contractors handle this risk as it is the prime responsibility of the contractors to coordinate with subcontractors for the execution of their works.
- **Delays in resolving disputes**. 85% consider it to be significant. The results show it to be a kind of risk that is to be shared between owner and contractor with a tilt towards the contractor.
- **Delays in payment to the contractor**. 19% considered it important while 78% consider it to be significant. The results indicate that owners assume this risk as if payments are delayed to the contractor any effect shall be the result of that and so owner be penalized for it.
- **Poor quality of the work**. 29% considered it important while 65% consider it to be significant. Attainment of quality is the responsibility of the contractor. The result shows that contractor is responsible for this type of risk.
- **Financial failure**. 77% of respondents considered it important while 20% consider it to be significant. Finances risk relay on the financial situation of the like inflation. Contractors are willing to accept the risk whence the economy is strong. Else they want to have a sharing approach. But the owner has to handle this risk
- **War threats and political instability**. 6% considered it important while 911% consider it to be significant. It is also a kind of external risk that is beyond the control of owner and contractor and therefore it is sharing risk with a tilt towards the contractor.

VII. Findings

Results of the survey have vividly shown that the construction industry faces many challenges and uncertainties. The trends are that as the business environment grows more complex and dynamic, the risks and uncertainties which construction organizations face also get complex and significant. On the other hand, the findings indicate that risk management is not implemented and practiced in the construction industry resulting in troubled projects and therefore dedicated risk management is mandatory for success of such projects.

VIII. Recommendations

- There should be a unique and well-documented risk policy regarding different projects which is understandable and can be implemented.
- There should be proper registers to note down the previous hazards and dangerous occurrences so that risk is minimized in the future.

- Risk should be accepted and dealt with rather than being transferred.
- Due care needs to be given to the finances so that any economical fluctuation may not disturb the projects.
- The design alteration should be avoided during execution as it is a major contributor to failure.
- Risk management should be incorporated during the planning stage and risk analysis should be carried out for critical activities monitoring is a continuous activity.
- To avoid any conflict during the execution, the client should be involved in the design stage and his satisfaction should be insured during designing

IX. Conclusion

Construction and Risk are inter-related, may it be positive or negative. As a bottom line; whenever a project is planned to be executed, all kinds of risks be studied in detail to find out remedial measures in advance, and continuously monitored throughout the project for evaluation and addressing the issue at the appropriate time and appropriate level.

Annex 1 (Questionnaire)

S.No	Question	Strongly Disagree	Disagree	Natural	Agree	Strongly Agree
1	Concsider presence of efficieent risk management plan in your company	1	2	3	4	5
2	Does effective risk management improve the performance of the company ?	1	2	3	4	5
3	The scope of the project is well defined	1	2	3	4	5
	The scope of the project is unlikely to change	1	2	3	4	5
4	The project requirements are understood	1	2	3	4	5
	The project requirements are stright forward	1	2	3	4	5

5	The project manager is Identified	1	2	3	4	5
	The project manager is Enthusiastic	1	2	3	4	5
	The project manager ia Committed	1	2	3	4	5
S.No.	**Question**	**Yes**	**No**			
6	The accountability of risk management is Documented and clearly understood	1	2			
7	The schedule of the project is Flexible	1	2			
8	The budget of the project is estimated based upon the experience of the staff	1	2			
9	The technology being utilized for the project is "Leading-edge	1	2			
10	The subject matter is well known by the project team	1	2			
11	The performance objective of the project are well described	1	2			
12	Have the staff been training by the company on risk policy, Risk procedures	1	2			
S.No.	**Question**					
13	Who is responsible for handling risks in the company	Circle all the apply				
	Senior Manager	1				
	Director Finance	2				
	Architects	3				
	Structure Engineers	4				
	Other Consultants	5				
	Genral Contractors	6				
	Risk Manager	7				
	All Staff	8				
	Other Consultants	9				

S.No.	Question	Not at all	Almost not at all	Neutral	Almost completely	Completely
14	The objectives of the company and the communication plan are documented to staff	1	2	3	4	5
15	The objectives of the company and the communication plan are entirely understood by the Stagg and management	1	2	3	4	5
16	The management of the company endorses the innovation to achieve its objectives	1	2	3	4	5
	The company uses a systemic approach for the identification of its risks relating to the declared objectives	1	2	3	4	5
18	The company uses a systemic approach for the identification of Opportunities	1	2	3	4	5
S.No.	**Question**	**Yes**	**No**			
19	Does your organization have developed a risk register/ Database system	1	2			
20	Risk is analyzed based on	1	2			
	Probability	1	2			
	Outcome	1	2			
	Financial impavt	1	2			
	The reputation of the company	1	2			
	the accomplishment of the objectives	1	2			
	other (Please specify below)	1	2			
S.No.	**Question**	**Not at all**	**Almost not at all**	**Neutral**	**Almost completely**	**Completely**
21	The assessment of risks is based on					

	Qualitative methods (high, moderate, low)	1	2	3	4	5
	Quantitative methods (Impact)	1	2	3	4	5
S.No.	**Question**	**Yes**	**No**			
22	Does your organization have an update					
	Business plan	1	2			
	Disaster Recovery plan	1	2			
	Risk management plan	1	2			
S.No.	**Question**	**Not at all**	**Almost not at all**	**Neutral**	**Almost completely**	**Completely**
23	What is the position of your company towars risks					
	Accepting risks	1	2	3	4	5
	Avoiding risks	1	2	3	4	5
	Reducing risks	1	2	3	4	5
	Transferring risks	1	2	3	4	5
	Monitoring the effectiveness of risk management	1	2	3	4	5
S.No.	**Question**	**Yes**	**No**			
24	Have you recognized sources of lessons learned to review before the initiation of the project	1	2			
25	Are you applying improvements from previous lessons learned in a project	1	2			
26	are you making improvements in risk management procedures as a result of lessons learned	1	2			
27	**Risk significance**					
	Risk type	**Not at all**	**Significant**	**Important**		
	Permits and ordinances	1	2	3		
	Lack of scope of work definition	1	2	3		

	Delays in obtaining site access	1	2	3		
	Laborer, Material and Equipment availability	1	2	3		
	Laborer, Material and Equipment productivity	1	2	3		
	Defective designs	1	2	3		
	Changes in work	1	2	3		
	Unforeseen site conditions	1	2	3		
	Unexpected inclement weather	1	2	3		
	Quality problems if materials	1	2	3		
	Changes in governments laws and regulations	1	2	3		
	labor stikes and disputes	1	2	3		
	Accidents during constrution	1	2	3		
	Inflation and changes in prices	1	2	3		
	contractors incompetence	1	2	3		
	Change order negotiations	1	2	3		
	Delays in third parties	1	2	3		
	Lack of corordination with sub-contractors	1	2	3		
	Delays in resolving disputes	1	2	3		
	Delayed payment to the contractor	1	2	3		
	Poor Quality of work	1	2	3		
	Financial Failure	1	2	3		
	War threats and political instability	1	2	3		
28	**Risk Allocation**					
	Risk types	**Owner**	**Contractor**	**Shared**		
	Permits and ordinances	1	2	3		
	Lack of scope of work definition	1	2	3		
	Delays in obtaining site access	1	2	3		

	Laborer, Material and Equipment availability	1	2	3		
	Laborer, Material and Equipment productivity	1	2	3		
	Defective designs	1	2	3		
	Changes in work	1	2	3		
	Unforeseen site conditions	1	2	3		
	Unexpected inclement weather	1	2	3		
	Quality problems if materials	1	2	3		
	Changes in governments laws and regulations	1	2	3		
	labor stikes and disputes	1	2	3		
	Accidents during constrution	1	2	3		
	Inflation and changes in prices	1	2	3		
	contractors incompetence	1	2	3		
	Change order negotiations	1	2	3		
	Delays in third parties	1	2	3		
	Lack of corordination with sub-contractors	1	2	3		
	Delays in resolving disputes	1	2	3		
	Delayed payment to the contractor	1	2	3		
	Poor Quality of work	1	2	3		
	Financial Failure	1	2	3		
	War threats and political instability	1	2	3		

Conflict of Interest:

No conflict of interest regarding this article

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