THE FACTORS AFFECTING PROJECT MANAGERS' PERSPECTIVE IN RISK MANAGEMENT OF RESIDENTIAL CONSTRUCTION PROJECTS IN GUJARAT

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ABSTRACT

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. The Analytic Hierarchy Process (AHP) is a new approach that can be used to analyse and assess project risks during the bidding stage of a construction project and to overcome the limitations of the traditional approaches currently used by contractors. All these factors are considered from the project managements' point of view.

Keyword: *AHP, RISK MANAGEMENT, PROJECT MANAGER, RISK FACTORS*

1. INTRODUCTION

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. **(1)** Risk in construction has been the object of attention because of time and cost overruns associated with construction projects. One of the risks in construction projects is choosing the wrong contractors, which have a significant impact on financial resources of the project.

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. **(8)** It can be concluded that risk management is essential to construction activities in minimizing losses and enhancing profitability. **(1)**

The process of risk management is broken down into the risk management system in the sequence of dealing with risk. Naturally the risk management system must be applied to each option under consideration. The stages are: Risk identification, it consists of a thorough review of every aspect of the project to detect, discover and expose risks; Risk analysis, the second stage of the risk management process, deals with the causes and effects of events which cause harm; Risk response, it covers both preventive actions to prevent the risk from occurring as well as a suitable response in case the risk actually occurs; Risk retention, it is the method of reducing controlling risks by internal management.

2. NEED OF THE STUDY

As the unanticipated risk can cause disorder for the planned construction project and it costs in terms of money and time, which both are crucial for any kind of project, it is necessary to know ins and outs of the possible occurrences of risk.

The studied literature shows that there is a very strong need to carry out this kind of quantitative study because in the past, there is much rare work has been done like this study. For effective result, the AHP methodology is used to know relative importance risk factors which affect Risk Management.

3. OBJECTIVES OF THE STUDY

The following are the objectives of this study:

1. To identify factors and its sources which are responsible for risk, either internal or external, for construction project.
2. To prioritize the identified factors based on consequences generated by the same on construction project.
3. To analyse risk factors and to point out relative importance of factors, using AHP method, which contribute to risk.

4. SCOPE OF THE STUDY

The scope of this research work of development of factors affecting Risk Management is limited to four cities of Central Gujarat Region of India: Ahmedabad, Surat, and Vadodara.

5. RESEARCH METHODOLOGY

The relevant data for this research were collected by a structured, close-ended questionnaire survey. From the study of past research work and with the help of expert opinion, factors affecting Risk Management identified. Based on review of relevant literature all the factors are categorized as given in APPENDIX 1.

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 as the consistency of the comparison of alternatives in the decision-making process **(3)**. The strength of this approach is that it organizes tangible and intangible factors in a systematic way, and provides a structured yet relatively simple solution to the decision-making problems **(8).**

Table 1: Scale of Relative Importance

Intensity of Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Weak importance of one over another	Experience and judgment slightly favour one activity over another
5	Essential or strong importance	Experience and judgment strongly favour one activity over another
7	Demonstrated importance	An activity is strongly favoured and its dominance demonstrated in practice
9	Absolute importance	The evidence favouring one activity over another is of the highest possible order of affirmation
2, 4, 6, 8	Intermediate values between the two adjacent judgments	When compromise is needed

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 pair wise comparisons of the elements.

Step-3: Synthesize these judgments to yield a set of overall priorities for the hierarchy.

Step-4: Check the consistency of the judgments.

Step-5: Come to a final decision based on the results of this process.

Table 2: List of factors affecting Risk Management

A. Site Related Risk	A1. Lack of facilities on site
	A2. Site condition
	A3. Weather condition
B. Technical risk	B1. Lack in modern technical knowledge
	B2. Poor performance of equipments
	B3. Coordination in distributing drawing
	B4. Engineering experience
	B5. Changes in design
	B6. Incomplete design
C. Customer related Risk	C1. Inexperienced customers
	C2. Discordance between designers and customers
	C3. Delay in payment
D. Management related Risk	D1. Project End time
	D2. Wrong assessment
	D3. Poor communications
	D4. Poor management of contractors
	D5. Delays in material supply, equipment and labour
	D6. Shortage of skilled workers
	D7. Bad quality of workmanship
E. Financial Risk	E1. Difficulties in project budgeting
	E2. Lack of insurance for facilities
	E3. Market risk
	E4. Credit risk
F. Unavoidable Risk	F1. Physical damage
	F2. Bad quality of materials and equipment
	F3. Actual quantity to contract quantity
G. Contractor related Risk	G1. Contractor selection
	G2. Contractors' policies
	G3. Uniqueness of project activities
	G4. Financial stability of contractor
	G5. Delay subcontractor
H. Socio-Political Risk	H1. Third party delays
	H2. Change in government policy act
	H3. Pollution and safety rules of project activity

6. DATA ANALYSIS APPROACH

Following the Table 3 which shown that data analysis by AHP Pairwise comparison metrices for the main criteria and its analysis.

Table 3: Pairwise comparison matrices for the main criteria

Criteria	A	B	C	D	E	F	G	H
A	1	0.5	0.25	0.33	0.25	1	0.25	0.5
B	2	1	2	1	1	3	0.33	1
C	4	0.5	1	0.33	0.25	1	0.33	0.5
D	3	1	3	1	1	2	0.33	1
E	4	1	4	1	1	3	1	4
F	1	0.33	1	0.5	0.33	1	0.25	3
G	4	3	3	3	1	4	1	4
H	2	1	2	1	0.25	0.33	0.25	1
Coll.sum	21	8.33	16.25	8.16	5.083	15.33	3.75	15

Local weights of the criteria's are as follows:

	A	B	C	D	E	F	G	H
Local weight	0.047	0.126	0.073	0.131	0.200	0.075	0.261	0.083

Now check the consistency of the result.
Lembda max. = sum of [W_i *sum of each column]
Lembda max= 8.728, and n = 8
Now find Consistency index (CI) = [(lembda max-n)/ (n-1)]
CI = 0.10404
Now Consistency Ratio (CR) = CI/RI
Where RI (Random Index)= 1.41 (for n=8),
CR = 0.0737 < 0.1 hence ok

7. RESULTS AND FINDINGS

According to the Respondents' data and using the AHP method, calculation is carried out for the most important factors which affect the risk management. For in case of Project Managers' point of view these are:

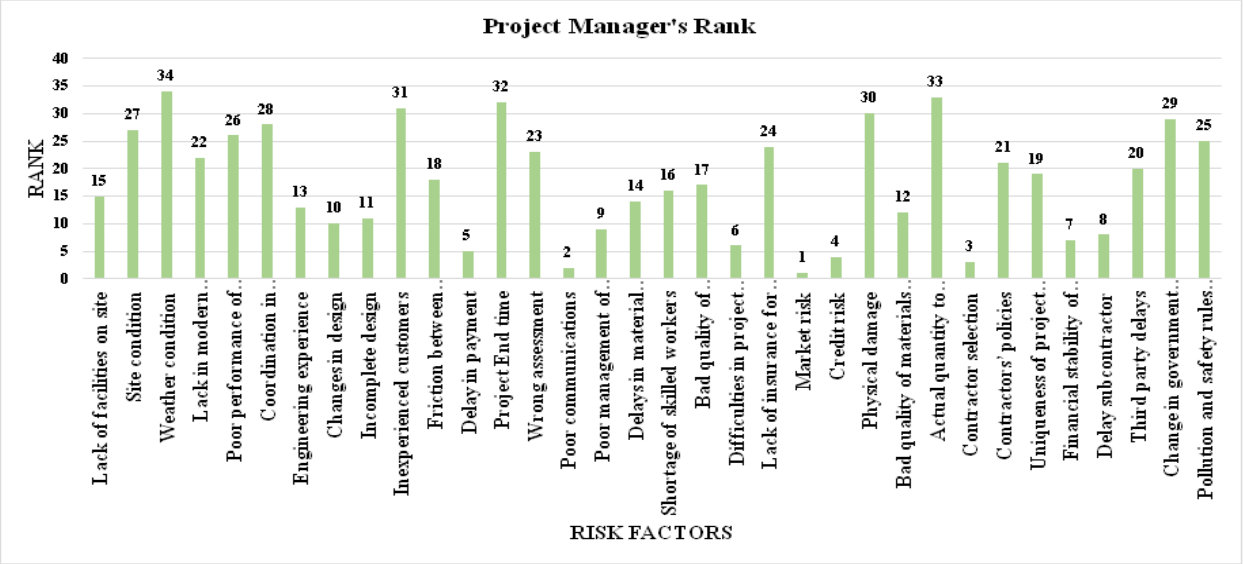

Figure 1: Describing rank of risk factors

8. CONCLUSION

From the questionnaire survey in various cities from Gujarat following results are concluded about Risk management of construction projects:

According to the Respondents' data and using the AHP method, calculation is carried out for the most important factors which affect the risk management. For in case of Project Managers' point of view these are:

1. Market Risk
2. Poor Communications
3. Contractor Selection
4. Credit Risk
5. Delay in Payment
6. Difficulties in Project Budgeting
7. Financial Stability of Contractor
8. Delay Subcontractor
9. Poor Management of Contractors
10. Changes in Design

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MAIN QUESTIONNAIRE

For Risk Management, the framework of classification and parameters is given above. Now, you are requested to compare each level of classification and parameter with reference to its importance.

APPENDIX 1

Site Related Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Technical Risk**
Site Related Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Customer Risk**
Site Related Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Management Risk**
Site Related Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Financial Risk**
Site Related Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Unavoidable Risk**
Site Related Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Contractor Risk**
Site Related Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Socio-Political Risk**
Technical Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Customer Risk**
Technical Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Management Risk**
Technical Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Financial Risk**
Technical Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Unavoidable Risk**
Technical Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Contractor Risk**
Technical Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Socio-Political Risk**
Customer Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Management Risk**
Customer Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Financial Risk**
Customer Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Unavoidable Risk**
Customer Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Contractor Risk**
Customer Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Socio-Political Risk**
Management Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Financial Risk**
Management Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Unavoidable Risk**
Management Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Contractor Risk**
Management Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Socio-Political Risk**
Financial Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Unavoidable Risk**
Financial Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Contractor Risk**
Financial Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Socio-Political Risk**
Unavoidable Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Contractor Risk**
Unavoidable Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Socio-Political Risk**
Contractor Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Socio-Political Risk**

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