



IDENTIFICATION OF RISK FACTORS AND MITIGATION STRATEGIES IN SLUM REDEVELOPMENT PROJECT

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Abstract: In this time of progressive world, it is little hard to avoid the risks. The construction processes is potentially surrounded by the risks. To minimize the impact of the risk during the construction risk management is must. Risk management is a systematic action of analyzing, identifying and responding to the risks. The purpose of the study is to find the risk factors that contribute to slum redevelopment projects. The research is conducted by conducting risk analysis and determining factors that affects particularly in the slum redevelopment projects. In the initial stage of this paper probable risk factor was listed after the reading the literature reviews related to topic. After the validation from the experts' 27 major threat factors was sorted out for the study. In this research questionnaire survey has been conducted by the physical interview and circulating google form. For the analyzing the collected data numerous assessment techniques like probabilistic assessment, risk severity assessment, risk matrix assessment technique has been performed. By this assessment we have got positioned some severe threat factors which have maximum possibility of occurring and impact on slum redevelopment projects. After the findings mitigation strategies has been suggested.

IndexTerms – Risk management, slum redevelopment, probability analysis, severity analysis, risk matrix analysis

I. INTRODUCTION

1.1 RISK MANAGEMENT

In this time of progressive world, it is little hard to avoid the risks. The construction processes is potentially surrounded by the risks. To minimize the impact of the risk, risk management is must. Risk management is a systematic action of analyzing, identifying, and responding to the risks. The action of maximizing the probability and the impact of positive events and minimizing the probability and the impact of negative events is Risk management. In the any project risk management is a very important and integral part of project management. The question is, what level of risk should be taken. First of all, we need to identify the most sever risk factors. To identify most severe factors, risk analysis is the most efficient way. By this we can identify the severity of the risk and also, we can build the mitigation strategy for the particular risk factor.

The purpose of the study is to find the risk factors that contribute to slum redevelopment projects. The research will be conducted by conducting risk analysis and determining factors that affects particularly in the slum redevelopment projects.

1.2 SLUM REDEVELOPMENT

A slum is a residential area with low standard housing. Which is poorly serviced, very crowded, unsafe, unhealthy, and socially undesirable. In India, the reason of increasing slum area is the lack of infrastructure in rural areas and it forcing people to seek out work in mega-cities. more and more peoples are making this migration, and the space left to accommodate them becomes less and less in the city and formation of slum starts. What is the slum redevelopment? The process of an institutional changes which involves changing the entire informal built environment to the formal housing system.

II. OBJECTIVES

Primary objective is To study the risk factors which affects objectives of construction of slum redevelopment project.

Secondary objective is to identify stakeholder who involved in slum redevelopment projects.

To suggest findings to reduce or minimize to risk in slum redevelopment projects.
To know the level of risk can occur.

III. LITERATURE

After the studying numerous literature review probable risk factor listed out. In the next stage listed risk factors validated by the experts and experienced in the slum redevelopment projects. After the validation 27 severe and impactable factors shorted out.

IV. RESERCH METHODOLOGY

4.1 LITERATURE REVIEW:

Literature reviews based on the topic were collected. These were used as a base for the project. From the literatures collected the methodology and processes were studied.

4.2 DATA COLLECTION:

Data Collection was done by questionnaire survey and expert opinion. After identification of factors from literatures and opinions of experts, Questionnaire was prepared for the associated personnel in construction companies' other stakeholders for identifying their views and preferences.

4.3 DATA ANALYSIS:

It is important to recognize the degree to how much the respondent's rate the possibility of the various parameters based on their own experience and knowledge. After collection of data from the survey it will be analyzed to identify the most affecting risk factors.

V. DATA COLLECTION

Data collection is an idea of action which the research objectives can be questioned. Data Collection was done by questionnaire survey and expert opinions. After identification of factors from literatures and opinions of experts, Questionnaire is prepared for the associated personnel in construction Contractor companies for identifying their views and preferences.

- **Part 1:** Personal information of survey respondent like Name, Organization, Designation, Experience.
- **Part 2:** Various Risk factors will be listed out in survey form. In this section attendee had to give the probability and Impact value on Likert scale of 1 to 5 to identify the most critical risk factors.

5.1 SAMPLE SIZE

$$ss = \frac{Z^2 \times (p) \times (1-p)}{c^2}$$

Z- Statistic value for the confidence level (95 % confidence Level) = 1.96
P= Percentage picking a choice (0.5 used for sample size needed) =50%
C = Confidence interval 11 % SS= 67 Nos.

VI. DATA ANALYSIS

Table 1 Determined 27 major risk factors

Factors description	Hazard Risk factors
Financial risk factors	Collapse of Building
Delay in payment	Accident due to Equipment
Overrun of Budget	Adverse Weather Condition
Irregularities in Accounting	fire/ explosion
The financial failure of the contractor	Injuries to Workers
Improper management of cash flow	Operational Risk factors
Strategic Risk factor	Delay in slum vacant time
New competitors at the time of bidding	Key personnel departure
Pricing wars	Damage to property by public
Political hostility	Poor Site Management
Relation with unions and suppliers	Loss of critical equipment or bed performance of equipment
Change in design or Defective design	Dispute during construction
Inadequate or unrealistic work Planning and scheduling	Delay in approval from authorities
Governmental rules and regulations	Lower work quality
Material not conforming to the specification	Improper Storage of materials or unviability of materials

6.1 DEFINITIONS:

Likelihood (L): Likelihood of the factor is probability of occurring this risk. Value of probability must be between 0 and 1.

Impact (I): Impact is the effect of the risk factor on the time and cost of the project. Value of impact must be between 0 and 1.

Severity: the level of the damage to the company, its goals and objectives resulting because of Particular risk occurring is severity of that factor. Impact can be calculated by multiplication of Likelihood (L) and Impact (I).

Determined factors are analyzed by two method one is probabilistic analysis and another one is Risk matrix method. And results from the deferent methods are compered.

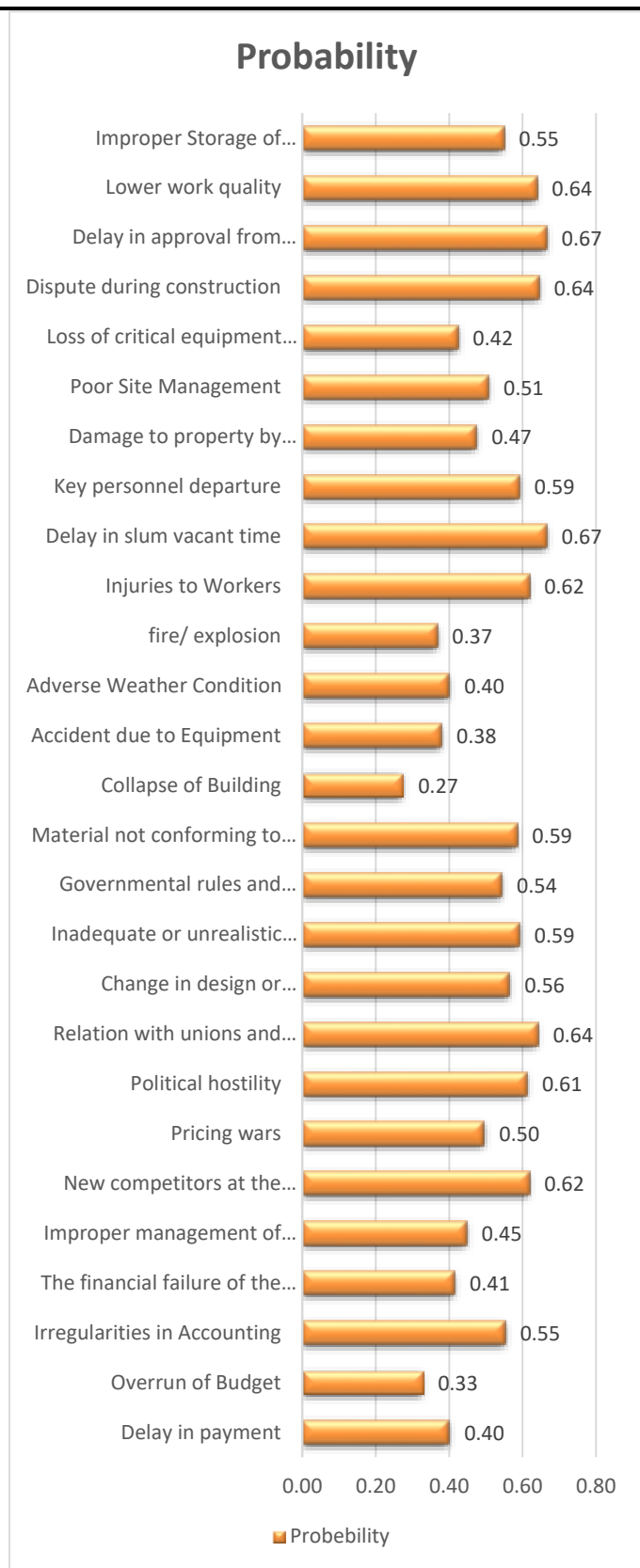


figure 1 Probabilistic analysis

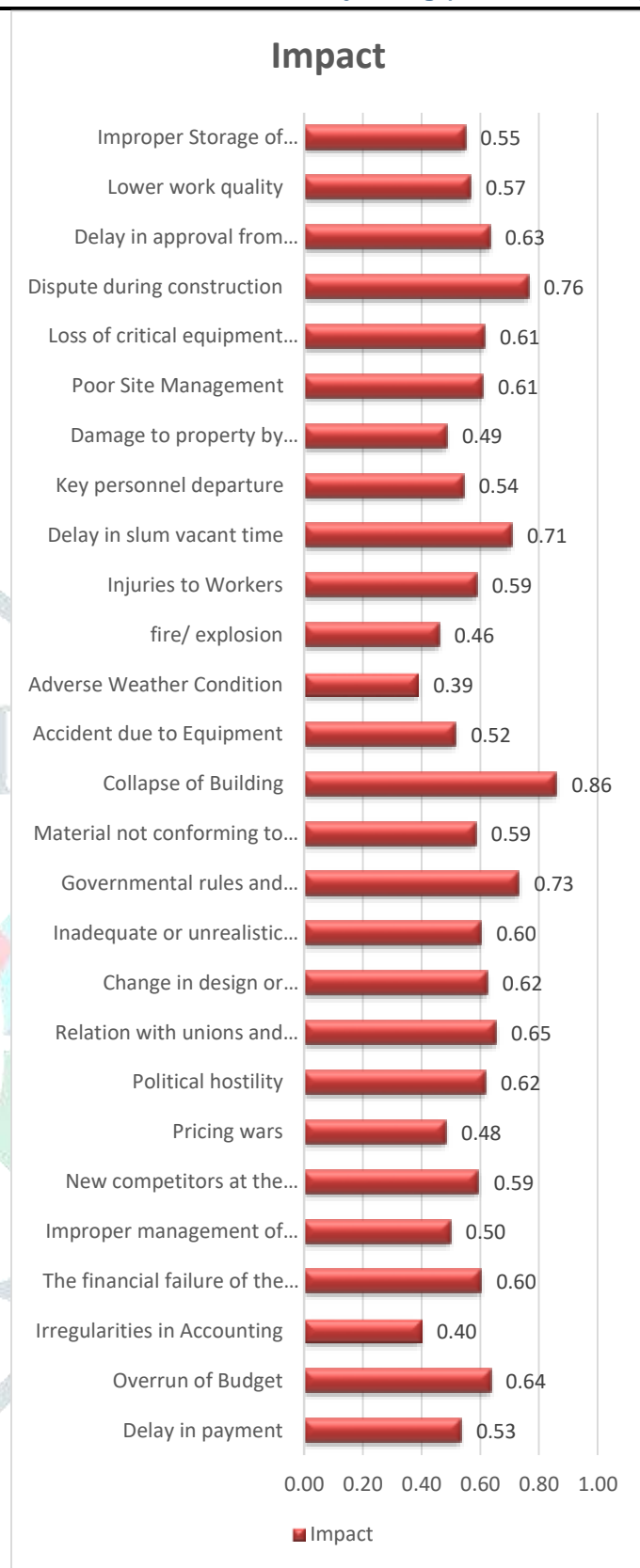


figure 2 Impact analysis

6.2 PROBABILISTIC ANALYSIS

From this probabilistic analysis we can derive that the probability of delay in approval from the authorities is maximum in this type of projects and there are other factors which have higher probability of occurring like delay in slum vacant time, dispute during construction another important factor is relation with unions and suppliers. There are minimum chances of hazards risks.

6.3 IMPACT ANALYSIS

From this probabilistic analysis we can derive that the probability of delay in approval from the authorities is maximum in this type of projects and there are other factors which have higher probability of occurring like delay in slum vacant time, dispute during construction another important factor is relation with unions and suppliers. There are minimum chances of hazards risks.

6.4 SEVERITY ANALYSIS

From this analysis we can derive that the impact of collapse of building is maximum but the probability of this factor is minimum. there are other factors which have higher impact like dispute during construction, governmental rules and regulations, relation with unions and suppliers. We can see that there are some factors which have minimum impact like adverse weather condition, irregularities in accounting, fire/explosion etc.

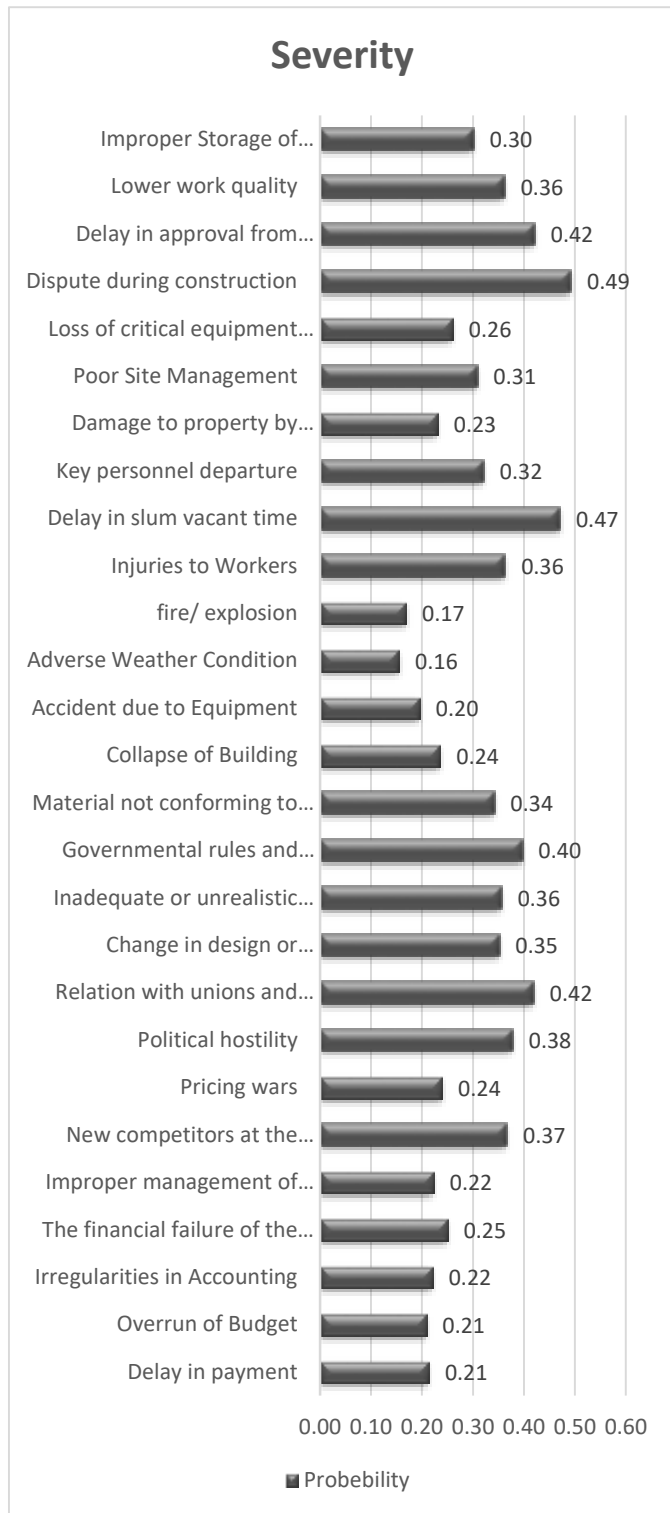


figure 3 Severity analysis

Table 2 Risk matrix table

Probability	Harm severity				
	Negligible	Marginal	Moderate	Critical	Catastrophic
Certain	Medium	Medium	High	Very high	Very high
Likely	Low	Medium	High	High	Very high
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	Medium

Table 3 Risk matrix analysis

Sr. No.	Factors	severity
1	Improper management of cash flow	Low
2	Pricing wars	Low
3	Adverse Weather Condition	Low
4	fire/ explosion	Low
5	Damage to property by public	Low
6	Delay in payment	Medium
7	Overrun of Budget	Medium
8	Irregularities in Accounting	Medium
9	The financial failure of the contractor	Medium
10	New competitors at the time of bidding	Medium
11	Lower work quality	Medium
12	Improper Storage of materials or unviability of materials	Medium
13	Poor Site Management	Medium
14	Inadequate or unrealistic work Planning and scheduling	Medium
15	Material not conforming to the specification	Medium
16	Accident due to Equipment	Medium
17	Injuries to Workers	Medium
18	Key personnel departure	Medium
19	Political hostility	Medium
20	Relation with unions and suppliers	Medium
21	Loss of critical equipment or bed performance of equipment	Medium
22	Change in design or Defective design	Medium
23	Collapse of Building	Medium
24	Delay in approval from authorities	Medium
25	Governmental rules and regulations	High
26	Delay in slum vacant time	High
27	Dispute during construction	High

6.5 RISK

MATRIX ANALYSIS

This method is used for the determining the level of severity using the likelihood of the factor and impact of the factor. Using risk matrix visibility of risk management and assistance for making the decision can be improved.

VII. CONCLUSION

In this study we've used numerous assessment techniques like probabilistic assessment, risk severity assessment, risk matrix assessment. By this assessment we have got positioned some severe threat factors which have maximum possibility of occurring and impact on slum redevelopment projects.

From probabilistic assessment we are able to end that the possibility of delay in approval from the authorities is maximum in this kind of projects and there are unique factors which have higher possibility of occurring like delay in slum vacant time, dispute during the construction, relation with unions and suppliers. There is maximum impact of collapse of building but the possibility is minimum.

there are unique factors which have higher impact like dispute during construction governmental regulations, relation with unions and suppliers. We can see that there are some factors which have minimum impact like damaging weather condition, irregularities in accounting, fire/explosion etc.

The maximum severe detail is dispute. delay in slum vacant time, delay in approval from authorities etc. unique crucial factors which can be severe are relation with unions and suppliers, political hostility. Weather related threat has minimum severity.

7.1 RECOMMENDATIONS AND MITIGATION STRATEGIES

- Maintaining all needed documents and approval letters related to assignment activities also can moreover help to reduce interferences of public and we also can hire prepared and professional personnel for handling the situation of **public interference and disputes**.
- We can introduce disputes treatment techniques for instance Negotiation, Arbitration, Mediation, Expert determination etc.
- Examine the **political connections** of your community partners, donate to the political parties, it is high-quality way to promote the interest in our agency in move returned for **financial and legal support**.
- Proper use of **planning and scheduling** program software to beautify execution of exertions on time.
- Maintain all needed documents in keeping with activities will help in submitting evaluations on time and getting approval on time for works, similarly apply the political connections of your community partners to get **approvals on time**.
- Project manager need to use numerous **material management techniques** on site to reduce over ordering of materials similarly to wastage of unused stocked materials.
- Machineries need to be regularly maintained it will help to reduce breakdowns and **failure of machineries** for the duration of introduction.
- These shape of projects takes extra than 4 years and for the duration of this time employees can get better opportunities in other organization. but at midway of assignment this can be severe for project objective. To mitigate this shape of threat settlement conditions needs to be cratered and signed via personnel.
- In some case, due to heavy scale of assignment, there are chances of **accidents** and Result can be time and **cost overrun** which can directly affects the objectives. To avoid this threat factor proper safety precaution should be taken and all **safety regulation** must be maintained.

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