Construction Companies Failure Factor Analysis using SMART

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Abstract— The construction industry is the second largest industry of the country after agriculture. It makes a significant contribution to the national economy & provides employment to more than 35 million people. Also it contributes about 11% to GDP at present. From the last few years it has been seen imbalanced growth in the Indian construction industry. Much of the slowdown in economy of the past months can be attributed to a slowdown in the infrastructure sector, which accounts for 54% of the construction industry's turnover. As construction is a risky business, the chance of business failure always exists for any construction company. With this view, construction companies have to consider the important factors to prevent business failure and continue to survive in the industry. The increasing number of business failure in construction industry makes the understanding of this issue critical. The aim of this work is to study the factors affecting on Construction Company failure, finding out different major and minor factors affecting on Construction Company failure particularly in Nasik region (Maharashtra) using SMART. The questionnaire survey was carried out among construction companies located in Nasik for the Simple Multi Attribute Rating Technique (SMART).
Key words: Construction Company Failure, Fuzzy AHP, Linguistic Terms, SMART

I. INTRODUCTION

The construction industry in India suffers from the problems such as workmanship defects, time and cost overrun. Poorly coordinated designs, plans and specifications usually lead to poor quality, cost overrun and customer dissatisfaction. A poorly defined scope of work that was made part of the engineering agreement can lead to extra costs incurred by the owner. Poor planning and execution can cause schedule problems that could translate into added contingencies. Poor communications between the disciplines involved in the project can lead to cost overruns due to poorly coordinated designs and specifications. Poor documentation of meetings and understandings often lead to costly revisions of design or could lead to changes during construction where extra work or force account work has to be paid by the owner. Poor or non-existent quality-control and quality-assurance procedures can allow costly errors to go undetected in the design and contract documents. The lack of understanding of construction procedures and techniques by the design professional can have a profound effect on construction feasibility and costs. Inaccurate quantity takeoff that mislead the contractor, inadequate quality-control and quality-assurance programs that lead to costly errors. Construction sector faces number of problems like poor quality of material/work, lack of skilled employees/labours, failure to meet schedules/deadlines, design flaws, errors in execution of plan, improper communications/co-ordination, improper management of resources, etc.

II. NEED OF THE STUDY

The construction business has many risks, which could lead to failure, that come from the sensitivity of the business to economic cycles and from high level competition. As there are large numbers of contractors, it's easy to establish a new firm. Since, the entry into the construction business is easy; implementation could easily be poor and unorganized, which increase the probability of a construction company failure.

The increasing number of business failure in construction makes the understanding of this issue critical. As per the twelfth five year plan 40% investment share is given for infrastructure sector. Large numbers of projects are suffering time and cost overrun. So the aim of this work is to study the factors affecting on Construction Company failure, finding out different major and minor factors affecting on Construction Company failure.

III. PROBLEM STATEMENT

The increasing number of business failure in construction makes the understanding of this issue critical. The study is to be conducted by taking questionnaire interview of construction firms and assigning ranking of different factors according to their importance and finding out which factor is major and which one is minor effect on failure of private Construction Company in Nashik.

IV. LITERATURE REVIEW

There have been various theoretical and financial models designed to study the factors affecting construction company failure.

After studying the literature on causes of construction company failure it has been reviewed that there is very less literature available which suit to Indian construction industry. So with this view it was decided to study failure factors for Nashik construction industry sector. Following are the construction company failure factors identified from the literature survey for further study.

Fig. 1: Failure Factors affecting construction companies

V. METHODOLOGY

As shown in table 1 there are 8 possible main factors and 44 sub factors that were felt to have an effect on the construction business failure for small, medium and large sized companies in Nashik region are finalized. A

questionnaire survey was carried out in Nashik city with 40 construction companies for SMART Method. The data collected was analysed using SMART method to determine the weightage of the critical factor affecting construction company failure. Finally, the factors are ranked according to their weightages.

No.	Main factors	Sub factors
1.	Lack of business experience	Difficulties with cash flow
		Poor relationship with the client
		Lack of proper planning
		Lack of communication management
		Lack of financial management
		Difficulty in acquiring work
2.	Country's economic condition	Economic crisis
		Increase in material prices
		Increase in interest rate
		Increase in exchange rate
		Absence of price variation clause
3.	Lack of managerial experience	Poor decision-making
		Defective financial control
		Difficulty in establishing qualified and experienced project team
		Poor supervision of jobs
		Lack of technical expertise
		Under-use of technology
4.	Personal attributes	Honesty and reliability
		Leadership
		Problem solving ability
		Communication skill
		Job experience
		Reputation
		Entrepreneurial skills
		Self confidence
		Flexibility
5.	Low profit margin	Competition
		Decrease in job quality
		Difficulty in cash transfer
		Problems in cash flow
6.	Difficulties in winning project	Financial condition of the company
		Financial condition of the country
		Competition
		Lack of qualified and experienced technical staff
		Site selection
7.	Overtrading	Increase in need for cash
		Difficulty in establishing qualified project teams
		Difficulty in job control
		Shortage of experienced workforce
8.	Corruption	Corruption at government employer level
		Corruption due to politician
		Corruption at companies managerial level
		Corruption at companies employer level
		Due to corruption overtrading

Table 1: Main and sub factors affecting construction company failure

A. *Simple multi attribute rating technique for failure factor analysis*

Simple Multi Attribute Rating Technique (SMART) is used for determining the ranking of the important factor causing company failure in this project. SMART is based on Ward

Edward's work which he introduced in 1971. It has been widely applied because of the simplicity of both the responses required of the decision maker and the manner in which the responses are analyses. It is an extension of direct rating techniques. The method went through many modification and improvement by Edwards and Barron in

1994 and Goodwin and Write in 2004. SMART is a linear additive model. This means that an overall value of a given alternative is calculated as the total sum of performance score (value) of each criterion (attribute) multiplied with the weight of that criterion.

In smart the performances of the alternatives are assessed directly, the decision maker is asked to rank each of the attribute from scale (0 to 10). The different scales of the criteria are converted to a common scale (from 0 to 1) by means of a value function. Importance was decided on basis of expert talk opinion and discussion with the people who are actually in the field from last 15 years in Nashik. The value function of the criteria is derived through asking the decision maker, series of questions on his preferences towards different changes in the attribute level.

	Sub factors	Average Score	Weightage
1	Lack of proper planning	X1	W9= (X1/Y) X W1
2	Lack of financial management	X2	W10= (X2/Y) X W2
3	Difficulties with cash flow	X3	W11= (X3/Y) X W3
4	Poor relationship with the client	X4	W12= (X4/Y) X W4
5	Lack of communication management	X5	W13= (X5/Y) X W5
6	Difficulty in acquiring work	X6	W14= (X6/Y) X W6
	Total	Y=(X1+ X2+X3+ X4+X5+ X6)	= (W9+W10+W11+ W12+W13+W14) = W1

Table 2: Sample calculation for main factors for construction company failure

After questionnaire interview of 40 companies carried out average score and weightage are calculated for each main and sub factors using Simple multi attribute rating Technique. Following are the Steps Follows for Calculation in Project

1) Step 1) after conducting survey and questionnaire interviews find out a score for each factor.
Average Score = (S1 + S2 + S3 +......SN) /N
> Where,
> S1, S2, S3....SN= Scale given for that particular factor by decision makers.
> N = Total no. of companies interview carried out.

2) Step 2) Next step is finding out Weightage for main factors

	Main factors	Average Score	Weightage
1	Lack of business experience	a	W1 = (a / T)
2	Lack of managerial experience	b	W2 = (b / T)
3	Overtrading	c	W3 = (c / T)
4	Personal attributes	d	W4 = (d / T)
5	Corruption	e	W5 = (e / T)
6	Low profit margin	f	W6 = (f / T)
7	Difficulties in winning project	g	W7 = (g / T)
8	Country's economical condition	h	W8 = (h / T)
	Total	T=(a+b+c+d+e+f+g+h)	=(W1+W2+W3+W4+W5+W6+W7+W8)

Table 3: Sample calculation for sub factors of lack of business experience

In Table II a, b, c, d, e, f, g, h are the scores of main factors and W1, W2, W3, W4, W5, W6, W7, W8 are the weightage of the main factors. Total of average score calculated by addition of all average scores of main factors given by respondents. Weightage calculated for each main factor by dividing average score of that main factor to total of average score of all main factors.

After calculating weightage for main factors having a highest value of weightage are the most important failure factors. Those factors are important failure factor for construction company failure.

3) Step 3) then finding out Weightage of Sub-Factors.
In Table III; X1, X2, X3, X4, X5, X6 are the scores of sub factors and W9, W10, W11, W12, W13, W14 are the weightage of sub-factors. Total average score for sub factors calculated by addition of all average scores of sub factors given by respondents. Weightage calculated for each sub factor by dividing average score of that sub factor to total of average score of all sub factors and multiplied by weightage of main factor of that sub factor.

According to the above third step for other all remaining sub factors similarly a weightage is also found out. After calculating weightage for all main and sub factors having a highest value of weightage are the most important failure factor. Those factors are responsible for construction company failure.

VI. RESULT

Using fuzzy SMART method, the final ranking and weightage of the main factors and the sub factors were calculated and shown in table IV. Also, the final results of alternatives for each factor were summarized in table XII.

Main factor	Sub factor	Weights	Rank
Lack of business experience	Lack of financial management	0.0305	1
	Lack of proper planning	0.0289	2
	Difficulties with cash flow	0.0271	3
	Lack of communication management	0.0238	4

	Poor relationship with the client	0.023	5
	Difficulty in acquiring work	0.0193	6
Lack of managerial experience	Poor decision-making	0.0287	1
	Difficulty in establishing qualified & experienced project team	0.0282	2
	Defective financial control	0.0273	3
	Lack of technical expertise	0.024	4
	Poor supervision of jobs	0.0237	5
	Under-use of technology	0.0192	6
Overtrading	Difficulty in establishing qualified project teams	0.0398	1
	Increase in need for cash	0.0357	2
	Shortage of experienced workforce	0.0356	3
	Difficulty in job control	0.0332	4
Corruption	Corruption due to politician	0.0274	1
	Corruption at government employer level	0.0253	2
	Due to corruption overtrading	0.022	3
	Corruption at companies managerial level	0.0205	4
	Corruption at companies employer level	0.0181	5
Personal attributes	Leadership	0.0192	1
	Honesty and reliability	0.0176	2
	Reputation	0.0173	3
	Self confidence	0.0163	4
	Entrepreneurial skills	0.0161	5
	Problem solving ability	0.0158	6
	Job experience	0.0146	7
	Communication skill	0.0135	8
	Flexibility	0.0128	9
Low profit margin	Competition	0.0307	1
	Decrease in job quality	0.0291	2
	Problems in cash flow	0.0274	3
	Difficulty in cash transfer	0.025	4
Difficulties in winning project	Financial condition of the company	0.0223	1
	Lack of qualified & experienced technical staff	0.0208	2
	Site selection	0.0205	3
	competition	0.0181	4
	Financial condition of the country	0.0122	5
Country's economical condition	Increase in material prices	0.0211	1
	Absence of price variation clause	0.02	2
	Increase in interest rate	0.0184	3
	Economic crisis	0.0148	4
	Increase in exchange rate	0.0148	5

Table 4: Weights and ranks of sub factors for SMART Method

VII. CONCLUSION & RECOMMENDATION

Lack of business experience, lack of managerial experience and overtrading were identified as the most important main failure factors resulting in construction company failure in Nashik.

Also Difficulty in establishing qualified project teams, poor decision making, and lack of proper planning was perceived to be the most important sub-factor resulting in company failure when considering the weightage of importance of the sub factors identified.

Following Recommendations Suggested for Construction Companies in Nashik Region:

A. Lack of Business Experience

1) Good Strategy
Sound business strategy tied to organization's core competency, strategy is interpreted into what gets done in the organization and the benefits are being realized.

2) Experience
Starting of firm experience is essential.

3) Decision making
Ability to make timely decision. The business is quickly solving problem and making sound, rapid decision as required to succeed.

4) Proper planning
Planning about business strategies and to know clear about goals and objectives.

5) Financial management
Proper cash flow management effectively lead to Success of company.

B. Lack of managerial experience

Manager is key role in any company. They should possess following roles and responsibilities-

− Manager should have proper experience.
− Manager should have leadership quality.
− Manager should have motivating skill.
− Manager should know their responsibility.
− Manager should have good communication skill.
− Manager should have organizational skill.
− Manager should take decision effectively and timely.
− Manager should ready to always changes.

C. Overtrading

Depending upon financial condition of company work is to be undertaken. If financial capacity up to X then goes to expand business up to only 2 times X not more than this. If expands more than 2 times X chances of overtrading and sub sequent failure of company.

D. Establishing qualified project team

Following points to be considered while establishing the project team for the construction company.
− Team should have relevant past experience.
− Team should have Competence.
− Team members must have motivational skills.
− Team members must have good communication among them.
− Team should have technical capability.
− There must be control system in team members.

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