

PRIORITISING FACTORS AFFECTING SUPPLY CHAIN MANAGEMENT: A CASE STUDY OF SURAT CITY

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Abstract — The success of a construction project is evaluated through the parameters of quality, cost and time. Construction companies use tools and techniques to improve supply chain management in the construction industry. The main objective of the study is to improve supply chain management in the construction industry. This research and data have collected using the RII (Relative Importance Index) method. Evaluate the factors affecting supply chain management with the help of the RII method. 40 factors are identified from various works of literature, which influence supply chain management in the construction industry. For this, the pilot survey has done first and found 30 relevant factors that affect supply chain management in the construction industry. Studies based on surveys and construction sites for data collection of questionnaires conducted by RII (Relative Importance Index). 109 questionnaires were distributed to various respondents in the Surat district. This study received 80 responses. The 80 respondents include 21 contractors, 7 consultants, 42 site engineers and 10 academics who participated in the survey of the field.

Keywords—Prioritising, Supply chain management, Relative importance index (RII), Pilot study, Likert scale

I. INTRODUCTION

SCM as a network of establishment and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products and the distribution of these finished products to customers.

The supply chain is the network of organizations that are involved through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer. SCM is the "strategic and systematic coordination of the traditional business functions".

Due to extra demand for houses and our country requires a new technology and scientific changes, without new technology and scientific change it is impossible to implement supply chain management process in construction industry. Increase in cost of supplying materials, equipment and human resources are not having proper efficiency. Problems during taking actions by different work groups in a civil project lead to huge expanses and even failure in civil project.

Companies have mange supply chains for decades but never in history did they have kind of ruthless pressure that they face now. The supply chain in their view lifts the mission of logistic to become top management concern top management can assure that conffliction functional objectives along the supply chain are reconciled and balanced. Supply chain management indicate that then research tend to fall within four mainly distribution, production, strategic procurement and industrial organizational economics. It can say that success in civil project evaluated using parameters of quality, price and time of completing project.

II. OBJECTIVES

- To identifying and prioritizing factors affecting supply chain management in construction industries.
- To study these factors using RII (Relative Importance Index) method.

III. RESEARCH METHODOLOGY

Data were collected through a questionnaire. The questionnaire is divided into two main parts. Part I deals with general information for respondents such as contractors, site engineers, consultants, educational exports, answering questions related to their experience in the construction industry and requesting their opinions about factors affecting supply chain management . Part II contains the list of identified factors affecting supply chain management in the construction industry. The data were analyzed by the RII method.

III.I RELATIVE IMPORTANCE INDEX (RII) METHOD

Based on the collected data analysis was done to find out the most appropriate methodology to be applied for the factors affecting supply chain management. The data collected was analyzed through the following statistical techniques and indices: Relative Importance Index technique: The Relative Importance Index method helps to determine the relative importance of the various factors affecting the supply chain. A four-point Likert scale ranging from 1 (less significant) to 4 (extremely important) has been adopted and converted into relative importance indices (RII) for each factor:

$$RII (\%) = \frac{4 n_4 + 3 n_3 + 2 n_2 + 1 n_1}{4 (n_1 + n_2 + n_3 + n_4)} * 100$$

Where: n1, n2, n3, and n4 = number of respondents who chose 1 with no effect; 2 small effects; 3 for moderate effect; 4 for strong impact; n each factor (from 1 to 4) has a weight assigned by the respondents. A is the highest weight (i.e. 4 in this case). The RII value ranges from 0 to 4 (0 not inclusive), the higher the RII price, the more important factors affecting the supply chain.

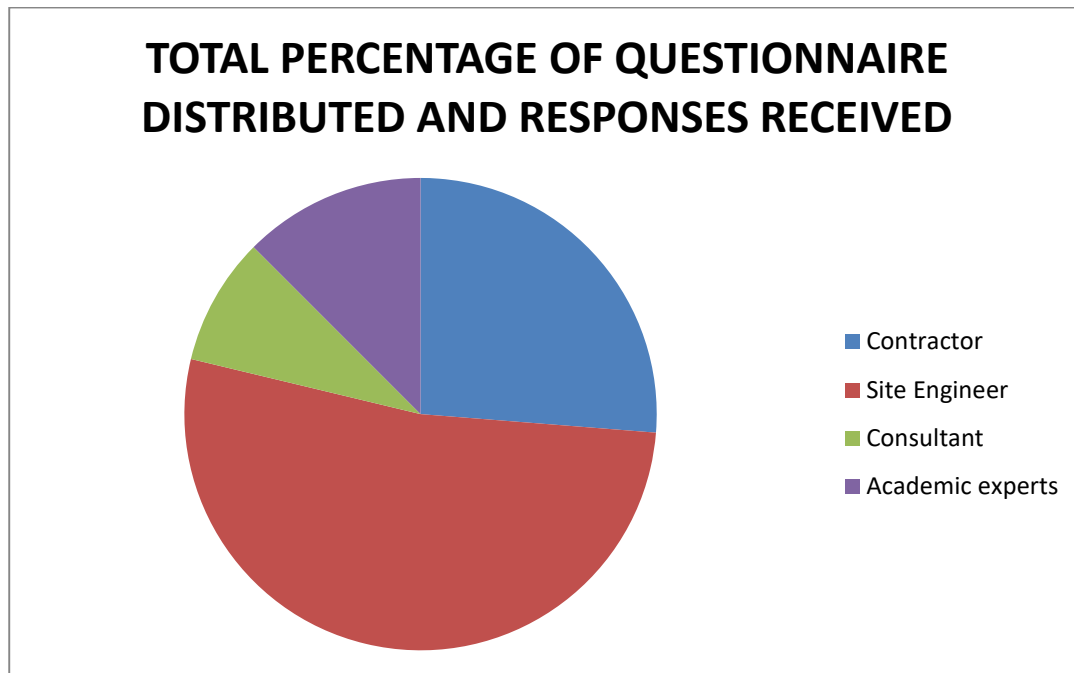
RII was used to rank the various factors affecting supply chain management. These rankings made it possible to overestimate the relative importance of the factors, as perceived by respondents (i.e. site engineers, contractors, consultants, academic exports). Each individual factor considered by all respondents should be used to assess general and overall rankings to give an overall picture of the RII methodology used in supply chain management.

IV. COLLECTION OF DATA

A questionnaire was designed based on factors affecting supply chain management in the construction industry for identification from the literature review. The main objective of the questionnaire was to identify the probability of occurrence and impact of each supply chain factor related to the construction industry. Then, a pilot survey was carried out to validate the questionnaire. Valid questionnaires and an expert survey were conducted to collect primary data. Data was collected from various registered civil engineers, consultants, civil contractors and educational experts. A total of 30 numbers are identified in the literature study. Questionnaires were distributed by telling various stakeholders about the purpose of the research and their willingness to participate in the research. Civil engineers, Contractors, Academic experts and Consultants once showed initial desire. He was given a questionnaire. A total of 109 questionnaires were distributed to various respondents in the Surat district. This study received 80 responses. A total of 80 respondents include 21 contractors, 7 consultants, 42 site engineers and 10 academicians who participated in the survey of this field. His responses were taken for this analysis.

Table 1
Total Percentage of Questionnaire Distributed and Responses Received

Sr. No	Respondent	Questionnaire Distributed	Responses Received	Percentage of Responses
1	Contractor	30	21	70%
2	Site Engineer	53	42	79.2%
3	Consultant	14	7	50%
4	Academic experts	12	10	83.3%



V. DATA ANALYSIS

V.I Data analysis by RII (Relative Importance Index) method

The data were gathered through a survey & analysed using Relative Importance Index (RII) Technique. RII technique: The process used in analysing the results was aimed at establishing the relative importance of the various factors affect Supply chain management in construction industry for project failure/Delay by ranking factors by RII technique. The questionnaire gave each respondent the opportunity to identify the factors most likely to be risked by giving a “very important, important.....etc.” response. The primary data collected from the first part of the questionnaire was analysed from the point of view of the Contractors, Consultants, Academic exports and Site Engineers. A total of 80 numbers of respondents include 21 contractors, 7 Consultant, 42 site engineers and 10 academics who participated in the survey of this field. His responses were taken for this analysis.

Table 2
Overall Ranking by RII Method

Rank	Factor affecting supply chain management	RII
1.	Long variable lead time	0.699
2.	Not proper resource management	0.692
3.	Project locations	0.687
4.	Poor financial stability	0.679
5.	Inaccurate demand forecasting	0.676
6.	Demand variability	0.676
7.	Delay payment	0.670
8.	Lack of contractor experience	0.670
9.	Poor communication between labours and Managers	0.650
10.	Procurement	0.647

VI. CONCLUSION

There are many inter-organizational problems, such as late delivery of materials, incorrect delivery and incorrect information transfer to the supply chain process of the content, resulting in missed performance. Efficient material supply chain processes are critical to the success of any construction project and can be the deciding factor between a successful project and a project full of delays and claims. The primary objective of this research was to develop a materials supply chain process framework that enables contractors to require the right amount of material, with the required volume and time required.

Lead-time is the time from the start of a process to its completion. Companies review leadership time in manufacturing, supply chain management, and project management during pre-processing, processing, and later stages of processing. By comparing results against established benchmarks, they can determine where inefficiencies exist. Reducing lead-time can facilitate operations and increase productivity, production, and revenue. Conversely, now lead-time negatively affects sales and manufacturing processes. Lead a period of substantial investment without profit. Companies that have a minimum amount of money are forced to invest. Returns will be received gradually (for example, at least one predetermined amount must be earned). As well as to maximize profit-oriented objective functions. A time limit is given that makes sense to estimate it. Feedback on customer behaviour, profit or revenue. Changing the supply chain management system yields financial investment, time and human resources. If it is not implemented properly, wasteful labour, service redundancy and missed deadlines will be eliminated, resulting in significant costs. To avoid these unnecessary costs, high-quality logistics providers always complete an in-depth analysis before implementing changes in the supply chain. This ensures that they fully understand the customer's freight schedule, consolidation opportunities, and last-mile logistics needs before developing and implementing a new system. There is a term in supply chain management called the "bullwhip effect" that is used to describe variability. The term describes large swings in inventory in relation to changes in demand from consumers. Since customer demand cannot be estimated and other resources must be maintained in view of demand. These forecasting methods depend to a large extent on statistical data and sometimes these data may not be accurate. To overcome this, manufacturers keep safety stock at their stores. Demand should not be managed with forecasts alone and all departmental activities need to be controlled by proper planning.

Proper resource management does not affect excessive supply chain management because well-managed resources cannot be damaged and we cannot meet the demand for resources at peak times. Therefore, we need to properly manage the storage of resources, so that can greatly help in reducing the financial pressure on supply chain management.

The present study focuses on identifying the important factors affecting supply chain management of construction projects in Surat Gujarat region of India. Factors are studied based on the relative importance of their phases. A total of 30 factors were identified through literature studies and expert opinion. This study received 80 responses. Out of this, 109 respondents are from Surat city. The respondents were 21 contractors, 7 consultants, 42 site engineers and 10 academic experts.

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