

IDENTIFICATION OF HURDLES IN IMPLEMENTATION OF SCM IN BUILDING CONSTRUCTION AS PER DIFFERENT STAKEHOLDER'S POINT OF VIEW

¹Binali Patel, ²Neeraj Sharma, ³Bhavin Kashiyani, ⁴Rushabh Shah

¹Student of Masters of Construction Engineering and Management, ²Professor, ^{3,4}Assistant Professor

¹Department of Civil Engineering,

¹SNPIT & RC, UmraKh, Bardoli, Gujarat, India

Abstract- Supply Chain Management (SCM) practices are at very initial phase in developing countries like India due to existence of many hurdles. In present research, an effort will be made to identify and evaluate hurdles in implementing SCM in Indian construction projects as per different stakeholder's point of view. Literature review approach and experts' inputs (questionnaire survey) has been use to identify hurdles in implementing SCM. There were seven stakeholders involved in supply chain i) contractor ii) Developer/Builder iii) Material supplier iv) Project manager v) Site Engineer vi) Sub contractor vii) Supervisor whom we have chosen for the questionnaire distribution. From the data collected by questionnaire survey top hurdles are identified by IMPI (Importance Index) method. We got different results from different stakeholder's point of view.

Index terms: Supply Chain Management, Hurdles, IMPI method

I. INTRODUCTION

Two issues invite a discussion about construction supply chains: lagging productivity development and increased economic weight of the supply chain. The productivity increase in building construction has been slow. The traditional approach to the control of the construction supply chain is not adequate any more, and a shift of methods for managing the supply chain is needed. From the end of the 1980s, the construction industry has seen the launch of a number of supply chain management (SCM) initiatives. However, until now these have been scattered and partial.

Supply Chain Management (SCM) is an important way to track goods across departments in real-time, which can be a huge advantage. Despite this, there are several supply chain challenges that are faced. Supply chain managers face issues on a daily basis which require direct attention and quick response. This research has the following objectives:

1. Identification of various Hurdles in implementing SCM in construction project as per different stakeholder's point of view;
2. Identification of top 15 hurdles affecting building construction projects

Initial top hurdles are identified from the literature review and pilot survey. Questionnaire was designed based on the Hurdles identified from the literature review and pilot survey. Further data analysis has been done using IMPI method for finding top 15 hurdles.

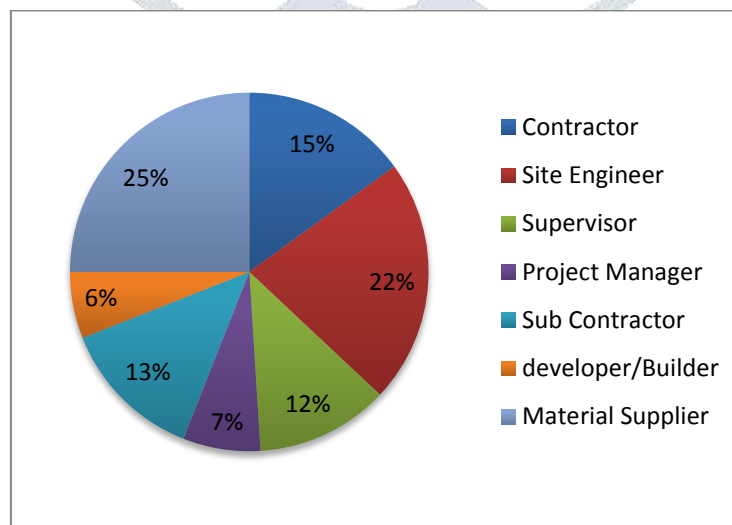


Fig 1: Percentage of different stakeholder's responses

II. RESEARCH METHODOLOGY

The research methodology for study contains two phases. In first phase the hurdles identified by literature review and pilot study. In second phase identified hurdles are analysed by IMPI method for identification of most to least affecting hurdles.

Table 1: Total Hurdles Identified from Literature Review and Pilot study

SR. NO	Hurdles
1	Improper supplier/ partner relationship management
2	Improper planning management
3	Improper risk management
4	Shorter lead time
5	Supplier base consolidation
6	Frequent changes to schedule
7	Improper safety and quality management
8	Globalization without proper information about market
9	Complexity
10	Compliance
11	Cost issue
12	Environmental uncertainty
13	Lack of Govt. support
14	Uncertainty aspects from overseas
15	Bad company environment
16	Dependence on multiple suppliers
17	Lack of information
18	Lack of new equipments
19	Lack of expert employee
20	Lack of Time
21	Lack to legislative frame work
22	Lack of knowledge among SC members
23	Lack of trust among SC members
24	Technical Obstruction
25	Improper Location and Transportation decision
26	Improper Procurement management
27	Less inventory
28	Frequent stock outs

A. Identification of top Hurdles in implementation of SCM

In Importance Index Technique, for each Hurdle two questions were asked: What is the frequency of occurrence for this hurdle? And what is the degree of severity of this hurdle on project delay? Both frequency of occurrence and severity were categorized on a four-point scale. Frequency of occurrence is categorized as follows: always, often, sometimes and rarely (on 4 to 1 point scale). Similarly, degree of severity was categorized as follows: extreme, great, moderate and little (on 4 to 1 point scale).

Frequency index: A formula is used to rank causes of delay based on frequency of occurrence as identified by the participants.

$$\text{Frequency Index (F.I.) (\%)} = \sum a (n/N) * 100/4 \dots\dots(1.1)$$

Where, 'a' is the constant expressing weighting given to each response (ranges From 1 for rarely up to 4 for always), 'n' is the frequency of the responses, and 'N' is total number of responses.

Severity index: A formula is used to rank causes of delay based on severity as indicated by the participants.

$$\text{Severity Index (S.I.) (\%)} = \sum a (n/N) * 100/4 \dots\dots(1.2)$$

Where a is the constant expressing weighting given to each response (ranges from 1 for little up to 4 for severe), n is the frequency of the responses, and N is total number of responses. Importance index: The importance index of each cause is calculated as function of both frequency and severity indices, as follows:

$$\text{Importance Index (IMPI) (\%)} = [\text{F.I.} * \text{S.I.}] / 100 \dots\dots(1.3)$$

B. Result of IMPI method

1) As per Project Manager

Table 2: Top 15 hurdles in SCM as per Project Manager view

Sr. No	Hurdles	FI	SI	IMPI
1	Technical Obstruction	83.93	80.36	67.44
2	Improper Location and Transportation decision	75.00	82.14	61.61
3	Improper supplier/ partner relationship management	75.00	76.79	57.59

4	Cost issue	75.00	75.00	56.25
5	Lack of expert employee	73.21	76.79	56.22
6	Lack of new equipment	73.21	73.21	53.60
7	Lack of Time	71.43	73.21	52.30
8	Lack of information	71.43	71.43	51.02
9	Lack of trust among SC members	73.21	69.64	50.99
10	Lack of knowledge among SC members	69.64	69.64	48.50
11	Frequent stock outs	64.29	73.21	47.07
12	Bad company environment	64.29	69.64	44.77
13	Improper safety and quality management	71.43	62.50	44.64
14	Improper planning management	60.71	71.43	43.37
15	Frequent changes to schedule	66.07	62.50	41.29

2) As per Site Engineer

Table 3: Top 15 hurdles in SCM as per Site Engineer view

Sr. NO.	Hurdles	FI	SI	IMPI
1	Cost issue	82.93	83.54	69.27
2	Improper Location and Transportation decision	76.22	76.83	58.56
3	Improper supplier/ partner relationship management	74.39	76.83	57.15
4	Lack of Time	76.22	73.17	55.77
5	Lack of new equipment	71.34	71.34	50.90
6	Lack of expert employee	67.07	73.17	49.08
7	Frequent changes to schedule	65.24	73.78	48.14
8	Lack of information	66.46	70.73	47.01
9	Technical Obstruction	63.41	72.56	46.01
10	Improper safety and quality management	61.59	74.39	45.81
11	Environmental uncertainty	60.37	73.17	44.17
12	Less inventory	60.37	70.12	42.33
13	Improper planning management	59.76	66.46	39.72
14	Lack of trust among SC members	62.80	62.80	39.44
15	Lack of knowledge among SC members	59.76	63.41	37.89

3) As per Material Supplier

Table 4: Top 15 hurdles in SCM as per Material Supplier view

Sr. No	Hurdles	FI	SI	IMPI
1	Cost issue	84.13	83.17	69.98
2	Improper supplier/ partner relationship management	80.77	83.65	67.57
3	Improper Location and Transportation decision	72.60	70.19	50.96
4	Technical Obstruction	65.38	70.67	46.21
5	Improper planning management	64.42	68.75	44.29
6	Frequent changes to schedule	61.54	67.31	41.42
7	Environmental uncertainty	61.06	61.06	37.28
8	Lack of Time	58.17	62.98	36.64
9	Improper safety and quality management	53.37	63.94	34.12
10	Lack of expert employee	56.73	59.13	33.55
11	Lack of information	56.73	57.69	32.73
12	Lack of new equipment	57.21	55.77	31.91
13	Lack of trust among SC members	52.88	57.21	30.26
14	Frequent stock outs	54.81	53.85	29.51
15	Bad company environment	52.88	55.77	29.49

4) As per Developers / Builders,

Table 5: Top 15 hurdles in SCM as per Developers / Builders view

Sr. No	Hurdles	FI	SI	IMPI
1	Lack of new equipment	75.00	85.00	63.75
2	Improper supplier/ partner relationship management	80.00	77.50	62.00
3	Lack of Time	72.50	85.00	61.63
4	Cost issue	77.50	75.00	58.13
5	Lack of information	67.50	80.00	54.00
6	Lack of expert employee	67.50	80.00	54.00
7	Improper Location and Transportation decision	82.50	62.50	51.56
8	Frequent changes to schedule	65.00	72.50	47.13
9	Bad company environment	65.00	70.00	45.50
10	Improper safety and quality management	67.50	65.00	43.88
11	Technical Obstruction	60.00	70.00	42.00
12	Less inventory	60.00	70.00	42.00
13	Frequent stock outs	57.50	72.50	41.69
14	Lack of trust among SC members	62.50	65.00	40.63
15	Environmental uncertainty	60.00	67.50	40.50

5) As per Contractors,

Table 6: Top 15 hurdles in SCM as per Contractors view

Sr. No	Hurdles	FI	SI	IMPI
1	Cost issue	80.36	81.25	65.29
2	Improper supplier/ partner relationship management	77.68	75.89	58.95
3	Technical Obstruction	75.00	78.57	58.93
4	Improper Location and Transportation decision	73.21	75.89	55.56
5	Lack of Time	73.21	71.43	52.30
6	Lack of knowledge among SC members	72.32	67.86	49.08
7	Lack of new equipment	65.18	71.43	46.56
8	Improper safety and quality management	61.61	74.11	45.66
9	Lack of expert employee	65.18	69.64	45.39
10	Lack of trust among SC members	69.64	65.18	45.39
11	Frequent stock outs	64.29	70.54	45.34
12	Frequent changes to schedule	64.29	68.75	44.20
13	Bad company environment	63.39	66.07	41.88
14	Lack of information	62.50	66.96	41.85
15	Improper planning management	60.71	64.29	39.03

6) As per Supervisor,

Table 7: Top 15 hurdles in SCM as per Supervisor view

Sr. No	Hurdles	FI	SI	IMPI
1	Improper Location and Transportation decision	83.87	82.25	68.99
2	Cost issue	82.25	83.06	68.33
3	Lack of Time	75.80	77.41	58.69
4	Technical Obstruction	79.83	73.38	58.59
5	Improper supplier/ partner relationship management	76.61	75.80	58.08
6	Environmental uncertainty	69.35	76.61	53.13
7	Lack of trust among SC members	73.38	71.77	52.67
8	Lack of expert employee	67.74	77.41	52.45
9	Frequent changes to schedule	70.96	71.77	50.94
10	Improper safety and quality management	68.54	72.58	49.75
11	Lack of new equipment	70.16	70.16	49.23
12	Lack of knowledge among SC members	70.96	69.35	49.22
13	Lack of information	66.12	69.35	45.86

14	Bad company environment	66.93	67.74	45.34
15	Improper planning management	61.29	73.38	44.98

7) As per Sub-Contractor,

Table 8: Top 15 hurdles in SCM as per Sub-contractor view

Sr. No	Hurdles	FI	SI	IMPI
1	Cost issue	78.57	80.35	63.14
2	Improper supplier/ partner relationship management	75.00	79.46	59.60
3	Technical Obstruction	76.79	76.78	58.96
4	Improper Location and Transportation decision	72.32	69.64	50.37
5	Lack of new equipment	66.96	69.64	46.64
6	Lack of information	66.96	66.96	44.84
7	Frequent changes to schedule	65.18	68.75	44.81
8	Lack of Time	64.29	69.64	44.77
9	Improper safety and quality management	63.39	66.07	41.88
10	Frequent stock outs	63.39	65.17	41.32
11	Lack of expert employee	62.50	66.07	41.29
12	Lack of knowledge among SC members	64.29	61.60	39.60
13	Lack of trust among SC members	60.71	60.71	36.86
14	Environmental uncertainty	57.14	61.60	35.20
15	Improper Procurement management	56.25	62.50	35.16

III. CONCLUSION

we can make project more efficient by minimise the above hurdles in supply chain management. By focusing on the most to least important hurdles project can run smoothly and effectively. It is identified that following 5 problems are most likely to occur in SCM as per different stakeholder's point of view:

1. Cost Issue
2. Improper supplier/ partner relationship management
3. Improper Location and Transportation decision
4. Technical Obstruction
5. Lack of Time

IV. ACKNOWLEDGEMENT

We are very thankful to SNPIT & RC, Vidyabharti trust, Guide, Co-guide and anonymous reviewers for their constructive feedback.

V. REFERENCES

- [1] A.K. Digalwar , Ganneri Giridhar Interpretive Structural Modeling Approach for Development of Electric Vehicle Market in India Procedia CIRP 26 (2015) 40 – 45
- [2] Ani Saifuza Abd Shukor, Mohammad Fadhil, Rohana Mahbub, Faridah Halil Towards Improving Integration of Supply Chain in IBS Construction Project Environment Procedia - Social and Behavioral Sciences 222 (2016) 36 – 45
- [3] Douglas M. Lambert, Matias G. Enz, Issues in Supply Chain Management: Progress and potential, Industrial Marketing Management xxx (2016) xxx–xxx
- [4] Gerald Reiner, Michael Trcka, Customized supply chain design: Problems and alternatives for a production company in the food industry. A simulation based analysis, Int. J. Production Economics 89 (2004) 217–229
- [5] Jolanta Tamošaitienė, Edmundas Kazimieras Zavadskas, Inga Šileikaitė, Zenonas Turskis , A novel hybrid MCDM approach for complicated supply chain management problems in construction, Procedia Engineering 172 (2017) 1137 – 1145
- [6] K. Mathiyazhagan, Kannan Govindan b, A. NoorulHaq, Yong Geng An ISM approach for the barrier analysis in implementing green supply chain management Journal of Cleaner Production xxx (2013) 1-15
- [7] Mohammad Fadhil Mohammad, Ani Saifuza Abd Shukor, Rohana Mahbub, Faridah Muhammad Halil Challenges in the Integration of Supply Chains in IBS Project Environment in Malaysia, Procedia - Social and Behavioral Sciences 153 (2014) 44 – 54
- [8] Ruben Vrijhoef, Lauri Koskela The four roles of supply chain management in construction, European Journal of Purchasing & Supply Management 6 (2000) 169 } 178
- [9] Sunil Luthra a, Suni I Luthra a, Abid Haleem c Hurdles in implementing sustainable supply chain management: An analysis of Indian automobile sector, Procedia - Social and Behavioral Sciences 189 (2015) 175 – 183
- [10] Tushar Khattri, Sohni Agarwal, Vaishant Gupta ,Mukesh Pandey critical causes of delay in construction project in jhansi region,International Research Journal of Engineering and Technology(IRJET)
- [11] Verena Schmid, Karl F. Doerner, Gilbert Laporte, Rich routing problems arising in supply chain management, European Journal of Operational Research 224 (2013) 435–448