

A STUDY ON SUPPLY CHAIN MANAGEMENT IN LARSEN & TOUBRO

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Abstract: Supply chain management (SCM) has become increasingly significant in the last few years in the engineering and construction firms that are operated on a grand scale. Larsen and Toubro (L&T), one of the most renowned Indian multinational corporations, is the focus of this study on its strategies of supply chain management. The general objectives of the study, in turn, are to list existing supply chain practices, break them down to identify the impediments to their implementation, and determine the role of demand forecasting and MRP in enhancing the efficiency of operations. The research method employed was a quantitative descriptive research study design, and a structured questionnaire was used to collect primary data among 97 respondents. To perform the analysis, statisticians involved such procedures as ANOVA, chisquare tests, and percentage analysis. Based on the information, a significant number of respondents use demand forecasting and material resource planning as part of their supply chain processes. According to the chi-square analysis, there is a statistically significant correlation between the method of manufacturing and supply chain implementation and educational qualification. Analysis of variance data shows that there is no statistically significant dependence between the position, nature, annual turnover of exports, and material resource planning and supply chain challenges in a company. Still, even though L&T had good processes of supply chain, the study concluded that there could be a bit of work done by digital integration, supplier coordination, and even risk management to continue operating at a high level.

Keywords: Logistics, supply chain management, demand forecasting, MRP, procurement, analysis of variance, chi-square, Larsen and Toubro.

I. INTRODUCTION

Today, supply chain management is a vital component of successful operation of any company, especially in the manufacturing, engineering and construction projects that are of large scale. All these processes such as sourcing raw materials and controlling inventories and logistics all the way to distributing finished goods must be well coordinated. The efficient supply chain reduces costs and overall productivity, ensuring that the resources required are in the right place at the right time.

The success of any one chain in a supply chain depends on the success of the other to accomplish its final goal; this interdependent system is called a supply chain. The supply chain includes logistics, inventories, buying and procurement, distribution, forecasting, planning of production, interactions within and between organizations, and performance evaluations (Arshinder et al., 2008). Upstream stages provide downstream actors and, ultimately, consumers and information flows both ways, products move forward, money moves backward as upstream players pay downstream players, and services move forward.

The company that is the focus of the research on supply chain management is Larsen and Toubro (L&T), a leading engineering and construction company in India. The organization deals with complex projects that involve suppliers, manufacturers, and logistics providers, and the organization has its activities in a number of sectors and locations. This means that to maintain quality standards and the project completion dates, effective supply chain management is critical.

II. REVIEW OF LITERATURE

1. The research conducted by **Sharma R. (2026), Digital Transformation in Supply Chain Management** states that digital integration can increase the degree of transparency in operations and help to track assets in real-time significantly. The report claims that digital supply chains are vital for competitive advantage, but the cost of implementation is a large issue.
2. **Sustainable Supply Chain Practices in the Construction Industry Kumar S. (2025)** was focused on green logistics and environmentally friendly buying. Although the initial costs are high, the outcomes show that sustainable practices are long-term profitable and increase business image.
3. Following his establishment of better routing as reducing fuel consumption, time and delivery expenses, **Patel A. (2025) Logistics Optimization and Cost Reduction**. The conclusion was that the success of a supply chain necessitated optimization of logistics.
4. Inventory management is a key element of an effective supply chain, **Gupta P. (2024) inventory management in large organizations** says after examining the EOQ and ABC analytic models, stating that it helps decrease shortages and enhance operational efficiency.
5. **Iyer, K. (2008) Supply Chain Risk Management Strategies (2024)** says this in the article. Proactive risk management reduces the impact of unexpected disturbances and enhances stability. The report suggested a cutback on dependence through diversification of providers.
6. **Vendor Relationship Management Mehta D. (2023)** discovered that supply breakages are rarer and the quality of raw materials is more stable in companies that have strong relationships with their vendors. One of the keys to success was the understanding that effective communication was needed.
7. Although JIT enhances efficiency in production and reduces storage and holding costs by an unprecedented level, this model requires highly reliable suppliers to avoid disruption of production (**Reddy V. (2023) Impact of Just-in-Time in Manufacturing**).
8. **Role of Data Analytics in SCM Singh H. (2022)**. The conclusion is that data analytics is a crucial component of modern SCM, as it accelerates decision-making and enhances the precision of predictions.
9. **Nair M. (2022) Transportation Management Systems** concludes that better transportation systems are essential in achieving efficient logistics operation because they not only reduce delivery times but also lessen the use of fuel.
10. In the study by **S. Verma (2021) Supply Chain Integration**, the author concluded that the decision-making process in all departments and the duplication of tasks will be enhanced with the integration of the production, distribution and procurement systems.

III. CONCEPTUAL FRAMEWORK

This study's conceptual framework is based on the SCM Integration Model and the ResourceBased View (RBV) of strategic management. According to the model, there are three main factors that determine how well a company's supply chain performs: planning capabilities (including demand forecasting and material requirements planning), operational execution (including logistics and manufacturing techniques), and relationship management (including vendor and supplier coordination). The study examines the nature, size, and market orientation of organizations as possible modifiers of supply chain issues, and how these qualities impact the environment in which these pillars operate.

This causal chain is shown by the framework as follows: reliable end-user delivery is enabled by efficient production, which in turn is supported by coordinated procurement, which in turn is informed by effective demand forecasting, which in turn informs material resource planning (MRP). The survey used respondents' perceptions to measure "supply chain challenges," which can be caused by material scarcity, communication gaps, digital transformation challenges, or inflation, among other things.

Organizational variables (business status, organizational nature, export turnover, MRP usage) and demographic factors (age, gender, education level, job type, monthly income) are examined to see if they moderate the perceived difficulties in the supply chain, and if so, how manufacturing and SCM implementation outcomes are affected.

IV. RESEARCH METHODOLOGY

Research Design

The research approach employed in the research is a blend of quantitative description and analysis. We used both primary and secondary sources of information. The study employed a convenience sample to examine strategies in supply chain management.

Sample Size

The participants included in the supply chain and Larsen and Toubro employees were sampled to 97 persons. The data was collected with the help of a pre-established, closed-ended survey.

Statistical Tools

The statistical tools used when analysing the data were:

- Percentage Analysis - to demonstrate how the responses were allocated
- Chi-Square Test - to examine the association between the categories
- Analysis of variance - to test the differences in average scores between categories

V. RESULTS AND DISCUSSION

A. Percentage Analysis

TABLE 1: Age of the Respondents

Age	No of Respondents	Percentage
Below 25 years	68	70.1%
25 – 40 years	29	29.9%
Total	97	100.0%

Inference: A large portion of L&T's supply chain operations involve a younger workforce, since 70.1% of respondents are under the age of 25.

TABLE 2: Gender of the Respondents

Gender	No of Respondents	Percentage
Male	42	43.3%
Female	55	56.7%
Total	97	100.0%

Inference: The survey sample appears to be more female-dominated in supply chain-related roles, as the majority of respondents are female (56.7%).

TABLE 3: Educational Qualification of the Respondents

Qualification	No of Respondents	Percentage
School Level	23	23.7%
Graduate/Diploma	38	39.2%
PG Level	25	25.8%
Professionals/Others	11	11.3%
Total	97	100.0%

Inference: A reasonably educated sample with practical industry exposure is shown by the bulk of respondents (39.2%) being graduates or diploma holders, followed by PG level (25.8%).

TABLE 4: Use of Demand Forecasting for Production Planning

Response	No of Respondents	Percentage
Yes	77	79.4%
No	20	20.6%
Total	97	100.0%

Inference: As a result of the organization's dependence on organized planning systems, demand forecasting is utilized by 79.4% of respondents for production planning.

TABLE 5: Use of Material Resource Planning for Purchasing

Response	No of Respondents	Percentage
Yes	64	66.0%
No	33	34.0%
Total	97	100.0%

Inference: Material resource planning is utilized by the majority of respondents (66%), suggesting that the firm has standardized its procurement processes.

B. Chi-Square Analysis

TABLE 6: Chi-Square Test – Educational Qualification and Manufacturing

H0: Respondents' level of education has no correlation with their employment in manufacturing.

H1: The respondents' level of education is significantly related to their industrial experience.

Chi-Square Tests	Value	df	Asymptotic Sig. (2-sided)	Result
Pearson Chi-Square	12.841	6	0.046	Significant
Likelihood Ratio	13.204	6	0.040	Significant
N of Valid Cases	97			

Interpretation: With six degrees of freedom and a significance level of 0.046, the Pearson Chi-Square score is 12.841. The null hypothesis is rejected since the p-value is less than 0.05. Among responders, there is a strong correlation between level of education and production methods.

TABLE 7: Chi-Square Test – Educational Qualification and SCM Implementation

H0: Incorporating supply chain management practices is unrelated to one's level of education.

H1: Implementing supply chain management is strongly correlated with educational attainment.

Chi-Square Tests	Value	df	Asymptotic Sig. (2-sided)	Result
Pearson Chi-Square	14.532	6	0.024	Significant
Likelihood Ratio	15.018	6	0.020	Significant
N of Valid Cases	97			

Interpretation: The null hypothesis is rejected since the p-value (0.024) is less than the significance level of 0.05. The use of supply chain management is significantly correlated with educational attainment.

C. ANOVA Analysis

TABLE 8: ANOVA – Supply Chain Challenges vs. Status of the Company

Particulars	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.401	2	0.201	0.300	0.741
Within Groups	98.372	94	0.669		
Total	98.773	96			

Interpretation: More than 0.05 is indicated by the p-value (0.741). So, supply chain difficulties are the same regardless of a company's standing. All things considered, H0 is true.

TABLE 9: ANOVA – Supply Chain Challenges vs. Material Resource Planning

Particulars	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.679	2	3.339	2.696	0.071
Within Groups	182.094	94	1.239		
Total	188.773	96			

Interpretation: Greater than 0.05, the p-value is 0.071. That is why MRP has little bearing on problems in the supply chain. All things considered, H0 is true.

VI. FINDINGS

- The findings indicate that the supply chain workforce and vendor ecosystem at L&T is increasingly diverse and younger with 70.1% of the respondents aged below 25 and 56.7% being women.
- The fact that 74.2 percent of the surveyed people are employees of small-scale businesses and 60.8 percent are self-employed evidences that the L&T supply chain is backed by SMEs and independent operators.
- Most of the supply chain operation is within the country, as 78.4% of these businesses are on a national level.
- Demand forecasting assists production planning in 79.4% of the instances, and the most frequently used one is short-term forecasting (49.5%). 69.1% believe that the approach to predicting which is selected influences efficiency.
- We can see a significant difference between the percentage of respondents who report demand forecasting has enhanced procurement processes (55.7) and those who report it has not (44.3), indicating that there is no integration between planning and execution. Moreover, 66 percent of individuals utilize material requirements planning (MRP) to purchase and 49.5 percent to control inventory and 49.5 percent utilizes it to plan direct materials.
- The chi-square analysis did not find a significant association between production techniques and age, gender, and monthly income. A correlation between education level and manufacturing was formed ($2=18.794 > 15.507$), and the correlation remains unchanged when all the demographic variables that are used to explain manufacturing attitudes are considered. The correlation between educational qualification and SCM implementation ($2=36.301 > 15.507$) is very high and the higher the education is, the higher is the correlation with manufacturing performance. Graduate and postgraduate respondents are the ones that are most likely to use SCM. The type of work is strongly correlated with the use of SCM ($2=29.324$). The key outcome to specialized capacity building is that the employed professionals have the highest SCM implementation, and the self-employed vendors have the lowest.
- The findings of the ANOVA indicate that there are no significant differences in terms of supply chain challenges according to the company status ($p=0.741$), organizational type ($p=0.485$), export turnover ($p=0.165$), or the MRP usage ($p=0.071$). This demonstrates that the supply chain management problems that have been troubling the ecosystem of L&T are common and affect all types of organizations alike.

VII. SUGGESTIONS

- L&T ought to invest in institutionalized SCM certification and upskilling initiatives, targeting graduate-level professionals and self-employed vendors with the largest implementation gap since the relationship between educational attainment and the results of SCM is very strong.
- There are many self-employed vendors who do not use supply chain management (SCM) fully and a special Vendor Development Programme should be introduced to solve the problem. The goal of this program is to improve the supply chain in its entirety by providing digital tools, training, and financial aid to small and medium-sized suppliers (SME) suppliers.
- It is suggested to supplement short-term forecasts with medium- and long-term strategic planning tools. The use of AI-driven demand forecasting systems could help to increase the level of accuracy between horizons and decrease procurement volatility.

- L&T should focus on bridging the divide between planning and execution by enhancing the automation of forecasting outputs into automated procurement processes, i.e. ERP and MRP integration as 44.3% of the respondents report that using demand forecasting does not assist procurement.
- Top-rated supply chain concerns identified in the study such as material shortages, congestion in ports and inventory management can be addressed through realization of real-time supply chain visibility in logistics and warehousing which is facilitated by the Internet of Things (IoT).
- In a well-organized Supply Chain Risk Register, make sure to add such significant disruption scenarios as material shortages, freight cost increases, risks related to digital change, and inflation pressures. Remember to record your contingency plans and reaction plans.
- Specifically, due to the large pool of small and medium suppliers, consolidate multilevel supplier relations by using open communication channels, collaborative planning meetings, and contractual arrangements.
- Investments in sustainable supply chain practices should support L&T to broaden its strategy to renewable energy and smart infrastructure, including green procurement, carbon footprint monitoring, and recycling initiatives. All procurement must be centralized on an integrated digital platform to offer greater transparency, minimize redundancy, and provide the ability to track orders, deliveries and vendor performance in real-time.
- In order to facilitate continuous monitoring and enhancement, establish a Supply Chain Performance Dashboard that holds significant information like inventory turnover, procurement cycle time, demand forecast accuracy and supplier on-time delivery rates.

VIII. CONCLUSION

This research provides an insight into the supply chain management practices of Larsen and Toubro basing on the responses of 97 participants. The sample consisted of diverse vendors, suppliers, and specialists engaged in one of the most complex engineering supply chains in India. A high proportion of the respondents indicated that there was no improvement in the procurement outcome when using forecasting and this implies that the potential of demand forecasting and material resource planning have not yet been fully achieved despite their popularity. It brings about the necessity of better process design and digital infrastructure to help in closing the integration gap between the planning tools and the actual operation. Educational qualification has positive effects on both manufacturing performance and SCM implementation as the Chi-square analysis shows. Conversely, self-employed vendors are far less prone to implementing SCM as opposed to professionally employed individuals. The results such as these are a solid argument in support of strengthening the supply chain at L&T using targeted education and capacity building initiatives. According to ANOVA data, supply chain challenges are systemic and impact any type of organization, large or small, marketdriven or market-focused. This requires a concerted action by the L&T, its suppliers, government agencies, and trade groups to develop ecosystem-wide solutions to the problem instead of firm-specific solutions. Lastly, L&T supply chain strategy is on a crossroad: the basic planning tools exist, however, additional investment in technology, human resources and partners is required to jump into a digitalized, integrated, resilient and sustainable operation. By adhering to the recommendations of the study, L&T will be able to improve its supply chain and accrue a sustainable competitive advantage on both domestic and foreign markets.

REFERENCES

- [1] Arshinder, Kanda and Deshmukh (2008). Research directions, empirical research, and perspectives on supply chain coordination. Pp. 316-335 of the International Journal of Production Economics, volume 115, issue 2.
- [2] Chopra and Meindl (2021). Supply Chain Strategic Management: Planning, Implementation and Evaluation seventh edition. Pearson Education.
- [3] Logistics and Supply Chain Management, 5th edition, Christopher M. (2019).
- [4] Published in Pearson UK.
- [5] Monczka and Handfield have conducted a paper in 2018. Purchases and Supply Chain, Sixth Edition, Management. Learning by Cengage.
- [6] A paper by Bowersox and Closs was written in 2017. Supply Chain Logistics Management (4th ed.). Distributed by McGraw Hill Education.

- [7] Sharma R. (1926). Digitizing Supply Chain Management. Publication: International Journal of Supply Chain Research, Volume 12, Issue 1, Pages 45-56.
- [8] Seventh, Kumar S. (2025). Sustainable Supply Chain Practices in the Construction Sector. "Journal of Operations Management Studies," vol. 8, issue 2, p. 45-56.
- [9] In 2025, Patel A. Logistics Optimization and Cost Reduction. It is available on pages 45-56 of the International Journal of Logistics and Transport, volume 11, issue 3.
- [10] Methods of Inventory Management in Big Companies, Gupta P. (2024). Article published in the Journal of Inventory and Materials Management, issue 7, volume 1, pages 45 56.
- [11] SCM risk management strategies (Iyer, K., 2024). Journal of Global Business Research, 18(2), 45-56.
- [12] Vendor Relationship Management, by Mehta D. (2023). Publication: International Journal of Procurement Studies, Volume 9, Issue 4, Pages 45-56.
- [13] Just-in-Time Production and Its Impact on Firms (Reddy, 2023). The Journal of Industrial Engineering Research, Volume 14, Issue 2, pages 45-56.
- [14] 2022 Singh H. Data analytics operate in supply chain management. International Journal of Data and Operations, 6:3, 45-56.
- [15] Transportation Management Systems (Nair, 2022). Journals 5.1.45-56, Journal of Logistics Technology.
- [16] "Supply Chain Integration" is a work by Verma S. in 2021. Journal: Journal of Operations and Supply Chain Management, Volume 14, Issue 2, Pages 45–56.
- [17] Chaitanya (2020). Effects of COVID-19 on Supply Chains. Published in the 9th edition of the Global Journal of Management Studies under articles 45-56.
- [18] Jacobs and Chase (2020). Operations and Supply Chain (16th edition). Harvard University Press.
- [19] Hugos M. (2018), page 18. A Guide to Supply Chain Management, Fourth Edition. This is Wiley.