

# Construction Material Supply Chain Management

## *Advanced Review Research Paper*

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**Abstract**— the management of construction material supply chains is crucial in ensuring successful implementation of residential and infrastructure construction projects. Residential construction projects, road construction projects, plumbing works, and asphalt/bitumen roads construction all rely heavily on the smooth movement of construction materials throughout the supply chain. Procurement and logistics practices contribute towards ensuring smooth material flow, minimizing delays, coordinating processes, and ensuring efficient project completion.

This study focuses mainly on the procurement and logistics practices used in residential and infrastructure construction projects as well as the challenges associated with construction material supply chains. This research work outlines procurement planning, vendor coordination, transportation management, logistics planning, delivery scheduling, and coordination between the supplier, contractor, transport agency, and site team.

The study further highlights some of the major challenges that include procurement delay, transportation challenges, lack of communication, fluctuation in material costs, material wastage, labor inefficiency, and over-budgeting for project expenditure, which impact project performance and material flow.

The information needed for this study was gathered through practical interactions with sites, coordination procedures, consultations with vendors and contractors, observation of procurement and logistics practices, and collecting quotations from suppliers through Google and Just dial platforms. Schedule reduced; and effective co-ordination achieved, leading to time bound project completion.

The purchasing plan, vendor co-ordination, supply chain management, transportation management, logistics planning, time scheduling, delivery operations, the co-ordination between suppliers, transport agency and the site team, among other factors have been described in the report. The most significant problems like delayed purchase, trouble in transportation, communication gap between supplier & transporter, fluctuation in prices of construction material, material wastages, unproductive hours of labors and project over-runs are listed out.

Data was collected through physical site visits and co-ordination, discussions held with the suppliers and contractors, observations made during purchase and logistics operations. Also, purchase of goods from different sources like Connections with Steak holders old sites vendors for a given construction project, along with collection of rates from supplier and asking them for delivery, also constituted sources for collecting data.

An efficient purchase and logistic operation may improve availability of construction material, reduce schedule, controlling the cost and finally enhancing overall project performance of both residential and infrastructure projects.

**Index Terms** — Construction Material Supply Chain, Procurement Management, Logistics Planning, Vendor Coordination, Transportation Management.

## I. INTRODUCTION

Construction is a major part of economic growth in lots of places because it builds the roads and buildings that keep things moving. Materials like cement steel and sand are what everything depends on so getting them managed right helps control costs and finish on time.

Supply chain work for these materials covers planning and moving them from where they come from to the actual site. Different groups have to stay in touch like suppliers and the people doing the building otherwise the whole thing slows down.

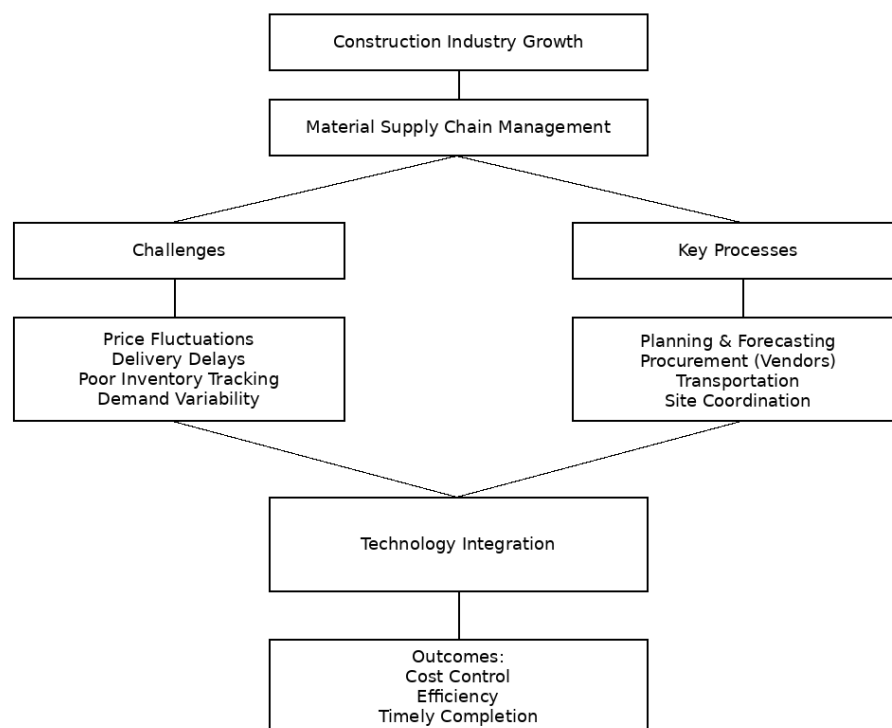
Lately the industry seems to run into more issues from prices going up and down and projects getting bigger. Late deliveries and bad inventory tracking add up fast and I think that is why so many jobs go over budget.

Demand changes a lot during a build so forecasting what is needed becomes really important. Older ways of handling materials do not always show where things are going which leads to waste that could have been avoided.

New tools like planning software and tracking systems are showing up more now. They help people see the flow better and make choices quicker but it is not clear how well every company uses them yet.

This paper looks into the buying side and how vendors and transport fit together with technology playing a bigger role. The goal is to point out what gets in the way and what might work better for keeping projects steady.

Findings could help planners and site managers cut down on extra costs through tighter coordination. Some parts of the supply chain still feel harder to pin down though.



## II. LITERATURE REVIEW

The literature review is an essential component of this study because it provides a means of gathering information that will assist in better understanding prior research activities related to the supply chain for construction materials.

The Literature Survey provide a general overview of the previous studies included in this literature review based on procurement systems and logistics practices relative to residential and infrastructure construction projects. Researchers have indicated that the use of digital technologies in construction supply chains has enhanced: tracking procurement, monitoring transportation; coordinating with suppliers; communications; and real time tracking of materials .GPS technology facilitates the

monitoring of transportation activities, while ERP technology facilitates the coordination and integration of the various functions associated with procurement, logistics, and finance and project phases.

The authors studied construction supply chain management and explained the importance of procurement planning, logistics coordination, transportation management, and supplier integration in construction projects. The study highlighted that improper transportation planning, delayed deliveries, and weak coordination can result in project delays and cost overruns. The research also explained the importance of advanced technologies such as ERP, BIM, and GPS systems in improving supply chain performance

### III. RESEARCH METHODOLOGY

The present research follows a systematic review methodology based on published literature, technical standards, and case studies from reputed journals and international codes.

#### 1. Design of the research

This study employs a mixed method approach.

Which means:

We create problems (qualitative)

We also see real cases (real data)

#### 2. Data Gathering

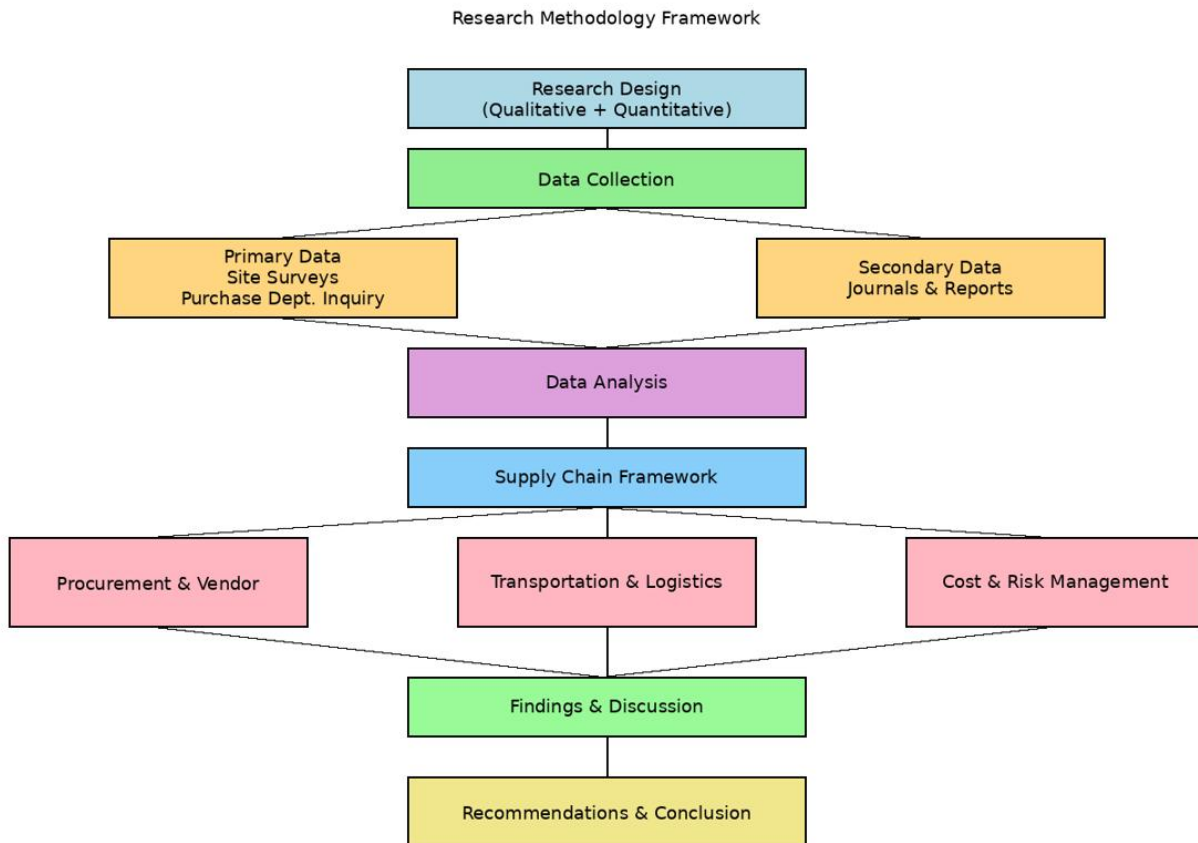
Data are gathered from two primary sources:

Primary Data

Site Surveys → Data gathered from construction sites directly

Purchase Department Inquiry → Information obtained from the purchase department about the purchase of materials, vendors, and costs.

This helps to understand real problems in projects.



#### IV. CONCLUSION

The study achieved its goals of examining construction material supply chain management, identifying key challenges within the supply chain, and assessing procurement and logistics practices in both residential and infrastructure projects. It found that successful project execution relies heavily on sound procurement planning, efficient transportation, strong vendor coordination, and well-managed logistics. Disruptions in procurement or transport often lead to significant issues, including project delays, idle labor, material waste, and increased costs.

Vendor coordination emerged as a critical factor influencing supply chain effectiveness. As intermediaries between suppliers and construction sites, vendors play a vital role in ensuring a steady flow of materials through timely deliveries and effective communication. Field observations revealed that contractors and construction firms typically favor established, reliable vendors over new ones, as long-standing professional relationships tend to enhance reliability, coordination, delivery consistency, and information exchange.

Moreover, the research demonstrated that robust procurement and logistics strategies contribute to fewer delays, better coordination, consistent material availability, tighter cost control, and improved overall project performance. To strengthen supply chain outcomes in construction, organizations should prioritize thorough procurement planning, stronger vendor collaboration, efficient transportation oversight, and continuous logistics monitoring.

## REFERENCES

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