

An Exploratory-Diagnostic Study of Operational Challenges, Strategic Supply Chain Enablers,  
And Order-Fulfillment Accuracy: The Case of An SME Construction Material Importer In  
Thailand

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**ABSTRACT**

This study investigates operational challenges affecting order-fulfillment accuracy in a small and medium-sized enterprise (SME) construction material importer in Thailand. In the construction materials import sector, order-fulfillment performance is often associated with coordination gaps across supply chain functions, particularly between procurement, planning, and delivery activities. The study adopts a diagnostic perspective to examine how operational challenges—such as siloed coordination, procurement delays, and delivery disruptions—relate to key strategic supply chain enablers, including strategic planning, supply chain visibility, and execution reliability.

A sequential exploratory mixed-methods design was employed. In the first stage, qualitative data were collected through semi-structured interviews with employees involved in planning, procurement, logistics, and delivery operations. The interview findings were analyzed thematically to identify recurring operational issues and to construct a diagnostic framework. In the second stage, a quantitative rating and ranking questionnaire was used to validate and prioritize the issues identified in the qualitative phase.

The findings indicate that procurement delays and limited upstream visibility are major contributors to downstream order-fulfillment inaccuracies. Based on these insights, the study proposes a Strategic Supply Chain Improvement Model to help managers diagnose operational constraints and strengthen coordination, planning, and visibility across the supply chain.

**Key Words**

Order-Fulfillment, Procurement Delays, Silo Management, Supply Chain Planning, Supply Chain Visibility

บทคัดย่อ

งานวิจัยนี้มุ่งศึกษาปัญหาและความท้าทายในการดำเนินงานที่เกี่ยวข้องกับความถูกต้องของการส่งมอบคำสั่งซื้อ (order-fulfillment accuracy) ในบริษัทผู้นำเข้าวัสดุก่อสร้างขนาดกลางและขนาดย่อม (SME) ในประเทศไทย ในธุรกิจนำเข้าวัสดุก่อสร้าง ความแม่นยำในการส่งมอบคำสั่งซื้อมักเกี่ยวข้องกับการประสานงานระหว่างหน่วยงานต่าง ๆ ในห่วงโซ่อุปทาน โดยเฉพาะระหว่างฝ่ายจัดซื้อ ฝ่ายวางแผน และฝ่ายจัดส่ง หากการทำงานระหว่างหน่วยงานเหล่านี้ไม่สอดคล้องกัน อาจทำให้เกิดปัญหาในการดำเนินงาน เช่น การทำงานแยกส่วนระหว่างหน่วยงาน ความล่าช้าในการจัดซื้อ หรือการสะดุดของกระบวนการส่งมอบสินค้า

การศึกษานี้ใช้แนวคิดเชิงวินิจฉัย (Diagnostic approach) เพื่อทำความเข้าใจว่าปัญหาในการดำเนินงานเหล่านี้มีความเชื่อมโยงกับปัจจัยสำคัญของการบริหารห่วงโซ่อุปทานอย่างไร เช่น การวางแผนเชิงกลยุทธ์ การมองเห็นข้อมูลในห่วงโซ่อุปทาน (supply chain visibility) และความเสถียรของการดำเนินงาน

งานวิจัยใช้ระเบียบวิธีแบบผสม (Mixed methods) โดยเริ่มจากการเก็บข้อมูลเชิงคุณภาพผ่านการสัมภาษณ์กับพนักงานที่เกี่ยวข้องกับการวางแผน การจัดซื้อ โลจิสติกส์ และการจัดส่ง จากนั้นนำข้อมูลมาวิเคราะห์เพื่อค้นหาปัญหาที่เกิดขึ้นบ่อยและสร้างกรอบการวิเคราะห์เชิงวินิจฉัยต่อมาในขั้นที่สอง มีการใช้แบบสอบถามเชิงปริมาณเพื่อให้ผู้เชี่ยวชาญประเมินและจัดลำดับความสำคัญของประเด็นปัญหาที่พบ

ผลการศึกษาพบว่าความล่าช้าในการจัดซื้อและข้อจำกัดในการเข้าถึงข้อมูลของห่วงโซ่อุปทานช่วงต้นน้ำ เป็นปัจจัยสำคัญที่เชื่อมโยงกับความคลาดเคลื่อนของการส่งมอบคำสั่งซื้อในช่วงปลายน้ำ จากผลการวิเคราะห์ดังกล่าว งานวิจัยจึงนำเสนอ Strategic Supply Chain Improvement Model เพื่อช่วยให้ผู้บริหารสามารถวิเคราะห์ปัญหาในการดำเนินงาน และปรับปรุงการประสานงาน การวางแผน และการมองเห็นข้อมูลตลอดทั้งห่วงโซ่อุปทานได้อย่างเป็นระบบ

คำสำคัญ : การดำเนินการตามคำสั่งซื้อ, ความล่าช้าในกระบวนการจัดซื้อจัดหา, การบริหารงานแบบแยกส่วน (ไซโล), การวางแผนห่วงโซ่อุปทาน, ความโปร่งใสของห่วงโซ่อุปทาน

## INTRODUCTION

Supply chains in the construction materials sector involve multiple interconnected activities, including procurement, planning, logistics coordination, and delivery to customers. For small and medium-sized enterprises (SMEs) that rely on imported construction materials, managing these activities can be particularly challenging due to the need to coordinate across international suppliers, internal departments, and local distribution operations. Within this operational environment, maintaining accurate order fulfillment is an important operational concern. Order-fulfillment accuracy refers to the extent to which customer orders are delivered according to the requested specifications, quantities, and timing.

In practice, challenges related to order fulfillment are often associated with coordination gaps across different supply chain functions. Procurement, planning, logistics, and delivery activities are frequently managed by separate organizational units, and limitations in information sharing or cross-functional coordination may create operational difficulties. For example, procurement delays, fragmented communication between departments, and limited visibility of upstream supply conditions may complicate delivery planning and order execution.

Given these operational realities, there is a need to better understand how such challenges are interconnected within SME supply chains. This study therefore adopts a diagnostic and exploratory perspective to examine operational challenges related to order-fulfillment accuracy in an SME construction material importing firm in Thailand, with the aim of identifying key operational constraints and providing structured insights for supply chain improvement.

## PROBLEM STATEMENT AND OBJECTIVES

Thailand's construction material import industry has expanded with globalization and infrastructure development, increasing reliance on imported materials such as steel and cement. However, import-dependent supply chains are complex, involving long lead times, multiple stakeholders, and high coordination requirements, making order-fulfillment accuracy difficult to maintain. Previous studies indicate that weak coordination, fragmented communication, and limited information visibility often disrupt supply chain planning and logistics processes, resulting in procurement delays, delivery disruptions, and reduced operational efficiency (Taylor & Bjornsson, 1999; Ogundipe et al., 2024; Kalaiarasan et al., 2022). In Thailand, research further highlights that poor internal communication, unclear specifications, and fragmented management structures contribute to supply chain inefficiencies in construction-related firms (Chinda, 2020; Naipinit & Chokanan, 2014). Despite these insights, limited empirical research examines how operational challenges interact with strategic planning, supply chain visibility, and process delivery in real construction material import environments.

To address this gap, this study adopts a case study approach focusing on N Company, a construction material import SME in Thailand, to explore operational challenges affecting order-fulfillment accuracy. The study applies the Supply Chain Operations Reference (SCOR) framework to examine planning, sourcing, and delivery activities, while the Resource-Based View (RBV) is used to interpret strategic planning and supply chain visibility as organizational capabilities influencing operational performance (Huan et al., 2004; Barney, 1991). The research aims to identify key operational challenges—such as silo management, procurement delays, and delivery delays—examine their relationships with strategic supply chain planning, supply chain visibility, and process delivery, and propose a strategic supply chain improvement model to strengthen coordination and improve order-fulfillment performance.

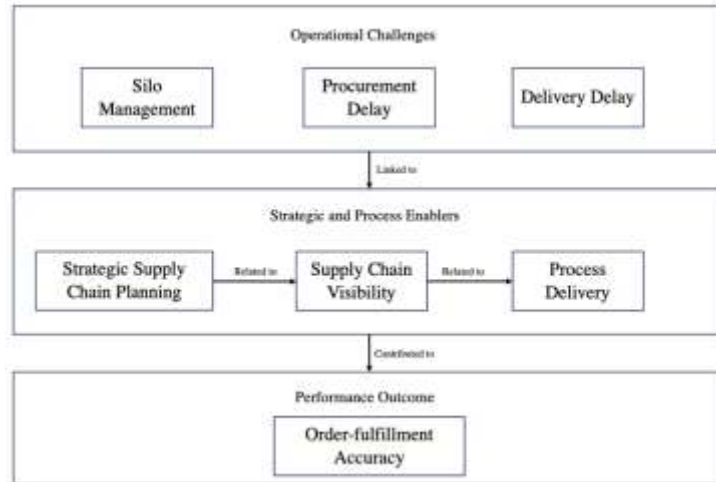
## **RESEARCH QUESTIONS**

This study investigates how operational challenges and supply chain capabilities influence order-fulfillment accuracy in construction material import supply chains. In particular, the research examines how issues such as silo management, procurement delays, and delivery delays interact with strategic supply chain planning, supply chain visibility, and process delivery. The study also seeks to identify which planning-, visibility-, and execution-related issues are perceived by practitioners as the most critical contributors to order-fulfillment inaccuracies.

1. How do operational challenges, strategic supply chain planning, supply chain visibility, and process delivery interact in shaping order-fulfillment accuracy within the construction material import supply chain?
2. What operational challenges associated with silo management, procurement delays, and delivery delays exist, and how are these challenges related to strategic supply chain planning, supply chain visibility, and process delivery?
3. Which issues related to supply chain planning, supply chain visibility, and process delivery are perceived as the most critical contributors to order-fulfillment inaccuracies?

## **CONCEPTUAL FRAMEWORK**

A conceptual diagnostic framework structures how operational challenges are understood to influence order-fulfillment accuracy in construction material import operations. At the top of the framework, operational challenges—silo management, procurement delay, and delivery delay—represent recurring operational problems that can disrupt coordination and information flow across supply chain activities. These challenges are shown as being linked to the next layer, which contains strategic and process enablers.



In the middle layer, the framework positions strategic supply chain planning, supply chain visibility, and process delivery as interrelated enablers. The diagram indicates a directional relationship where strategic supply chain planning is related to supply chain visibility, and supply chain visibility is related to process delivery. This reflects the idea that planning supports the conditions for visibility, and visibility supports more effective execution during delivery processes. At the bottom of the framework, order-fulfillment accuracy is defined as the performance outcome, which is contributed to by the effectiveness of these enablers in managing operational challenges.

The framework is informed by the logic of the SCOR model, particularly the focus on Plan–Source–Deliver process domains, and it also draws on the Resource-Based View (RBV) by treating planning, visibility, and coordinated delivery routines as internal organizational capabilities that create value when integrated effectively. Importantly, the arrows represent diagnostic linkages and practical flow of issues, not statistically tested causal relationships.

### Scope of the research:

This study focuses on examining how operational challenges are linked to strategic supply chain planning, supply chain visibility, and process delivery in influencing order-fulfillment accuracy within construction material import supply chains. The research adopts a diagnostic perspective and is based on a single case study of N Company, a Thai SME coordinating procurement, international logistics, and delivery between overseas suppliers and domestic contractors. The study is geographically limited to Thailand and concentrates on operational activities related to planning, procurement, visibility, and delivery, while excluding manufacturing, financial analysis, and marketing aspects. The findings aim to provide practical insights relevant to SMEs in construction material import sectors, although they are not intended for statistical generalisation due to the single-case design.

### Significance of the research:

This study contributes to supply chain management literature by providing empirical insights into construction material import supply chains in Thailand, a context that remains relatively underexplored. By adopting a diagnostic perspective, the research enhances understanding of how operational challenges, strategic supply chain planning, and supply chain visibility interact in practice. Drawing on the Resource-Based View (RBV), the study interprets planning and visibility as organizational capabilities that influence operational performance when effectively coordinated. From a practical standpoint, the findings help managers better understand operational challenges and identify priority areas for improving coordination, visibility, and order-fulfillment accuracy. The proposed strategic supply chain improvement model further supports managerial decision-making and may inform policy initiatives aimed at strengthening logistics capability and supply chain resilience in Thailand's construction sector.

### **Limitation of the research:**

This study has several limitations. First, it is based on a single case organisation (N Company) in Thailand, which limits the generalisability of the findings. Second, the mixed-methods approach relies on employee interviews and questionnaires, meaning the results may reflect participant perceptions and organisational bias. Third, the quantitative stage includes only five respondents due to the small population size of the SME, and Cronbach's alpha is used only as an indicative reliability measure. Fourth, the study focuses on a specific operational period and does not consider major external disruptions that may affect supply chain performance. Finally, the research does not include financial or cost-benefit analysis and is limited to the Thai context, which may restrict the transferability of the findings to other countries or industries.

## **REVIEW OF RELATED LITERATURE**

This chapter reviews prior studies on strategic supply chain planning, supply chain visibility, and order-fulfillment accuracy in Thailand's construction material import sector. It examines key theories and empirical evidence explaining how operational challenges—such as silo management, procurement delays, and delivery disruptions—affect supply chain performance and how these issues may be addressed through improved planning, visibility, and coordination. The review integrates global and Thai research and is summarized covering theoretical foundations, empirical challenges, the Thai industry context, literature synthesis and research gaps, and a summary that supports the study's conceptual framework and methodology.

### **1. Theoretical and Conceptual Foundations**

This section reviews key theories explaining how supply chain coordination, planning, visibility, and operational execution influence order-fulfillment performance. The discussion integrates supply chain management theory, responsiveness theory, visibility theory, and capability-based perspectives. Together, these theories establish the conceptual foundation for analyzing operational challenges affecting order accuracy in construction material import supply chains.

- **Supply Chain Management and Performance Measurement**

Supply Chain Management (SCM) refers to the coordinated management of material, information, and financial flows across organizations to improve efficiency and service performance. Frameworks such as the SCOR model and supply chain performance metrics help firms evaluate planning, sourcing, and delivery activities to identify operational bottlenecks and improve coordination. These concepts highlight the importance of effective planning and integrated information flow in achieving reliable order-fulfillment performance (Mentzer et al., 2001).

- **Strategic Supply Chain Planning and Responsiveness Theory**

Strategic supply chain planning aligns long-term objectives, resources, and operational activities to ensure coordinated supply chain performance. Responsiveness theory further explains that firms must be able to quickly sense and react to demand changes or disruptions through information sharing, coordinated planning, and flexible processes. Together, effective planning, visibility, and responsiveness enable organizations to improve reliability and operational performance in complex supply chains (Christopher & Towill, 2001).

- **Visibility and Information Flow Theory**

Supply chain visibility refers to the ability to access and use real-time information on the movement and status of materials across the supply chain to support coordination and control. Effective information flow improves traceability, reduces operational errors, and enhances order accuracy by enabling organizations to monitor inventory, deliveries, and logistics activities more effectively. In digitally integrated supply chains, technologies such as tracking systems and IoT further strengthen visibility, allowing firms to respond quickly to disruptions and maintain reliable fulfillment performance (Brandon-Jones et al., 2014).

- **Process Delivery and Operational Execution Frameworks**

Process-delivery frameworks explain how supply chain operations are executed through coordinated processes such as planning, sourcing, and delivery. The SCOR model highlights that effective order fulfillment depends on synchronized activities including order processing, transportation, documentation, and final delivery. Inefficiencies in these processes—such as poor coordination, planning errors, or limited visibility—can lead to delays and inaccurate deliveries, particularly in complex industries like construction supply chains (Huan et al., 2004).

- **Resource-Based and Dynamic Capability Perspectives**

The Resource-Based View (RBV) explains that firms gain competitive advantage by developing valuable and difficult-to-imitate internal capabilities such as planning routines, information systems, and coordinated decision-making processes. In supply chains, these capabilities improve responsiveness and operational reliability by enabling firms to monitor disruptions, adjust resources, and maintain consistent delivery performance. This perspective highlights that strong planning and visibility capabilities are essential for managing uncertainty and achieving reliable order-fulfillment outcomes (Barney, 1991).

## **2. Empirical Studies on Key Challenges**

This section reviews empirical studies on operational challenges that affect supply chain performance in construction and import-dependent supply chains. It focuses on issues such as silo management, procurement delays, delivery delays, and limitations in planning, visibility, and process delivery. The review highlights how these challenges influence coordination, information flow, and order-fulfillment accuracy, helping identify the key factors guiding the analysis of this study.

- **Silo Management**

Silo management occurs when departments operate independently with limited coordination and fragmented information, reducing overall supply chain integration. In construction-related supply chains, silo behavior between procurement, warehouse, and logistics functions often leads to inconsistent information, poor coordination, and delivery errors. Studies show that such fragmentation weakens visibility and increases the risk of delays and order inaccuracies in supply chain operations (Barratt, 2004).

- **Procurement Delay**

Procurement delay refers to disruptions that extend the time between material requisition and confirmed delivery, often caused by slow approvals, unclear specifications, documentation issues, and payment bottlenecks. In construction supply chains, fragmented communication, manual procurement processes, and poorly integrated information systems frequently lengthen procurement cycles and create administrative delays. These operational and coordination issues significantly increase lead times and reduce order-fulfillment reliability (Donyavi et al., 2024).

- **Delivery Delay**

Delivery delay refers to the gap between the promised and actual delivery time caused by disruptions in transportation, documentation, warehousing, or coordination within the logistics network. In construction supply chains, weak planning, poor coordination among suppliers and contractors, and bottlenecks in order-processing activities can extend lead times and disrupt project schedules. These delays reduce delivery reliability and directly affect order-fulfillment performance (Ogundipe et al., 2024).

- **Strategic Supply Chain Planning**

Strategic supply chain planning aligns sourcing, logistics, inventory, and customer-service decisions with a firm's long-term competitive objectives. It emphasizes integrated coordination across procurement, warehousing, transportation, and digital information systems to support synchronized operations and improve supply chain responsiveness. Effective strategic planning enables firms to enhance coordination, reduce lead times, and improve overall supply chain performance (Barata et al., 2023).

- **Supply Chain Visibility**

Supply chain visibility (SCV) refers to the ability to track and monitor real-time information on inventory, orders, and material flows across the supply chain. Enhanced visibility through digital technologies such as IoT, RFID, and tracking systems improves transparency, reduces operational errors, and supports more accurate order fulfillment. By enabling real-time monitoring and better coordination among supply chain actors, SCV strengthens delivery reliability and decision-making efficiency (Ben-Daya et al., 2019).

- **Process Delivery**

Process delivery refers to the coordinated execution of activities that convert a confirmed order into a completed delivery, including order processing, picking, packing, loading, transportation, and confirmation. Inefficiencies in coordination among planning, warehouse operations, and logistics can create delays, incomplete shipments, and mismatches between ordered and delivered items. These operational bottlenecks reduce delivery reliability and overall supply chain performance (Rahman et al., 2019).

- **Order-Fulfillment Accuracy**

Order-fulfillment accuracy refers to the extent to which delivered orders meet customer requirements in terms of correctness, completeness, proper documentation, and on-time delivery. Errors often arise from earlier operational stages such as picking, documentation, and loading, where mismatches in quantities or specifications can occur. Improving tracking and verification systems helps reduce these errors and enhances overall fulfillment reliability (Rahman et al., 2019).

### **3. Supply Chain in Thailand's Construction Material Import Industry**

Thailand's construction sector faces significant supply chain challenges due to its reliance on imported materials and fragmented supply chain networks. Import dependency exposes firms to risks such as shipping disruptions, customs delays, and volatile material prices (Chinda, 2020; Rungskunroch, 2024).

In the conclusion, the literature indicates that strategic supply chain planning, supply chain visibility, and effective process delivery play critical roles in improving order-fulfillment accuracy by enhancing coordination, information flow, and operational execution. However, existing research rarely focuses on construction material import SMEs in Thailand or examines the mediating role of visibility between planning and fulfillment performance. Overall, the reviewed theories and empirical studies highlight key challenges such as silo management, procurement delays, and delivery delays, and provide the conceptual foundation for this study's framework and methodology.

## **RESEARCH METHODOLOGY**

This study adopts a sequential exploratory mixed-methods design to examine how operational challenges relate to strategic supply chain planning, supply chain visibility, process delivery, and

order-fulfillment accuracy within a construction material import supply chain. The research design consists of three phases: qualitative exploration, quantitative validation and prioritisation, and final synthesis and interpretation.

### **Phase 1: Qualitative Exploration**

In the first phase, qualitative data were collected through **semi-structured interviews** to explore operational challenges and coordination issues within the supply chain operations of N Company. The population consists of all 10 employees of N Company who are involved in supply chain operations. From this population, five participants were selected using purposive sampling, as they hold roles directly related to supply chain planning, procurement, logistics coordination, delivery execution, and order processing. This approach ensures that data are collected from individuals who possess relevant operational knowledge and experience.

Each interview lasted approximately 45–60 minutes and followed a structured interview guide covering topics such as strategic supply chain planning, supply chain visibility, silo management, procurement delays, delivery delays, and process delivery. The purpose of this phase was to identify operational issues affecting order-fulfillment accuracy and to gain an in-depth understanding of how these issues occur in practice.

The interview data were analysed using **thematic analysis**, which involved reviewing responses, coding key statements, identifying recurring patterns, and grouping them into broader themes related to the study's conceptual framework. The identified themes were later used to develop the quantitative questionnaire for the next phase.

To ensure the trustworthiness of qualitative data, the study applied **triangulation and member checking**. Triangulation was achieved by collecting perspectives from participants across different functional roles within the organisation. Member checking was conducted by confirming the interpretation of interview responses with selected participants to ensure that the findings accurately reflected their operational experiences.

### **Phase 2: Quantitative Validation and Prioritisation**

The second phase involved quantitative data collection through a structured **rating and ranking questionnaire** developed based on the themes identified in the qualitative phase. The population and sample remain the same five participants who took part in the interviews. Since, N Company is a small SME with only a limited number of employees involved in supply chain activities, the available pool of knowledgeable respondents is small. Therefore, using the same participants ensures that the evaluation of operational issues is conducted by individuals with relevant experience.

Participants were asked to evaluate each identified issue using a **five-point severity rating scale**, ranging from very low impact to very high impact on order-fulfillment accuracy. They were also asked to **rank the issues according to their improvement priority**. This approach allows qualitative insights to be transformed into structured quantitative evaluations that validate and prioritise operational challenges.

The quantitative data were analysed using **descriptive statistical techniques**, including **mean and median calculations**, to determine the perceived severity of each issue. A **ranking analysis** was also conducted to identify which operational challenges should be addressed first.

To ensure reliability and validity, the internal consistency of the questionnaire was assessed using **Cronbach's Alpha**, with a threshold value of 0.70 considered acceptable for reliability. The calculations were conducted using Microsoft Excel. This step ensured that the questionnaire items consistently measured the intended constructs before further interpretation of the results.

Theme	No. question (K)	Total Variance	Variance of total score	Alpha Value	Result
1	4	2.0	5.7	0.87	<b>PASS</b>
2	4	1.3	3.3	0.81	<b>PASS</b>
3	4	1.5	3.2	0.71	<b>PASS</b>
4	4	1.3	2.8	0.71	<b>PASS</b>
5	4	1.6	4.3	0.84	<b>PASS</b>
6	4	1.1	2.7	0.79	<b>PASS</b>
7	4	1.0	2.5	0.80	<b>PASS</b>

**Note:** Cronbach's Alpha value of 0.70 or above was considered acceptable, indicating adequate internal consistency of the measurement instrument

### Phase 3: Synthesis and Interpretation

In the final phase, the quantitative results were interpreted and synthesised in relation to the study's conceptual framework. The analysis focused on **mean, and median ranking results** to identify the most critical operational issues affecting order-fulfillment accuracy. The mean was used to show the overall perceived severity of each issue, while the median was used to reflect the central judgment or level of agreement among respondents. The ranking results were then used to determine which issues should be prioritised for improvement. These quantitative findings were interpreted together with the qualitative insights from Phase 1 to provide a diagnostic understanding of how operational challenges, planning, visibility, and process delivery interact within the supply chain.

## DATA ANALYSIS AND FINDINGS

### Qualitative Findings

In the first phase, the qualitative findings derived from the thematic analysis of interview data. The interview responses were first coded to identify recurring operational issues and were subsequently grouped into broader themes through a systematic thematic analysis process. The analysis identified several recurring operational issues affecting supply chain performance in the construction material import process. These themes represent key operational challenges and enabling factors influencing supply chain planning, visibility, process delivery, and ultimately order-fulfillment accuracy. The identified themes provide the basis for interpreting how

operational problems emerge and interact across different supply chain stages and serve as the foundation for the subsequent quantitative validation and prioritization.

The qualitative analysis of interview data identified several recurring operational issues affecting supply chain performance in the construction material import process. Through coding and thematic analysis, the interview responses were grouped into key themes representing operational challenges and enabling factors influencing order-fulfillment accuracy.

First, strategic supply chain planning weaknesses were identified as an important constraint. Planning activities were often reactive and based on assumptions rather than structured forecasting or risk assessment. Limited coordination between functions and the absence of contingency planning reduced the effectiveness of planning activities.

Second, customer-driven timeline pressure was found to significantly affect procurement and delivery processes. Fixed project deadlines and limited flexibility often forced operational decisions to be made under time pressure, reducing buffer time and increasing the risk of delays.

Third, silo management and cross-functional coordination gaps emerged as a major organizational issue. Departments frequently operated independently, resulting in fragmented information sharing, delayed communication, and reliance on manual coordination through meetings or follow-ups.

Fourth, supply chain visibility limitations were identified as another key challenge. The absence of real-time tracking systems and the reliance on manual tools such as spreadsheets reduced transparency across supply chain stages and constrained decision-making.

In addition, information quality and communication problems further complicated coordination among departments and external partners. Incomplete or delayed information often led to misalignment between procurement planning, logistics scheduling, and delivery execution.

Operational challenges were also evident in the procurement process, where supplier response times, documentation procedures, and payment-related issues contributed to procurement delays. These upstream issues often propagated downstream and affected subsequent logistics and delivery activities.

Finally, logistics and delivery execution risks were observed during the transportation and delivery stages. Coordination issues, scheduling mismatches, and limited operational flexibility increased the likelihood of delivery disruptions and order inaccuracies.

Overall, the findings indicate that supply chain problems are largely interrelated and originate from upstream operational conditions, particularly planning limitations, procurement delays, and visibility constraints. These issues weaken coordination and responsiveness across supply chain stages and ultimately increase the risk of order-fulfillment inaccuracies.

## **Quantitative Findings**

The quantitative findings provide additional validation and prioritisation of these issues. The reliability assessment indicates that all questionnaire topics achieved Cronbach’s Alpha values above the acceptable threshold of 0.70, demonstrating satisfactory internal consistency of the measurement instrument. This confirms that the questionnaire statements consistently represent the operational issues identified during the qualitative phase.

Descriptive statistical analysis reveals differences in the perceived severity of the operational topics. The mean severity scores indicate that order-fulfillment accuracy recorded the highest severity level, suggesting that operational problems are most visible at the final stage of the supply chain where delivery errors directly affect customers.

However, the median values, which represent the level of agreement among respondents, highlight a different pattern. Procurement delays and supply chain visibility limitations recorded the highest median scores, indicating strong consensus among respondents that these issues are widespread and fundamental operational challenges.

The ranking results further support this observation by showing that upstream operational constraints—particularly procurement delays, limited information visibility, and coordination gaps—are perceived as critical contributors to supply chain inefficiencies. While fulfillment errors appear as the most visible outcome, the results indicate that many of these problems are linked to earlier stages of the supply chain process.

### Synthesis and Interpretation

The final phase synthesizes the qualitative and quantitative findings to interpret the relationships proposed in the conceptual framework. The synthesis indicates that upstream issues—particularly procurement delays, silo management, and limited supply chain visibility—are perceived as key constraints that weaken coordination and planning effectiveness. These upstream challenges subsequently influence process delivery and increase the likelihood of order-fulfillment inaccuracies.

Topic	Topic Mean	Ranking Topic Mean (Highest to lowest severity)
1	4.05	7
2	4.35	5
3	4.3	2
4	4.1	3
5	4.4	6
6	4.2	4
7	4.5	1

Topic	Topic Median	Consensus level based on Median (Highest to lowest)
1	4	4
2	5	2
3	4	6
4	5	1
5	4	3
6	4.5	5
7	4	7

## **RESULT AND DISCUSSIONS**

The results indicate that order-fulfillment inaccuracies in the construction material import supply chain are largely driven by upstream operational constraints rather than isolated delivery-stage failures. While fulfillment errors appear most visible at the final stage of the supply chain, the findings show that their underlying causes originate earlier in the process.

In particular, procurement delays, silo management, and limited supply chain visibility weaken coordination and planning reliability across departments. These upstream constraints reduce information transparency and operational responsiveness, making it difficult for organizations to adjust procurement and delivery activities effectively. As a result, disruptions propagate through the supply chain and ultimately manifest as delivery delays or order inaccuracies.

This pattern reflects an upstream–downstream relationship in supply chain performance, where weaknesses in planning and sourcing processes influence downstream delivery outcomes. The findings therefore highlight the importance of addressing coordination and information challenges at earlier stages of the supply chain rather than focusing only on delivery execution.

The results are consistent with the Supply Chain Operations Reference (SCOR) framework, which emphasizes the integration of planning, sourcing, and delivery activities to achieve reliable supply chain performance. They also support the Resource-Based View (RBV) perspective by showing that capabilities such as strategic planning, information visibility, and cross-functional coordination contribute to operational performance only when they are effectively integrated within organizational processes.

Based on these insights, this study proposes a Strategic Supply Chain Improvement Model that focuses on three key improvement dimensions: strengthening strategic supply chain planning, enhancing supply chain visibility, and improving process delivery through stronger cross-functional coordination. By addressing upstream operational constraints and improving integration across supply chain functions, the model aims to enhance coordination, increase operational responsiveness, and ultimately improve order-fulfillment accuracy.

## **LIMITATION AND RECOMMENDATIONS FOR FUTURE RESEARCH**

This study provides a diagnostic understanding of operational challenges in construction material import supply chains and proposes a Strategic Supply Chain Improvement Model. However, several limitations should be acknowledged. The study is based on a small number of interview participants from a single firm, which may limit the generalisability of the findings to other organisations or industries.

Future research can extend this work in several ways. First, studies may investigate how advanced planning technologies—such as ERP systems, predictive analytics, or AI-based forecasting—can

improve strategic supply chain planning and responsiveness. Second, further research could explore technology-enabled solutions that enhance supply chain visibility, including real-time tracking systems, Internet of Things (IoT) applications, blockchain-based documentation, and integrated digital dashboards.

Third, future studies may examine how digital execution tools such as transport management systems (TMS), warehouse management systems (WMS), and workflow automation can strengthen process delivery and operational integration. Fourth, the model may be expanded by incorporating sustainable supply chain management practices, such as green logistics initiatives and carbon tracking systems.

Finally, future research could empirically test the proposed model across multiple organisations or industries using comparative or longitudinal research designs. Expanding the scope to include external supply chain partners—such as suppliers, logistics providers, and regulatory agencies—may also provide deeper insights into collaborative innovation and ecosystem-level coordination in import-dependent supply chains.

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