

MidOcean University

Management College

Business Administration

**The Impact of Supply Chain Integration on Airline Operational Performance: The Mediating
Role of Supply Chain Visibility**

Prepared by:

Majid Shamaa

Supervised By:

Fayez Jarad

العام الدراسي:

2026

Table of Contents

Introduction	3
Research Problem	5
Significance of the Study	7
Research Objectives	9
Research Questions	10
Research Hypothesis	11
Literature Review	13
Research Gap.....	15
Theoretical Foundation	17
Research Methodology	19
Research Instrument	21
Study Limitations	23
Reference List	25

Introduction

The airline industry operates in a highly dynamic and competitive environment where efficient supply chain management has become a critical determinant of operational success. Airlines depend on extensive networks of suppliers, maintenance providers, airport operators, fuel companies, and logistics partners to ensure the timely delivery of services and maintain operational continuity. As global supply chains become increasingly complex, effective integration among these stakeholders is essential for improving coordination, reducing operational disruptions, and enhancing overall performance (Ivanov & Dolgui, 2020; Christopher, 2022).

Supply chain integration enables organizations to establish collaborative relationships, facilitate information sharing, and synchronize business processes across the supply network. However, integration alone may not be sufficient to achieve superior operational performance unless organizations possess adequate visibility across their supply chains. Supply chain visibility provides real-time access to critical operational information, allowing organizations to respond proactively to disruptions, optimize resource utilization, and improve decision-making. In the aviation industry, where operational reliability and service continuity are essential, visibility has become an increasingly important strategic capability (Brandon-Jones et al., 2014; Queiroz et al., 2023).

Although previous studies have examined the relationship between supply chain integration and organizational performance, most have focused on manufacturing and general logistics contexts. Comparatively limited research has investigated this relationship within the airline industry, particularly regarding the mediating role of supply chain visibility. This represents an important research gap that warrants further investigation.

Accordingly, this study examines the impact of supply chain integration on operational performance in the airline industry while investigating the mediating role of supply chain visibility. The findings

are expected to contribute to the existing body of knowledge in supply chain management and provide practical recommendations for airline managers seeking to improve operational performance through enhanced supply chain capabilities.

Research Problem

The airline industry operates within a highly interconnected supply chain that depends on effective coordination among airlines, aircraft manufacturers, maintenance, repair and overhaul (MRO) providers, airport operators, logistics companies, fuel suppliers, and other strategic partners. As airlines strive to improve operational efficiency and maintain service reliability in an increasingly competitive environment, supply chain integration has become a strategic priority. However, despite significant investments in collaborative technologies and integrated business processes, many airlines continue to experience operational disruptions, including delayed aircraft maintenance, shortages of critical spare parts, flight delays, and increased operational costs. According to the International Air Transport Association (IATA, 2024), persistent supply chain constraints continue to affect fleet availability and operational efficiency across the global aviation industry.

The desired situation is for airlines to achieve seamless coordination and uninterrupted information flow throughout their supply chains, enabling timely decision-making and improved operational performance. However, the current reality indicates that supply chain integration does not always produce the expected operational outcomes. One possible explanation is that integration alone may be insufficient unless it is accompanied by adequate supply chain visibility, which enables organizations to access accurate, real-time information across the supply network and respond effectively to operational challenges.

Previous studies have reported positive relationships between supply chain integration and organizational performance across various industries (Flynn et al., 2010; Leuschner et al., 2013). Nevertheless, most empirical research has focused on manufacturing and general logistics contexts, while relatively limited attention has been given to the airline industry. Furthermore, the mediating

role of supply chain visibility in explaining how supply chain integration enhances airline operational performance remains insufficiently investigated, particularly within the context of modern aviation supply chains (Queiroz et al., 2023). This represents an important theoretical and practical gap that requires further investigation.

Significance of the Study

1. Scientific Significance

This study is expected to contribute to the growing body of knowledge in supply chain management and aviation operations by examining the relationship between supply chain integration and operational performance within the airline industry. While previous research has extensively investigated supply chain integration in manufacturing and general logistics sectors, empirical evidence focusing on the airline industry remains relatively limited. Furthermore, this study extends existing literature by examining the mediating role of supply chain visibility, thereby providing a more comprehensive understanding of the mechanisms through which supply chain integration influences operational performance.

In addition, the study integrates concepts from supply chain management and aviation operations into a unified conceptual framework. The findings are expected to provide empirical evidence that supports or extends existing theories related to supply chain integration, visibility, and organizational performance, while offering a foundation for future academic research in the aviation sector.

2. Practical Significance

From a practical perspective, this study is expected to provide valuable insights for airline executives, supply chain managers, airport operators, and other aviation stakeholders seeking to improve operational performance through more effective supply chain practices. By identifying the role of supply chain integration and supply chain visibility in enhancing operational performance, the study may support organizations in developing strategies that improve coordination, information sharing, and operational decision-making.

The findings may also assist policymakers and industry leaders in promoting best practices that strengthen supply chain capabilities across the aviation sector. Furthermore, the study is expected to provide a validated research framework and measurement instrument that can be used by practitioners and future researchers to evaluate supply chain integration, supply chain visibility, and operational performance within airline organizations.

Research Objectives

General Objective

The primary objective of this study is to examine the impact of supply chain integration on operational performance in the airline industry and to investigate the mediating role of supply chain visibility in this relationship.

Specific Objectives

To achieve the general objective, the study seeks to:

1. To examine the level of supply chain integration within airline organizations.
2. To evaluate the effect of supply chain integration on airline operational performance.
3. To examine the effect of supply chain integration on supply chain visibility within the airline industry.
4. To assess the effect of supply chain visibility on airline operational performance.
5. To investigate the mediating role of supply chain visibility in the relationship between supply chain integration and airline operational performance.

Research Questions

The study seeks to answer the following research questions:

Main Research Question

RQ1: What is the impact of supply chain integration on operational performance in the airline industry, and how does supply chain visibility mediate this relationship?

Specific Research Questions

RQ2: To what extent does supply chain integration influence operational performance in the airline industry?

RQ3: To what extent does supply chain integration influence supply chain visibility in the airline industry?

RQ4: To what extent does supply chain visibility influence operational performance in the airline industry?

RQ5: Does supply chain visibility mediate the relationship between supply chain integration and operational performance in the airline industry?

Research Hypotheses

Based on the research objectives, research questions, and the proposed conceptual framework, the following hypotheses are formulated.

Main Hypotheses

Null Hypothesis (H_a)

H_a: Supply chain integration has no statistically significant effect on operational performance in the airline industry through the mediating role of supply chain visibility.

Alternative Hypothesis (H_b)

H₁: Supply chain integration has a statistically significant effect on operational performance in the airline industry through the mediating role of supply chain visibility.

Sub-Hypotheses

Relationship between Supply Chain Integration and Operational Performance

H₀₁: Supply chain integration has no statistically significant effect on operational performance in the airline industry.

H₁₁: Supply chain integration has a statistically significant positive effect on operational performance in the airline industry.

Relationship between Supply Chain Integration and Supply Chain Visibility

H₀₂: Supply chain integration has no statistically significant effect on supply chain visibility in the airline industry.

H12: Supply chain integration has a statistically significant positive effect on supply chain visibility in the airline industry.

Relationship between Supply Chain Visibility and Operational Performance

H03: Supply chain visibility has no statistically significant effect on operational performance in the airline industry.

H13: Supply chain visibility has a statistically significant positive effect on operational performance in the airline industry.

Mediating Effect of Supply Chain Visibility

H04: Supply chain visibility does not mediate the relationship between supply chain integration and operational performance in the airline industry.

H14: Supply chain visibility mediates the relationship between supply chain integration and operational performance in the airline industry

Literature Review

Supply chain management has become a strategic function that significantly influences organizational competitiveness and operational excellence across industries. Among its core dimensions, supply chain integration has received considerable attention from researchers because of its ability to improve collaboration, facilitate information sharing, synchronize business processes, and enhance coordination among supply chain partners. Previous studies have consistently demonstrated that organizations with higher levels of supply chain integration achieve superior operational and organizational performance through improved efficiency, reduced operational costs, enhanced service quality, and greater responsiveness to market changes (Flynn et al., 2010; Leuschner et al., 2013).

More recently, researchers have highlighted supply chain visibility as a critical organizational capability that strengthens supply chain performance by providing timely, accurate, and transparent information throughout the supply network. Supply chain visibility enables organizations to monitor inventory, coordinate logistics activities, anticipate disruptions, and support proactive decision-making. With the rapid adoption of digital technologies and real-time information systems, visibility has become an essential component of modern supply chain management, particularly in industries characterized by high operational complexity and uncertainty (Queiroz et al., 2023).

Within the aviation industry, effective supply chain management has become increasingly important due to the industry's dependence on multiple interconnected stakeholders, including aircraft manufacturers, maintenance, repair and overhaul (MRO) providers, airport operators, fuel suppliers, logistics companies, and ground handling service providers. Maintaining operational continuity requires effective integration among these entities, supported by timely access to accurate operational

information. Consequently, both supply chain integration and supply chain visibility have emerged as strategic capabilities that contribute to improved airline operational performance.

Although previous studies have examined the relationships among supply chain integration, supply chain visibility, and organizational performance, the existing evidence is fragmented. Most empirical studies have concentrated on manufacturing, retail, healthcare, and general logistics sectors, while comparatively limited attention has been devoted to the airline industry. Furthermore, existing studies have frequently examined direct relationships between supply chain integration and performance, with fewer investigations exploring the mechanisms through which integration influences operational outcomes. Therefore, a comprehensive review of previous studies is necessary to critically evaluate existing knowledge, identify inconsistencies, and establish the theoretical foundation for the present study.

Research Gap

The review of previous studies indicates that supply chain integration is generally associated with improved organizational and operational performance. Likewise, supply chain visibility has been recognized as an important capability for enhancing coordination, decision-making, and responsiveness within complex supply chain networks. However, several important gaps remain in the existing literature.

First, although supply chain integration has been widely investigated, most empirical studies have focused on manufacturing and general logistics organizations, with relatively few studies examining the airline industry. Given the unique operational characteristics of airlines, findings from other industries cannot be assumed to apply directly to aviation.

Second, while previous research has established direct relationships between supply chain integration and organizational performance, limited attention has been given to understanding the underlying mechanisms through which these relationships occur. In particular, the mediating role of supply chain visibility has not been sufficiently examined within the airline industry.

Third, recent technological developments, increasing supply chain complexity, and ongoing operational disruptions have significantly changed the way airlines manage their supply chains. These changes create a need for updated empirical evidence that reflects contemporary aviation practices and evaluates the contribution of supply chain visibility within integrated airline supply chains.

Accordingly, this study seeks to address these gaps by examining the impact of supply chain integration on operational performance in the airline industry while investigating the mediating role of supply chain visibility. By developing and empirically testing an integrated conceptual framework, the study is

expected to contribute to the existing body of knowledge in supply chain management and provide practical guidance for airline managers seeking to enhance operational performance through improved supply chain capabilities.

Theoretical Foundation

This study is grounded in two complementary theoretical perspectives: the Resource-Based View (RBV) and Organizational Information Processing Theory (OIPT). These theories provide a robust foundation for explaining how supply chain integration influences operational performance and why supply chain visibility serves as a critical mediating capability within the airline industry.

The Resource-Based View (RBV), originally proposed by Barney (1991), argues that organizations achieve sustainable competitive advantage by developing valuable, rare, inimitable, and well-organized resources and capabilities. Within the context of supply chain management, supply chain integration represents a strategic organizational capability that enables firms to strengthen collaboration with internal functions and external partners, improve resource coordination, and enhance operational effectiveness. From the RBV perspective, airlines that successfully integrate their supply chain activities are better positioned to utilize their resources efficiently, improve service reliability, and achieve superior operational performance.

While RBV explains the strategic value of integration, Organizational Information Processing Theory (OIPT) (Galbraith, 1973) provides the theoretical basis for the mediating role of supply chain visibility. OIPT suggests that organizations operating in complex and uncertain environments require timely, accurate, and relevant information to support effective decision-making. The airline industry is characterized by high operational complexity involving multiple stakeholders, dynamic demand, strict regulatory requirements, and time-sensitive operations. In such an environment, supply chain visibility enables organizations to access real-time information across the supply network, facilitating coordination, reducing uncertainty, and improving operational responsiveness. Consequently, higher levels of supply chain integration are expected to enhance supply chain visibility, which in turn contributes to improved operational performance.

The integration of RBV and OIPT provides a comprehensive theoretical explanation for the proposed research model. RBV explains why supply chain integration represents a valuable organizational capability, while OIPT explains how this capability enhances operational performance through improved supply chain visibility. Together, these theories support the conceptual framework of the present study and provide the theoretical justification for examining the mediating role of supply chain visibility in the relationship between supply chain integration and operational performance in the airline industry.

Research Methodology

This study adopts an applied research design, as it seeks to address a practical managerial issue by examining how supply chain integration influences operational performance in the airline industry through the mediating role of supply chain visibility. The study is also explanatory in nature because it aims to investigate the causal relationships among the proposed research variables and to explain the mechanism through which supply chain integration affects operational performance.

A quantitative research approach will be employed to achieve the objectives of the study. The quantitative approach is considered appropriate because it enables the collection of standardized data from a relatively large number of respondents and facilitates the statistical examination of the proposed hypotheses. Furthermore, this approach provides objective and reliable evidence for assessing the direct and indirect relationships among supply chain integration, supply chain visibility, and operational performance.

The study will utilize a cross-sectional survey research design, in which data will be collected at a single point in time through a structured questionnaire. The collected data will be analyzed to examine the proposed conceptual model and to determine the extent to which supply chain visibility mediates the relationship between supply chain integration and operational performance in the airline industry.

The implementation of the research will follow a systematic process. First, an extensive review of the relevant literature will be conducted to establish the theoretical foundation and develop the conceptual framework. Second, the research hypotheses will be formulated based on the identified relationships among the study variables. Third, a structured questionnaire will be developed using validated measurement scales adapted from previous studies. After obtaining the required data from the target respondents, appropriate statistical techniques will be employed to test the

proposed hypotheses and evaluate the conceptual model. Finally, the findings will be interpreted in light of the theoretical framework and previous empirical studies to provide conclusions and practical recommendations for the airline industry.

Research Instrument

A structured questionnaire will be employed as the primary instrument for collecting quantitative data. The questionnaire is considered appropriate for this study because it enables the efficient collection of standardized data from a large number of respondents and facilitates the statistical examination of the proposed relationships among the study variables.

The questionnaire will be developed based on validated measurement scales adopted and adapted from previous empirical studies on supply chain integration, supply chain visibility, and operational performance. The wording of the items will be modified, where necessary, to reflect the operational context of the airline industry while preserving the original meaning of the constructs.

The questionnaire will consist of four sections:

Section I: Demographic Information

This section will collect respondents' background information, including gender, age, educational qualification, years of professional experience, current job position, department, and the type of airline or aviation organization in which they are employed. These data will be used to describe the study sample and support the interpretation of the findings.

Section II: Supply Chain Integration

This section will measure the extent of supply chain integration within airline organizations. The items will assess key dimensions such as internal integration, supplier integration, customer integration, information sharing, collaborative planning, and coordination among supply chain partners. Responses will be measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Section III: Supply Chain Visibility

This section will evaluate respondents' perceptions of supply chain visibility by measuring the availability, accuracy, accessibility, and timeliness of operational information throughout the airline supply chain. The items will also assess the organization's capability to monitor supply chain activities and respond effectively to operational changes using a five-point Likert scale.

Section IV: Operational Performance

This section will measure airline operational performance using indicators such as operational efficiency, service reliability, delivery performance, operational flexibility, responsiveness, and resource utilization. Respondents will evaluate each statement using the same five-point Likert scale to ensure consistency throughout the questionnaire.

To ensure the quality of the measurement instrument, the questionnaire will be reviewed by academic experts and industry specialists to establish content validity. A pilot study will subsequently be conducted to evaluate the clarity and relevance of the questionnaire items before full-scale data collection. The reliability of the instrument will be assessed using Cronbach's Alpha, with values of 0.70 or higher considered acceptable for internal consistency (Hair et al., 2022). In addition, construct validity will be evaluated during the data analysis stage through Confirmatory Factor Analysis (CFA) or, if Partial Least Squares Structural Equation Modeling (PLS-SEM) is employed, through assessments of convergent and discriminant validity using Composite Reliability (CR), Average Variance Extracted (AVE), and the Heterotrait–Monotrait (HTMT) ratio.

Study Limitations

The scope of this study is defined by the following limitations:

1. Human Boundary

The study is limited to managerial and professional employees working in supply chain-related functions within commercial airline organizations, including supply chain management, procurement, logistics, operations, inventory management, and maintenance planning. These participants are selected because they possess the knowledge and experience necessary to evaluate supply chain integration, supply chain visibility, and operational performance.

2. Geographical Boundary

The study is limited to commercial airline organizations operating in the Kingdom of Saudi Arabia. This context is appropriate because Saudi Arabia's aviation sector is undergoing significant transformation and expansion, providing a suitable environment for examining supply chain integration and operational performance.

3. Time Boundary

The study adopts a cross-sectional research design, whereby data will be collected at a single point in time during the research period. Consequently, the findings will reflect respondents' perceptions of supply chain integration, supply chain visibility, and operational performance at the time the survey is conducted.

4. Conceptual Boundary

The study is limited to examining the relationships among Supply Chain Integration, Supply Chain Visibility, and Operational Performance. Other organizational factors that may influence

operational performance, such as organizational culture, leadership practices, digital transformation, and organizational resilience, are beyond the scope of this study.

Reference List

- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Brandon-Jones, E., Squire, B., Autry, C. W., & Petersen, K. J. (2014). A contingent resource-based perspective of supply chain resilience and robustness. *Journal of Supply Chain Management*, 50(3), 55–73.
- Christopher, M. (2022). *Logistics & supply chain management* (6th ed.). Pearson.
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). Sage.
- Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28(1), 58–71.
- Galbraith, J. R. (1973). *Designing complex organizations*. Addison-Wesley.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.
- International Air Transport Association. (2024). *Annual Review 2024*. International Air Transport Association.
- Ivanov, D., & Dolgui, A. (2020). A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0. *Production Planning & Control*, 32(9), 775–788.
- Leuschner, R., Rogers, D. S., & Charvet, F. F. (2013). A meta-analysis of supply chain integration and firm performance. *Journal of Supply Chain Management*, 49(2), 34–57.
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics*, 22(2), 1–25.

- Queiroz, M. M., Fosso Wamba, S., Trinchera, L., & Machado, M. C. (2023). Digital supply chain management and supply chain visibility: Recent advances and future research directions. *International Journal of Production Economics*.
- Saunders, M., Lewis, P., & Thornhill, A. (2023). *Research methods for business students* (9th ed.). Pearson.
- Simatupang, T. M., & Sridharan, R. (2005). The collaboration index: A measure for supply chain collaboration. *International Journal of Physical Distribution & Logistics Management*, 35(1), 44–62.
- Wong, C. W. Y., Lai, K.-H., & Bernroider, E. W. N. (2015). The performance of contingencies of supply chain information integration. *International Journal of Production Economics*, 139, 160–170.
- World Economic Forum. (2023). *The Future of Supply Chains: Resilience, Agility and Sustainability*. World Economic Forum.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage.
- Zhang, M., Guo, H., Huo, B., Zhao, X., & Huang, J. (2019). Linking supply chain quality integration with mass customization and product modularity. *International Journal of Production Economics*, 207, 227–235.
- Zhou, H., & Benton, W. C. (2007). Supply chain practice and information sharing. *Journal of Operations Management*, 25(6), 1348–1365.