International Journal of Science, Strategic Management and Technology
Volume **02** Issue **06** June-**2026** | ISSN: **3108-1762 (Online)** | Impact Factor: 3.8
An International, Peer-Reviewed, Open Access Scholarly Journal Indexed in recognized academic databases

Logistics and Supply Chain Performance Dashboard

Priyanka Behera

Department of Master of Computer Applications

GIFT Autonomous, Bhubaneswar, Odisha, India, priyankab2024@gift.edu.in

Smruti Ranjan Swain

Head of Department Master of Computer Applications

GIFT Autonomous, Bhubaneswar, Odisha, India, hodmca@gift.edu.in

https://doi.org/10.55041/ijsmt.v2i6.064

Cite this Article: Behera, P. (2026). Logistics and Supply Chain Performance Dashboard. International Journal of Science, Strategic Management and Technology, *02*(6). https://doi.org/10.55041/ijsmt.v2i6.064

ABSTRACT

The rapid growth of global trade, e-commerce, and transportation systems has significantly increased the complexity of logistics and supply chain operations. Organizations generate large volumes of logistics data from shipment records, inventory updates, supplier information, transportation costs, and delivery activities. Efficient analysis of this data is essential for improving operational visibility, reducing delays, optimizing inventory management, and supporting data-driven business decisions. This paper presents a Logistics and Supply Chain Performance Dashboard developed using the Databricks Lakehouse Platform and Medallion Architecture for scalable logistics data processing and analytical reporting.

The proposed system processes logistics datasets through Bronze, Silver, and Gold layers to improve data quality, perform transformation, and generate meaningful business insights. Interactive dashboards and visualization techniques are used to monitor key performance indicators (KPIs) such as delivery performance, transportation costs, supplier efficiency, inventory levels, and order fulfillment status through charts, KPI cards, and analytical reports. The developed dashboard helps organizations identify operational bottlenecks, improve supply chain visibility, and support strategic decision-making. This research demonstrates how modern big data technologies, Medallion Architecture, and dashboard visualization tools can be effectively utilized for intelligent logistics analytics and supply chain performance management.

Keywords- ***Logistics Management; Supply Chain Analytics; Databricks; Medallion Architecture; Dashboard Visualization; Data Analytics; KPI Monitoring; Transportation Analysis; Inventory Management; Business Intelligence; Operational Efficiency.***

I. INTRODUCTION

The rapid growth of global trade, e-commerce, and transportation networks has increased the complexity of logistics and supply chain operations. Organizations generate large volumes of logistics data every day through shipment tracking, inventory management, supplier activities, and delivery services. Managing and analyzing this data efficiently has become essential for improving operational performance, reducing delays, and supporting effective business decision-making.

Traditional logistics management systems often face challenges such as lack of real-time monitoring, inefficient inventory tracking, delayed deliveries, and high transportation costs. To address these issues, modern organizations are increasingly adopting big data analytics and business intelligence technologies for operational analysis and visualization. Technologies such as the Databricks Lakehouse Platform and Medallion Architecture help process and transform large-scale logistics datasets through Bronze, Silver, and Gold layers for better data quality and analytical reporting.

This research presents a Logistics and Supply Chain Performance Dashboard developed using data analytics and visualization techniques for monitoring supply chain operations and key performance indicators (KPIs). The dashboard provides interactive visualizations for analyzing delivery performance, transportation costs, inventory levels, supplier efficiency, and operational trends using charts, KPI cards, and analytical reports. The proposed system helps organizations improve operational transparency, identify inefficiencies, and support data-driven supply chain management decisions.

Fig 1: Supply Chain Process

II. RELATED WORK

A. Supply Chain Analytics

Supply chain analytics has become an important area in modern logistics management due to the increasing complexity of transportation and delivery systems. Organizations generate large amounts of operational data related to shipments, inventory, suppliers, and warehouse activities. Researchers and industries use data analytics techniques to improve supply chain visibility, reduce operational costs, and enhance delivery performance. Analytical methods such as KPI monitoring, performance tracking, and trend analysis help organizations identify inefficiencies and improve logistics operations. Technologies such as the Databricks Lakehouse Platform are widely used for scalable logistics data processing and analytical reporting.

B. Dashboard Visualization Systems

Dashboard visualization systems are widely used in logistics and supply chain management for monitoring operational performance through interactive visual reports. Business intelligence dashboards help organizations analyze key performance indicators such as transportation costs, delivery status, inventory levels, and supplier efficiency. Interactive charts, graphs, KPI cards, and analytical reports improve data understanding and operational monitoring. Visualization platforms such as Microsoft Power BI and Tableau provide advanced dashboard development and reporting features. These systems support faster and more effective data-driven decision-making processes.

C. Big Data in Logistics

Big data technologies have significantly improved logistics and supply chain analytics by enabling organizations to process large-scale operational datasets efficiently. Logistics systems generate massive amounts of data from transportation networks, warehouse management systems, and shipment tracking activities. Traditional processing systems often struggle to manage such complex datasets effectively. Modern architectures such as Medallion Architecture organize data into Bronze, Silver, and Gold layers for structured data transformation and analytical processing. These technologies improve data quality, support real-time analytics, and help organizations generate meaningful business insights for supply chain performance management.

III. CHALLENGES IN LOGISTICS AND SUPPLY CHAIN ANALYTICS

Logistics and supply chain systems generate massive volumes of operational data every day through shipment records, inventory management systems, supplier networks, transportation activities, warehouse operations, and delivery tracking systems. Managing and analyzing this continuously growing data introduces several challenges such as real-time monitoring, data integration, inventory management, transportation optimization, and operational visibility. Logistics data often exists in structured, semi-structured, and unstructured formats collected from multiple sources, making data processing and analytical reporting more complex. Organizations also face challenges related to delivery delays, high transportation costs, scattered operational data, and inefficient decision-making processes. Another major challenge is maintaining data quality, consistency, and scalability while processing large-scale logistics datasets. The proposed Logistics and Supply Chain Performance Dashboard addresses these challenges using the Databricks Lakehouse Platform and Medallion Architecture for scalable data processing, transformation, visualization, and analytical reporting.

A. Data Storage and Processing

One of the major challenges in logistics and supply chain analytics is handling the continuously increasing volume of operational data generated from transportation systems, warehouses, inventory records, supplier activities, and shipment tracking systems. Traditional database systems often face limitations in storing and processing large-scale logistics datasets efficiently. Logistics data may contain missing values, duplicate records, inconsistent formats, and unstructured information, which affects analytical accuracy and reporting performance. Another important challenge is integrating data collected from multiple operational sources into a centralized analytical system.

To overcome these challenges, the proposed system utilizes Bronze, Silver, and Gold layers within the Medallion Architecture for scalable data ingestion, cleaning, transformation, and analytical processing. The layered architecture improves data quality, maintains consistency, and supports efficient dashboard visualization and KPI monitoring for logistics performance analysis and business decision-making.

B. Scalability and Dashboard Visualization

Scalability is another significant challenge in logistics analytics because supply chain systems continuously generate large amounts of real-time operational data. Analytical platforms must efficiently handle growing datasets without affecting processing speed, reporting accuracy, or dashboard performance. In addition, effective dashboard visualization is essential for understanding supply chain operations, identifying delivery delays, monitoring transportation costs, analyzing inventory performance, and tracking supplier efficiency. Poor visualization techniques may reduce analytical clarity and make decision-making more difficult.

The developed dashboard integrates multiple visualization techniques such as bar charts, pie charts, line charts, KPI cards, and analytical reports to provide meaningful logistics insights. These visualizations help organizations monitor operational trends, identify bottlenecks, improve supply chain visibility, and support faster data-driven business decisions.

C. Data Security and Operational Reliability

Logistics and supply chain systems often manage sensitive operational and business information, making data security and reliability important challenges in analytics platforms. Unauthorized access, data loss, inaccurate reporting, and system failures can negatively affect logistics operations and business performance. Therefore, maintaining secure data processing, controlled access mechanisms, and reliable analytical reporting is essential for logistics management systems.

The proposed system focuses on maintaining data integrity, secure analytical processing, and reliable reporting within the Databricks environment. Structured processing layers and controlled data management practices improve operational reliability and analytical consistency during dashboard generation and KPI monitoring. In addition, authentication mechanisms, secure data handling practices, and backup systems help improve data protection, system availability, and long-term operational stability for supply chain analytics environments.

Fig 2: Challenges In Supply Chain Analytics

IV. OBJECTIVES

The primary objective of this research is to develop a Logistics and Supply Chain Performance Dashboard for analyzing and monitoring logistics operations using data analytics and visualization techniques. The proposed system aims to improve operational visibility, support efficient decision-making, and enhance supply chain performance through interactive analytical reporting.

The main objectives of the proposed system are:

1. To analyze logistics and supply chain operations using data analytics techniques.
2. To implement the Databricks Lakehouse Platform and Medallion Architecture for scalable data processing.
3. To monitor key performance indicators (KPIs) such as delivery performance, transportation costs, inventory levels, and supplier efficiency.
4. To develop interactive dashboards and visualization reports for logistics performance analysis.
5. To identify operational inefficiencies such as delivery delays, poor inventory tracking, and high transportation costs.
6. To support data-driven business decision-making through real-time analytical insights.
7. To improve operational transparency and overall supply chain management efficiency.

V. TOOLS AND FRAMEWORKS FOR LOGISTICS AND SUPPLY CHAIN ANALYTICS

The proposed Logistics and Supply Chain Performance Dashboard utilizes the Databricks Lakehouse Platform, Apache Spark, cloud computing, and dashboard visualization tools for logistics data processing, transformation, analytics, and reporting.

A. Apache Spark for Logistics Analytics

Apache Spark is a distributed big data processing framework used for scalable and fast analytical computation. In the proposed system, Spark is used for logistics data ingestion, transformation, filtering, aggregation, and KPI analysis within the Bronze, Silver, and Gold layers of the Medallion Architecture. It supports large-scale logistics analytics and operational reporting efficiently.

B. Databricks Lakehouse Platform

The Databricks Lakehouse Platform provides a unified environment for big data storage, processing, and analytics. In the proposed system, Databricks is used for scalable logistics data management, Medallion Architecture implementation, SQL analytics, and dashboard reporting. It improves data

quality, analytical processing, and operational monitoring efficiency.

C. Cloud Computing for Logistics Data Processing

Cloud computing technologies provide scalable storage, distributed processing, and real-time analytics for logistics systems. The proposed system utilizes cloud-based analytical processing for managing logistics datasets, KPI monitoring, and dashboard generation. Cloud platforms improve scalability, flexibility, and operational performance for supply chain analytics.

D. Dashboard Visualization Tools

Dashboard visualization tools help convert complex logistics data into interactive analytical reports and graphical insights. In the proposed system, Microsoft Power BI is used for developing dashboards, KPI cards, charts, and performance reports. These visualizations help organizations monitor logistics operations and support data-driven decision-making.

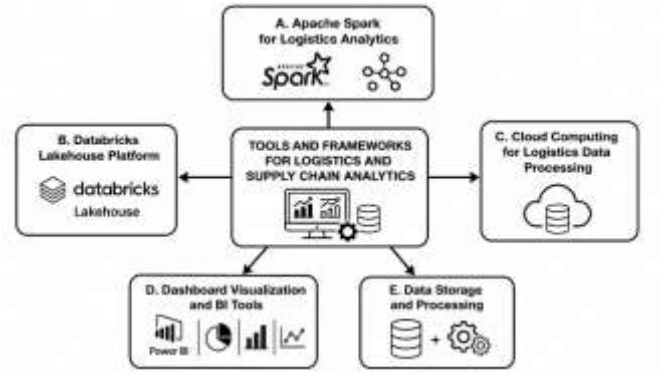

Fig 3: Technology Stack of the Proposed System

VI. SYSTEM ARCHITECTURE

The proposed Logistics and Supply Chain Performance Dashboard is designed using the Databricks Lakehouse Platform and Medallion Architecture for scalable data processing, transformation, and analytical reporting. The system architecture consists of multiple layers including data collection, data processing, storage, transformation, and dashboard visualization. Logistics data such as shipment records, inventory details, transportation information, supplier data, and delivery status are collected from multiple operational sources and processed through different transformation stages.

The architecture follows the Medallion Architecture approach, where raw logistics data is first stored in the Bronze layer for initial ingestion and storage. The data is then cleaned, filtered, and transformed in the Silver layer to improve data quality and consistency. Finally, the Gold layer generates optimized analytical datasets and KPI metrics for dashboard reporting and business analysis. Interactive dashboards are developed using visualization tools to display logistics insights through charts, KPI cards, graphs, and analytical reports.

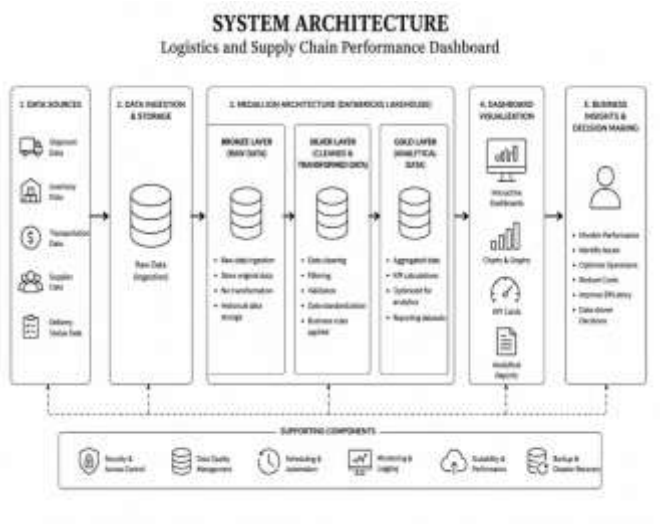

Fig 4: System Architecture of Logistic and Supply chain Performane Dashboard

The proposed architecture supports efficient logistics monitoring, scalable analytical processing, real-time performance analysis, and data-driven decision-making for supply chain management.

VII. METHODOLOGY

The proposed **Logistics and Supply Chain Performance Dashboard** follows a structured methodology for logistics data collection, processing, transformation, analytics, and dashboard visualization using the Databricks Lakehouse Platform and Medallion Architecture. The methodology focuses on improving logistics data quality, operational monitoring, and KPI-based analytical reporting for efficient supply chain management.

International Journal of Science, Strategic Management and Technology
Volume **02** Issue **06** June-**2026** | ISSN: **3108-1762 (Online)** | Impact Factor: 3.8
An International, Peer-Reviewed, Open Access Scholarly Journal Indexed in recognized academic databases

A. Data Collection

The first stage of the methodology involves collecting logistics and supply chain datasets from multiple operational sources such as shipment records, inventory systems, transportation details, supplier information, warehouse operations, and delivery tracking systems. The collected datasets may contain structured, semi-structured, and unstructured data used for logistics analysis and dashboard reporting.

Fig 5: Medallion Architecture

B. Data Ingestion and Storage

The collected logistics datasets are ingested into the Databricks environment for scalable storage and processing. Raw operational data is initially stored in the Bronze layer of the Medallion Architecture without major transformation. This layer maintains original logistics datasets for historical tracking, backup, and large-scale analytical processing.

C. Data Cleaning and Transformation

In the Silver layer, logistics datasets are cleaned, filtered, validated, and transformed to improve data quality and consistency. Duplicate records, missing values, and inconsistent formats are removed during preprocessing. Data transformation techniques and business rules are applied to prepare optimized datasets for KPI analysis and dashboard visualization.

D. Analytical Processing and KPI Generation

The Gold layer is used for analytical processing and KPI generation. Aggregated logistics datasets are prepared for monitoring delivery performance, transportation costs, supplier efficiency, inventory levels, and order fulfillment status. Various analytical techniques are applied to generate meaningful business insights and operational performance metrics.

E. Dashboard Visualization and Reporting

Interactive dashboards and analytical reports are developed using visualization tools such as Microsoft Power BI. Various visualization techniques including bar charts, line charts, KPI cards, pie charts, and graphical reports are used to represent logistics insights and supply chain trends. The developed dashboard helps organizations monitor operations, identify bottlenecks, and support business decision-making processes.

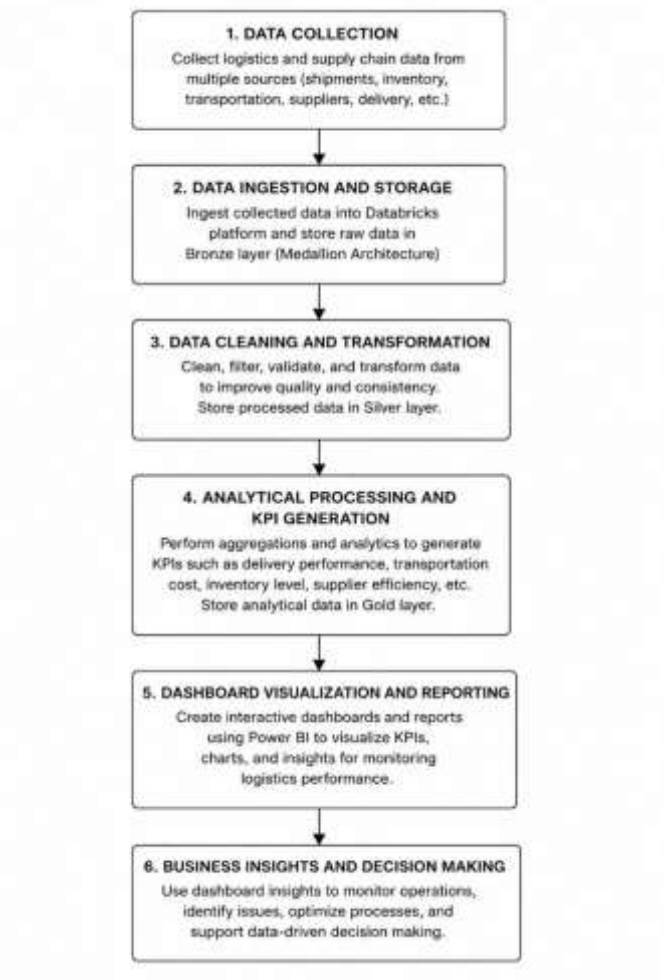

Fig 6 : Workflow of the Proposed Logistics Dashboard

VIII. RESULTS AND ANALYSIS

The developed **Logistics and Supply Chain Performance Dashboard** successfully processes and analyzes logistics datasets using the Databricks Lakehouse Platform and Medallion Architecture. The system efficiently handles logistics data related to

shipment tracking, transportation management, inventory monitoring, supplier performance, and delivery operations through structured analytical processing and dashboard visualization.

The interactive dashboard provides meaningful insights using KPI cards, bar charts, line charts, pie charts, and analytical reports for monitoring logistics performance. The generated dashboards help identify delivery delays, transportation inefficiencies, inventory issues, and operational bottlenecks more effectively. The system also improves supply chain visibility, supports real-time operational monitoring, and enables organizations to make faster data-driven business decisions.

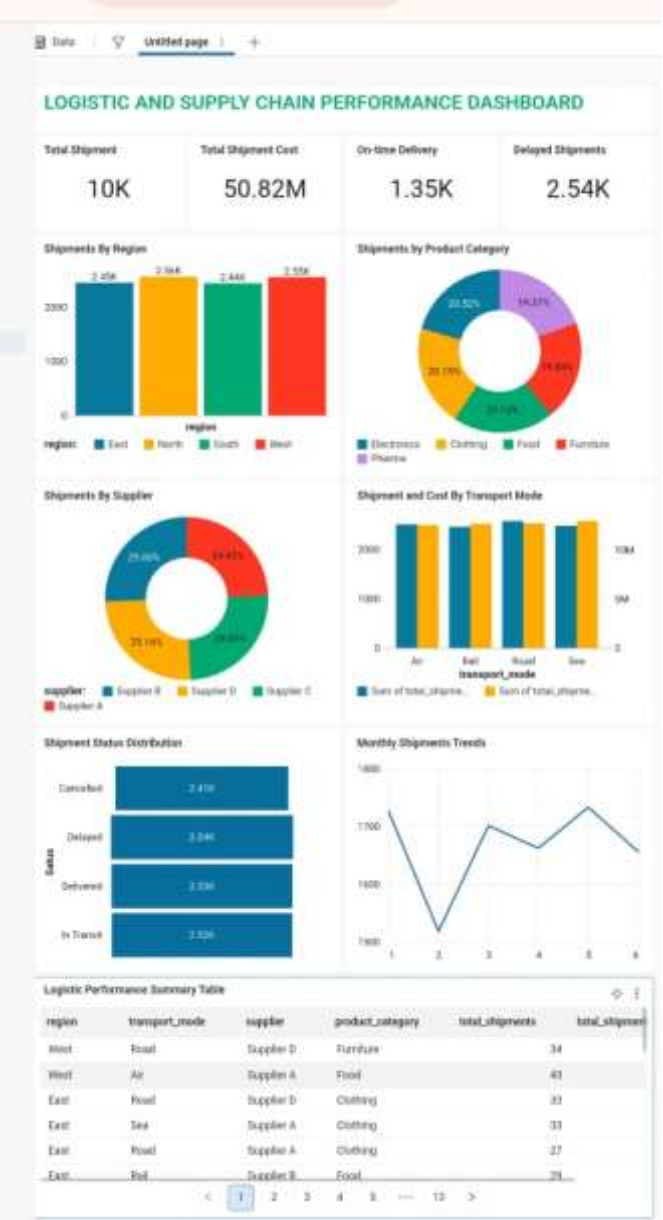

Fig 7: Logistics and Supply Chain Performance Dashboard Visualization

The analytical reports demonstrate that the proposed system improves operational transparency, enhances logistics performance monitoring, and supports efficient supply chain management through scalable big data analytics and dashboard visualization techniques.

IX. SUGGESTIONS FOR FUTURE WORK

The proposed Logistics and Supply Chain Performance Dashboard can be further enhanced by integrating advanced analytical and intelligent technologies for improved logistics management and operational efficiency. Future improvements may

include the implementation of machine learning and artificial intelligence techniques for demand forecasting, route optimization, and predictive supply chain analytics.

Real-time IoT integration can also be incorporated for live shipment tracking, warehouse monitoring, and transportation analysis. In addition, cloud-based automation, real-time alert systems, and advanced predictive analytics can improve operational monitoring and decision-making processes. Future research may also focus on enhancing dashboard scalability, security, and real-time big data processing capabilities for large-scale logistics environments.

X. CONCLUSION

The proposed **Logistics and Supply Chain Performance Dashboard** provides an effective solution for monitoring and analyzing logistics operations using big data analytics and dashboard visualization techniques. The system utilizes the Databricks Lakehouse Platform, Apache Spark, and Medallion Architecture for scalable logistics data processing, transformation, and KPI-based analytical reporting.

The developed dashboard helps organizations monitor delivery performance, transportation costs, inventory levels, supplier efficiency, and operational trends through interactive visualizations and analytical reports. The proposed system improves operational transparency, supports data-driven decision-making, and enhances overall supply chain management efficiency.

The implementation of structured data processing through Bronze, Silver, and Gold layers improves data quality, consistency, and analytical reliability within the logistics environment. The developed system enables organizations to identify operational bottlenecks, reduce inefficiencies, and improve overall supply chain visibility through centralized dashboard monitoring and KPI analysis. The proposed research also highlights the importance of scalable analytical frameworks and visualization technologies in supporting real-time logistics monitoring, business intelligence, and strategic operational planning for modern supply chain systems.

This research demonstrates how modern big data technologies, cloud-based analytical platforms, and dashboard visualization tools can be effectively utilized for intelligent logistics analytics and supply chain performance management.

XI. REFERENCES

[1] A. Gandomi and M. Haider, “Beyond the Hype: Big Data Concepts, Methods, and Analytics,” *International Journal of Information Management*, vol. 35, no. 2, pp. 137–144, 2015.

[2] K. Kambatla, G. Kollias, V. Kumar, and A. Grama, “Trends in Big Data Analytics,” *Journal of Parallel and Distributed Computing*, vol. 74, no. 7, pp. 2561–2573, 2014.

[3] M. Zaharia, M. Chowdhury, M. J. Franklin, S. Shenker, and I. Stoica, “Spark: Cluster Computing with Working Sets,” in *Proceedings of the 2nd USENIX Conference on Hot Topics in Cloud Computing*, 2010, pp. 1–7.

[4] M. Zaharia et al., “Apache Spark: A Unified Engine for Big Data Processing,” *Communications of the ACM*, vol. 59, no. 11, pp. 56–65, 2016.

[5] I. A. T. Hashem, I. Yaqoob, N. B. Anuar, S. Mokhtar, A. Gani, and S. U. Khan, “The Rise of Big Data on Cloud Computing: Review and Open Research Issues,” *Information Systems*, vol. 47, pp. 98–115, 2015.

[6] S. Chopra and P. Meindl, *Supply Chain Management: Strategy, Planning, and Operation*, 6th ed. Pearson Education, 2016.

[7] M. Christopher, *Logistics and Supply Chain Management*, 5th ed. Pearson Education, 2016.

[8] A. Gunasekaran, T. Papadopoulos, R. Dubey, et al., “Big Data and Predictive Analytics for Supply Chain and Organizational Performance,” *Journal of Business Research*, vol. 70, pp. 308–317, 2017.

[9] R. Dubey, A. Gunasekaran, S. J. Childe, T. Papadopoulos, and K. Wamba, “World Class Sustainable Supply Chain Management: Critical Review and Further Research Directions,” *International Journal of Logistics Management*, vol. 28, no. 2, pp. 332–362, 2017.

[10] H. Stadtler, “Supply Chain Management and Advanced Planning Basics, Overview and Challenges,” *European Journal of Operational Research*, vol. 163, no. 3, pp. 575–588, 2005.

[11] Y. Wang, A. Kung, and T. A. Byrd, "Big Data Analytics: Understanding Its Capabilities and Potential Benefits," *Technological Forecasting and Social Change*, vol. 126, pp. 3–13, 2018.
[12] Databricks, "The Databricks Lakehouse Platform," Databricks Inc., 2024. Available: Databricks Official Website
[13] Apache Software Foundation, "Apache Spark Documentation," 2024. Available: Apache Spark Documentation
[14] Microsoft, "Power BI Documentation," 2024. Available: Microsoft Power BI Documentation