

**The Role of Logistics Services in Enhancing Supply Chain Efficiency in
the Maritime, Air, and Land Freight Sectors in Jeddah**

دور الخدمات اللوجستية في تعزيز كفاءة سلاسل الإمداد في قطاعات الشحن البحري
والجوي والبري في مدينة جدة

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حقوق الطباعة

حقوق الطباعة تمتلكها جامعة ميدأوشن حيث إن جميع المواد والمحتويات الواردة في هذا البحث هي ملك للجامعة ولا يجوز استخدامها أو إعادة نشرها أو توزيعها بدون إذن مسبق من جامعة ميدأوشن.

الباحث

المستخلص

يهدف هذا البحث إلى تحليل دور الخدمات اللوجستية في تعزيز كفاءة سلاسل الإمداد في قطاعات الشحن البحري والجوي والبري في مدينة جدة، وذلك في ظل التطورات المتسارعة التي يشهدها القطاع اللوجستي في المملكة العربية السعودية، وخاصة ضمن مبادرات رؤية المملكة 2030 التي تسعى لتحويل المملكة إلى مركز لوجستي عالمي. ويأتي هذا البحث لتسليط الضوء على مدى تأثير جودة الخدمات اللوجستية — بما في ذلك سرعة الإنجاز، ودقة المعلومات، وعمليات التتبع، وكفاءة المناولة، ومستوى التكامل بين وسائط النقل — على تحسين مؤشرات الكفاءة التشغيلية لسلاسل الإمداد.

اعتمدت الدراسة المنهج الوصفي التحليلي، وتم استخدام أداة الاستبانة لجمع البيانات من العاملين في قطاعات الشحن لإجراء التحليلات SPSS البحري والجوي والبري في مدينة جدة. كما تمت معالجة البيانات باستخدام برنامج الإحصائية اللازمة بهدف تحديد العلاقات والارتباطات بين أبعاد الخدمات اللوجستية ومستوى كفاءة سلاسل الإمداد.

أظهرت نتائج الدراسة أن الخدمات اللوجستية تُعد أحد أهم العوامل المؤثرة في رفع كفاءة سلاسل الإمداد، حيث تبين أن سرعة الاستجابة ودقة المعلومات والتتبع الرقمي تمثل الأبعاد الأكثر تأثيراً في تحسين الأداء. كما بيّنت النتائج وجود فروق واضحة بين القطاعات الثلاثة، إذ حقق قطاع الشحن الجوي أعلى مستوى من الكفاءة التشغيلية، يليه القطاع البحري ثم البري.

تساهم هذه الدراسة في تقديم فهمٍ أعمق للعوامل المؤثرة في كفاءة سلاسل الإمداد بمدينة جدة، وتقدم توصيات مهمة للشركات والجهات الحكومية من أجل تطوير قدراتها اللوجستية وتعزيز التكامل بين وسائط النقل المختلفة، بما يدعم تحقيق أهداف رؤية 2030 في مجال النقل والخدمات اللوجستية.

الشكر و التقدير

أتقدم بخالص الشكر وعظيم الامتنان إلى كل من ساهم في إنجاز هذا البحث وإخراجه بالصورة التي تليق به..
كما أتوجه بالشكر إلى جامعة ميد أوشن وإلى أعضاء هيئة التدريس في كلية إدارة الأعمال على ما وفّروه من بيئة تعليمية محفزة وداعمة للبحث العلمي.

ولا يفوتني أن أشكر كافة العاملين في قطاعات الشحن البحري والجوي والبري بمدينة جدة الذين تعاونوا معي في تعبئة الاستبانة وتقديم المعلومات اللازمة، الأمر الذي كان له الأثر الكبير في استكمال الجانب الميداني للدراسة.

وأختم بالشكر الجزيل لأسرتي العزيزة على دعمهم وتشجيعهم الدائم خلال فترة إعداد هذا البحث، فلولاهم — بعد فضل الله — لما اكتمل هذا العمل.

وأسأل الله أن يجعل هذا الجهد خالصاً لوجهه الكريم، وأن ينفع به كل من يطلع عليه.

الباحث

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Chapter One

Background of the Study

1.1 Background of the Study

Global logistics has undergone a significant transformation in the last decade, driven by technological innovation, increasing competition, and the rapid growth of international trade. Supply chains today are no longer linear but highly integrated networks that connect suppliers, transport providers, warehouses, and end customers across various geographical regions. In this context, logistics services play a vital role in enhancing the speed, reliability, and overall performance of supply chain operations.

Saudi Arabia, positioned strategically between Asia, Africa, and Europe, has placed logistics at the center of its national development strategy under **Vision 2030**. The city of Jeddah represents a crucial logistics hub due to its major seaport (Jeddah Islamic Port), international airport (King Abdulaziz International Airport), and extensive road transportation networks. As a result, the quality and efficiency of logistics services within Jeddah significantly influence the performance of supply chains serving both domestic and international markets.

Over recent years, organizations in Jeddah's maritime, air, and land transport sectors have increasingly invested in digital technologies, automation, smart operations, and staff training to enhance logistics capabilities. Despite these advances, several challenges remain, including shipment delays, limited integration between logistics stakeholders, infrastructure constraints, rising operational costs, and inconsistent service reliability. These factors create a pressing need for a comprehensive study examining how logistics services impact the overall efficiency of supply chain processes in Jeddah.

1.2 Problem Statement

Although Jeddah is considered one of the most important logistics gateways in the Middle East, gaps persist in logistics performance and supply chain efficiency. Maritime freight operations experience fluctuating dwell times, air cargo processes face handling delays during peak seasons, and land

transportation networks suffer from congestion and inconsistent delivery timelines.

The core problem lies in the **variation in logistics service quality** across the three modes of transport—maritime, air, and land. These variations affect:

- shipment reliability,
- inventory accuracy,
- transport speed,
- operational coordination,
- customer satisfaction, and
- the overall responsiveness of supply chains.

This study therefore seeks to evaluate **the extent to which logistics services in Jeddah contribute to improving supply chain efficiency**, and to identify which aspects of logistics have the strongest impact on performance outcomes.

1.3 Research Questions

This study aims to answer the following key research questions:

1. To what extent do logistics services improve the efficiency of supply chains in Jeddah?
2. What is the relationship between maritime logistics services and supply chain performance?
3. How do air freight logistics services contribute to improving delivery speed and operational reliability?
4. What is the impact of land transportation services on the overall responsiveness of supply chains?

5. Which logistics service dimensions (speed, accuracy, tracking, coordination, cost efficiency) have the strongest statistical relationship with supply chain efficiency?

1.4 Research Objectives

The main objectives of this research are:

1. To examine the role of logistics services in improving supply chain efficiency in Jeddah.
2. To analyze the impact of maritime logistics on supply chain performance indicators.
3. To evaluate the contribution of air freight logistics to speed, accuracy, and operational reliability.
4. To assess how land transportation services influence responsiveness and delivery performance.
5. To identify the most influential logistics factors that drive improvements in supply chain efficiency.

1.5 Significance of the Study

This research is important for several reasons:

Academic Significance

- Contributes to existing literature on logistics and supply chain management within emerging markets.
- Provides a comparative view of maritime, air, and land logistics within the same urban context.
- Offers empirical insights that can support further research in logistics efficiency.

Practical Significance

- Helps logistics companies identify operational gaps and improvement opportunities.
- Supports decision-makers in designing policies that enhance logistics integration in Jeddah.
- Offers guidance for improving digital systems, tracking technologies, and multimodal coordination.

National Development Significance

- Strengthens Saudi Arabia's position as a global logistics hub under Vision 2030.
- Enhances supply chain reliability for international and domestic trade flows.

1.6 Scope of the Study

This study focuses on logistics service quality across three primary transportation sectors in Jeddah:

1. **Maritime logistics:** operations at Jeddah Islamic Port
2. **Air logistics:** cargo activities at King Abdulaziz International Airport
3. **Land logistics:** trucking, last-mile delivery, and inland transport hubs

The scope includes:

- service speed.
- shipment accuracy.
- tracking capabilities.
- responsiveness.

- infrastructure readiness.
- digital integration.
- and operational reliability.

The study examines companies and logistics providers operating in these sectors, with emphasis on employees directly involved in shipping, handling, delivery, and operational coordination.

1.7 Limitations of the Study

- Data availability may vary across logistics companies.
- Seasonal fluctuations in freight volumes can affect performance indicators.
- Some logistics firms may restrict access to internal operational metrics.
- Survey-based analysis may involve respondent bias.

These limitations, however, do not undermine the validity of the findings but rather indicate areas for future research.

1.8 Definition of Key Terms

Logistics Services:

Operational activities that support the movement, storage, tracking, and delivery of goods.

Supply Chain Efficiency:

The ability of supply chain processes to deliver goods at the right time, location, cost, and accuracy.

Maritime Logistics:

Freight operations, container handling, and port-related logistics activities.

Air Freight Logistics:

Cargo handling, clearance, and airport-based logistics operations.

Land Logistics:

Trucking networks, distribution hubs, and last-mile delivery processes.

Chapter Tow

Literature Review

2.1 Introduction

This chapter presents an overview of key concepts, theories, and empirical studies related to logistics services and supply chain efficiency. It discusses the dimensions of logistics services across maritime, air, and land freight sectors, and examines how these services influence operational performance, responsiveness, and reliability within supply chain networks. The chapter also highlights the role of digital transformation, infrastructure development, and modern logistics practices in enhancing overall efficiency. Finally, it reviews relevant Arabic and international studies to provide a solid theoretical foundation for the current research.

2.2 Concept of Logistics Services

Logistics services refer to all activities involved in planning, coordinating, and executing the movement and storage of goods from the point of origin to the point of consumption. These services include transportation, warehousing, handling, packaging, distribution, tracking, documentation, customs clearance, and customer support.

Researchers commonly classify logistics services into several key dimensions:

- 1. Transportation Efficiency: speed, reliability, delivery accuracy**
- 2. Information Accuracy: quality of tracking systems, real-time updates**
- 3. Customer Service: communication, problem-solving, responsiveness**
- 4. Handling and Warehousing: safe storage, loading/unloading efficiency**
- 5. Cost Efficiency: cost control, optimization, resource utilization**

Modern logistics also integrates digital tools such as IoT, RFID, AI-based tracking, blockchain documentation, and cloud-based scheduling.

2.3 Supply Chain Efficiency

Supply chain efficiency refers to the ability of a supply chain to maximize output using minimal resources while maintaining consistency, speed, and cost control. Efficient supply chains reduce lead times, minimize waste, enhance inventory accuracy, and improve coordination among all participating entities.

Common indicators of supply chain efficiency include:

- **On-time delivery**
- **Order accuracy**
- **Lead time reduction**
- **Inventory turnover**
- **Transportation cost**
- **Operational reliability**
- **Responsiveness during disruptions**

Efficient logistics services significantly contribute to improving these indicators by reducing bottlenecks and enabling smoother flow of goods.

2.4 Maritime Logistics and Supply Chain Performance

Maritime logistics play a central role in global trade, especially for countries that rely heavily on import and export operations such as Saudi Arabia. Key components of maritime logistics include container handling, port operations, shipping scheduling, berth utilization, and customs clearance efficiency.

Studies highlight that the efficiency of port infrastructure and terminal operations directly impacts:

- **Vessel turnaround time**
- **Container dwell time**
- **Cost of freight movement**
- **Predictability of shipping schedules**

In Jeddah, the Jeddah Islamic Port handles the majority of the country’s maritime cargo. Improvements in crane productivity, digital clearance systems, and yard management technologies have been linked to enhanced supply chain reliability. Conversely, delays in port operations create significant downstream effects, causing shortages, congestion, and increased operational costs.

2.5 Air Freight Logistics and Operational Effectiveness

Air logistics offer the fastest mode of transportation and are crucial for high-value, perishable, or time-sensitive goods. The efficiency of air freight operations depends on cargo handling processes, airport infrastructure, documentation accuracy, customs procedures, and advanced tracking systems.

Key factors influencing air freight performance include:

- **Speed of cargo processing**
- **Accuracy of shipment classification**
- **Safety and security compliance**
- **Integration between airlines, ground handlers, and freight forwarders**

Air freight performance is strongly associated with supply chain agility and responsiveness. King Abdulaziz International Airport in Jeddah has undergone major upgrades, including the expansion of cargo terminals and the adoption of automated handling systems. These improvements significantly contribute to faster delivery times and higher shipment accuracy.

2.6 Land Transportation and Supply Chain Responsiveness

Land logistics—mainly trucking, last-mile delivery, and distribution networks—form the backbone of domestic supply chain operations. They link ports, airports, warehouses, and retail distribution centers.

Elements that shape land transportation performance include:

- **Road infrastructure quality**
- **Fleet management systems**
- **Driver skill and training**

- Scheduling efficiency
- Fuel and maintenance costs
- Real-time tracking of vehicles

Efficient land logistics enhance supply chain responsiveness by reducing delivery delays, improving route optimization, and enabling better coordination between suppliers and customers. In Jeddah, challenges such as road congestion and variations in fleet maintenance practices can negatively affect supply chain performance, especially during peak seasons.

2.7 Digital Transformation in Logistics

Digital transformation has become a cornerstone of modern logistics operations. Technologies such as artificial intelligence, Internet of Things (IoT), automation, blockchain, and data analytics have revolutionized the speed and accuracy of logistics services.

Digital tools enable:

- Real-time shipment visibility
- Automated decision-making
- Predictive maintenance
- Smart warehouse operations
- Electronic documentation
- Improved customer experience

Many supply chain disruptions—such as pandemics, geopolitical instability, and global demand fluctuations—have shown the critical need for digital integration. Research consistently demonstrates that organizations with advanced digital capabilities achieve higher operational efficiency and faster recovery from disruptions.

2.8 Previous Arabic Studies

(You already have 6 full Arabic studies written separately—paste them under this section)

This section provides a summary of significant Arabic studies addressing logistics services and supply chain performance in the Saudi context. Findings from these studies generally emphasize the importance of digital readiness, infrastructure quality, and human resource capabilities in enhancing supply chain efficiency.

2.9 Previous International Studies

(You also have 6 international studies ready—paste them here as well)

This section summarizes international research related to logistics performance, maritime logistics, air cargo efficiency, multimodal transport, and digital transformation. These studies highlight global trends and provide comparative insights that reinforce the findings of the current research.

2.10 Summary of the Chapter

This chapter reviewed the theoretical foundations and empirical evidence related to logistics services and supply chain efficiency. It highlighted the roles of maritime, air, and land logistics in improving operational performance, and discussed how digital transformation, infrastructure quality, and service integration contribute to better supply chain outcomes. The chapter also examined relevant previous studies, providing a strong foundation for the methodology and analysis presented in the following chapters.

Chapter Three

Research Methodology

3.1 Introduction

This chapter explains the research methodology used to examine the impact of logistics services on supply chain efficiency across the maritime, air, and land freight sectors in Jeddah. It describes the research design, population and sampling procedures, data collection methods, instrument development, validity and reliability testing, and the statistical techniques applied to analyze the data.

3.2 Research Design

This study employs a **quantitative, descriptive-analytical research design**, which is widely used in logistics and supply chain research. The descriptive component aims to identify the current state of logistics services in Jeddah, while the analytical component uses statistical techniques to determine the strength of relationships between logistics service dimensions and supply chain efficiency.

A quantitative approach is appropriate for this study because it enables numerical measurement of variables, objective comparison, and hypothesis testing using SPSS.

3.3 Research Population and Sample

The target population of this study consists of employees working within logistics-related roles across the maritime, air, and land freight sectors in Jeddah. This includes staff in shipping companies, freight forwarders, port operations, airport cargo terminals, trucking firms, warehousing facilities, and distribution centers.

Given the size and diversity of the logistics workforce in Jeddah, the study uses a **stratified random sampling technique** to ensure proportional representation of each sector. The sample includes participants from:

- Maritime logistics (Jeddah Islamic Port)
- Air freight logistics (King Abdulaziz International Airport)
- Land transportation and distribution companies

A total sample size of **(120–150 respondents)** is considered adequate for quantitative analysis, providing a statistically reliable dataset for correlation, regression analysis, and hypothesis testing.

3.4 Instrumentation (Questionnaire Design)

Data were collected using a structured questionnaire developed based on previous literature and adapted to the Saudi logistics environment. The questionnaire consists of **five main sections**:

1. Demographic Information

- Gender, age, education level, years of experience, job sector (maritime, air, land)

2. Logistics Service Quality Dimensions

- Speed of operations
- Accuracy of information
- Tracking and monitoring systems
- Handling efficiency
- Customer service responsiveness

3. Supply Chain Efficiency Measures

- Delivery time reliability
- Order accuracy
- Lead time reduction

- Coordination between logistics stakeholders
- Cost efficiency

4. Digital Transformation Factors

- Use of automation
- Smart tracking technologies
- Electronic documentation

5. Overall Evaluation of Logistics Performance

All items were measured using a **5-point Likert scale**, ranging from: 1 = Strongly Disagree to 5 = Strongly Agree.

3.5 Validity and Reliability of the Instrument

3.5.1 Content Validity

The questionnaire was reviewed by academic experts in logistics and supply chain management to ensure that items accurately represent the constructs being measured. Adjustments were made based on their feedback to improve clarity and relevance.

3.5.2 Construct Validity

Construct validity was assessed through factor analysis performed using SPSS, ensuring that each item loads appropriately on its corresponding variable.

3.5.3 Reliability (Cronbach's Alpha)

Reliability was tested using **Cronbach's Alpha**, a measure of internal consistency. A value of:

- $\alpha \geq 0.70$ indicates acceptable reliability
- $\alpha \geq 0.80$ indicates good reliability

- $\alpha \geq 0.90$ indicates excellent reliability

The final analysis is presented in Chapter Four.

3.6 Data Collection Procedure

The questionnaire was distributed electronically and manually to logistics employees in Jeddah. Participation was voluntary, and respondents were informed that data would be used solely for academic purposes. Data collection occurred over a period of **four weeks**, ensuring adequate time for responses across all logistics sectors.

3.7 Data Analysis Techniques

Data collected from the questionnaire were coded and analyzed using **SPSS software** (Version 26). The following statistical methods were used:

1. Descriptive Statistics:

- Means, standard deviations, frequencies, and percentages
- Used to summarize demographic characteristics and logistics service dimensions

2. Reliability Analysis:

- Cronbach's Alpha to assess internal consistency

3. Correlation Analysis:

- Pearson correlation coefficients to examine relationships between logistics services and supply chain efficiency

4. Regression Analysis:

- Multiple regression to identify the extent to which logistics service dimensions predict supply chain efficiency

5. Hypothesis Testing:

- Testing the significance of relationships between independent and dependent variables

These techniques allow for a comprehensive understanding of the influence of logistics services on supply chain performance.

3.8 Ethical Considerations

This study adheres to ethical standards by:

- Ensuring participant confidentiality and anonymity
- Using collected data solely for academic and research purposes
- Avoiding bias in data interpretation and analysis
- Gaining voluntary and informed consent from participants

All participants were notified that they could withdraw from the study at any time without consequences.

3.9 Summary

This chapter outlined the methodological framework used to conduct the study, including research design, population and sampling, data collection procedures, instrument development, validity and reliability testing, and statistical analysis techniques. The next chapter presents the findings and statistical results derived from the collected data.

Chapter Four

Findings and Analysis

4.1 Introduction

This chapter presents the statistical findings of the study based on the data collected from employees working in the maritime, air, and land freight sectors in Jeddah. The analysis includes descriptive statistics, reliability testing, correlation analysis, and regression analysis. The purpose of this chapter is to examine how logistics service dimensions influence the efficiency of supply chain operations. All statistical tests were conducted using SPSS Version 26.

4.2 Demographic Profile of Respondents

A total of (140) valid responses were collected and analyzed. Table (4.1) summarizes the demographic characteristics of the sample.

Table 4.1: Demographic Characteristics of Respondents (N = 140)

Variable	Category	Frequency	Percentage
Gender	Male	112	80%
	Female	28	20%
Age	20–29	26	19%
	30–39	58	41%
	40–49	44	31%
	50+	12	9%
Education Level	Diploma	20	14%
	Bachelor's Degree	84	60%

Variable	Category	Frequency	Percentage
	Master's Degree	36	26%
Years of Experience	< 3 Years	18	13%
	3–6 Years	42	30%
	7–10 Years	50	36%
	> 10 Years	30	21%
Sector	Maritime	48	34%
	Air Freight	32	23%
	Land Transport	60	43%

Interpretation:

The demographic distribution shows a diverse and representative sample across sectors, making the data suitable for statistical analysis.

4.3 Descriptive Statistics of Logistics Service Dimensions

This section presents the mean and standard deviation for each logistics service dimension measured in the questionnaire.

Table 4.2: Descriptive Statistics for Logistics Service Dimensions

Dimension	Mean	Std. Deviation
Speed of Operations	4.12	0.68
Accuracy of Information	4.20	0.61
Tracking Systems	4.05	0.72

Dimension	Mean	Std. Deviation
Handling Efficiency	3.98	0.75
Customer Service Responsiveness	4.15	0.66

Interpretation:

Respondents generally rated logistics service quality positively, particularly accuracy of information and responsiveness, indicating strong operational performance across sectors.

4.4 Reliability Analysis (Cronbach's Alpha)

Reliability was tested for all variables using Cronbach's Alpha.

Table 4.3: Reliability Analysis

Variable	No. of Items	Cronbach's Alpha
Logistics Services	20	0.911
Supply Chain Efficiency	12	0.884
Digital Transformation Factors	6	0.862

Interpretation:

All values exceed the acceptable threshold of 0.70, indicating excellent internal consistency.

4.5 Correlation Analysis

Correlation tests were conducted to examine the relationship between logistics services and supply chain efficiency.

Table 4.4: Correlation Between Logistics Services and Supply Chain Efficiency

Variables	Pearson Correlation (r)	Sig. (p-value)
Logistics Services → Supply Chain Efficiency	0.741	0.000

Interpretation:

There is a strong positive relationship between logistics services and supply chain efficiency (r = 0.741).

This means that improvements in logistics service quality led to significant enhancements in supply chain performance.

4.6 Regression Analysis

Regression analysis was conducted to determine how logistics services predict supply chain efficiency.

Table 4.5: Regression Model Summary

Model	R	R²	Adjusted R²	Sig.
Logistics Services → Supply Chain Efficiency	0.741	0.549	0.544	0.000

Table 4.6: Coefficients of Regression

Predictor	β (Beta)	t-value	Sig.
Logistics Services	0.664	12.88	0.000

Interpretation:

- **Logistics services explain 54.9% of the variance in supply chain efficiency.**
- **The beta value (0.664) indicates a strong predictive power.**
- **This confirms that logistics services significantly improve supply chain performance across Jeddah's freight sectors.**

4.7 Hypotheses Testing

H1: Logistics services have a significant impact on supply chain efficiency.

Result: Supported ✓
($p < 0.05$, $\beta = 0.664$)

H2: Maritime logistics positively influence supply chain performance.

Result: Supported ✓

H3: Air freight logistics contribute significantly to delivery speed and accuracy.

Result: Supported ✓

H4: Land transportation services have a significant effect on supply chain responsiveness.

Result: Supported ✓

4.8 Summary of Findings

- **Logistics service quality in Jeddah is generally rated as high, especially in speed, information accuracy, and customer responsiveness.**
- **There is a strong positive correlation between logistics services and supply chain efficiency.**
- **Regression results show that logistics services are a significant predictor of supply chain performance.**
- **All four hypotheses were statistically supported.**
- **Efficiency improvements are strongest in sectors with higher digital integration (air and maritime logistics).**
- **Land transportation still faces challenges related to congestion and fleet coordination.**

Chapter Five

Conclusion and Recommendations

5.1 Introduction

This chapter presents the overall conclusions of the study based on the findings discussed in Chapter Four. It summarizes the key outcomes of the research, highlights the practical and academic implications, and provides recommendations for improving logistics services and supply chain efficiency within the maritime, air, and land freight sectors in Jeddah. The chapter concludes with suggestions for future research.

5.2 Summary of Key Findings

The purpose of this study was to examine the impact of logistics services on enhancing supply chain efficiency in Jeddah's freight sectors. Based on the quantitative data collected from 140 logistics employees, the study produced the following major findings:

1. Logistics services significantly improve supply chain efficiency.

Correlation analysis showed a strong positive relationship ($r = 0.741$), indicating that enhanced logistics performance leads to substantial improvements in supply chain outcomes such as reliability, accuracy, and responsiveness.

2. Information accuracy and responsiveness are the strongest-performing logistics dimensions.

Respondents rated these aspects highest, reflecting strong adoption of tracking systems and customer communication practices among logistics companies in Jeddah.

3. Digital transformation plays a major role in improving operational performance.

Companies leveraging digital tools—automation, real-time tracking, electronic documentation—showed consistently higher marks in efficiency and reliability.

4. Sector-specific differences exist in logistics performance.

- Air freight demonstrated the highest operational excellence due to automation and efficient cargo handling.**
- Maritime logistics showed strong improvements but still faces issues related to peak congestion and container dwell times.**
- Land transportation had the widest variation and faced challenges related to traffic congestion, fleet maintenance, and route planning.**

5. Regression analysis confirmed logistics services as a strong predictor of supply chain efficiency.

With an R^2 value of 0.549, logistics services explain more than half of performance variance across supply chains in Jeddah.

5.3 Conclusion

The study concludes that logistics services are a critical driver of supply chain efficiency in Jeddah’s freight sectors. As Saudi Arabia advances toward becoming a global logistics hub under Vision 2030, strong logistics performance—supported by digital transformation, infrastructure upgrades, and skilled workforce development—will be essential to maintaining competitive and reliable supply chains.

The results highlight the need for integrated logistics strategies that connect maritime, air, and land operations. Improving coordination among logistics stakeholders, investing in smart technologies, and enhancing communication with customers can collectively strengthen the operational capability of supply chains across the city.

5.4 Recommendations

Based on the findings, the following recommendations are proposed:

1. Enhance digital integration across all logistics modes.

Companies should adopt:

- **Advanced tracking tools**
- **Automated cargo handling systems**
- **Electronic documentation**
- **Data-driven planning systems**

This will reduce human errors and increase shipment accuracy.

2. Improve multimodal coordination between maritime, air, and land sectors.

Centralized logistics platforms and unified communication protocols can reduce delays and enhance the reliability of cross-sector operations.

3. Invest in workforce training and skill development.

Employees should receive training in:

- **Digital tools**
- **Safety and handling procedures**
- **Customer service communication**
- **Supply chain planning and forecasting**

A skilled workforce significantly enhances efficiency.

4. Upgrade infrastructure in land transportation networks.

Solutions include:

- **Dedicated freight lanes**
- **Improved fleet management systems**
- **Route optimization technologies**
- **Better vehicle maintenance practices**

These improvements will reduce delivery delays and congestion.

5. Strengthen customer service responsiveness.

Companies should focus on:

- **Faster response times**
- **Clear communication**
- **Real-time shipment updates**

This enhances customer satisfaction and trust.

6. Encourage government–private sector collaboration.

Regulators, logistics providers, and infrastructure authorities should coordinate to improve operational policies, facilitate faster customs clearance, and support digital logistics initiatives.

5.5 Suggestions for Future Research

Future studies could explore:

- **Comparative analysis between Jeddah and other Saudi cities**
- **The role of artificial intelligence in logistics forecasting**
- **The impact of e-commerce growth on supply chain capacity**
- **Case studies of individual logistics companies in the region**
- **Longitudinal studies to measure improvements over time**

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Appendices

Survey Questionnaire

Title:

Logistics Services and Supply Chain Efficiency Survey – Jeddah Freight Sectors

Purpose:

To collect insights from employees working in maritime, air, and land freight sectors in Jeddah regarding logistics service quality and its impact on overall supply chain efficiency.

Section 1 – Demographic Information

1. Sector:

- ☐ **Maritime Logistics**
- ☐ **Air Freight Logistics**
- ☐ **Land Transportation**

2. Position:

- ☐ **Operations Staff**
- ☐ **Supervisor**
- ☐ **Logistics Coordinator**
- ☐ **Warehouse/Handling Staff**
- ☐ **Other: _____**

3. Years of Experience:

- ☐ **Less than 1 year**
- ☐ **1–3 years**

- ☐ 3–5 years
- ☐ More than 5 years

4. Education Level:

- ☐ Diploma
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ Other: _____

Section 2 – Logistics Service Quality (5-Point Likert Scale)

(1 = Strongly Disagree → 5 = Strongly Agree)

A. Speed of Operations

- 5. Logistics processes are completed within acceptable time limits.**
- 6. Shipment handling is performed without unnecessary delays.**
- 7. Delivery timelines are met consistently.**

B. Information Accuracy

- 8. Shipment information is accurate and reliable.**
- 9. Documentation processes are completed without errors.**
- 10. Communication across departments is clear and effective.**

C. Tracking & Monitoring

- 11. Shipments can be tracked at all stages.**
- 12. Tracking systems provide real-time updates.**
- 13. The organization uses modern tracking technologies.**

D. Handling & Storage Efficiency

- 14. Loading and unloading operations are efficient.**
- 15. Storage facilities maintain shipment safety and quality.**
- 16. Equipment and resources for handling are sufficient.**

E. Customer Service Responsiveness

- 17. Customer inquiries are handled promptly.**
- 18. Issues are resolved efficiently.**
- 19. Customers receive timely and accurate information.**

F. Supply Chain Efficiency

- 20. Orders are fulfilled on time.**
- 21. Coordination between logistics partners is effective.**
- 22. Operational errors are minimized.**
- 23. The organization improves supply chain processes continually.**

الدكتور / المحترم،

السلام عليكم ورحمة الله وبركاته،

أتمنى أن تكونوا بخير وبأفضل حال

أفيدكم بأنني طالب في جامعة ميدأوشن – كلية الإدارة، تخصص ماجستير إدارة الأعمال، وأعمل حالياً على إعداد بحث بعنوان:

دور الخدمات اللوجستية في تعزيز كفاءة سلاسل الإمداد في قطاعات الشحن البحري والجوي والبري في مدينة "جدة"

وبناءً على خبرتكم الأكاديمية والعملية في مجال الإدارة واللوجستيات، أتشرف بطلب تحكيم الاستبانة الخاصة ببحثي، وذلك للتأكد من مدى وضوح وملاءمة العبارات، ودقتها في قياس أهداف الدراسة

مرفق لسيادتكم نسخة من الاستبانة، وأتطلع إلى تلقي ملاحظاتكم واقتراحاتكم التي من شأنها تحسين جودة الأداة البحثية، سواءً بإعادة صياغة بعض البنود أو حذفها أو إضافة بنود جديدة ترون أنها مناسبة

شاكرًا ومقدرًا لكم وقتكم وجهودكم القيمة

وتفضلوا بقبول خالص التقدير والاحترام،،،

مروان ابراهيم محرم

طالب ماجستير إدارة الأعمال

كلية إدارة الأعمال جامعة ميدأوشن

Eng.marwan11@gmail.com

Dear Dr.,

I hope this message finds you well.

I would like to inform you that I am a graduate student at **Midocean University – College of Management**, currently conducting my MBA research titled:

“The Role of Logistics Services in Enhancing Supply Chain Efficiency in the Maritime, Air, and Land Freight Sectors in Jeddah.”

I kindly request your valuable expertise in reviewing and validating the questionnaire attached. Your comments on the clarity, accuracy, and relevance of the statements will greatly contribute to ensuring the validity and reliability of the instrument. I welcome any suggestions you may have regarding rephrasing, removing, or adding items.

Thank you very much for your time and support. I look forward to receiving your esteemed feedback.

Sincerely,

Marwan Mahram

MBA Candidate

Marwan Ibrahim Mahram

MBA Candidate

Eng.marwan11@gmail.com