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THE IMPACT OF LOGISTICS IN INTERNATIONAL SUPPLY CHAINS ON THE PRICES OF IMPORTED CARS IN JORDAN (AN APPLIED STUDY ON CAR IMPORTING ORGANIZATIONS)

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Abstract

This study examines the impact of logistics in international supply chains on the prices of imported cars in Jordan. Using a descriptive-analytical approach, data were collected through questionnaires from 54 car-importing organizations in the Zarqa Free Zone. The research analyzes three key logistics factors—transportation, storage, and management and control operations—and their influence on vehicle pricing. Results indicate a statistically significant effect ($\alpha \leq 0.05$) of all logistics components on car prices, with transportation exerting the strongest impact, followed by storage and management operations. The findings highlight that efficient logistics management is crucial in reducing costs and stabilizing vehicle prices. The study recommends that importing organizations enhance logistical coordination and adopt cost-effective strategies to improve supply chain performance and mitigate risks.

Keywords: Logistics, Supply Chain, Imported Cars, Transportation, Storage, Jordan

Introduction

Foreign trade enables each country to acquire the goods it needs. Among these goods are automobiles, which not all countries are capable of producing due to the lack of raw materials or the absence of a skilled labor force necessary for their production. This necessitates the importation of vehicles in order to satisfy the needs and desires of the citizens — Jordan being one such country.

Car importing organizations in Jordan are involved in an international supply chain that starts with the supplier and ends with the product reaching the consumer. Logistics, as an integral part of this chain, may have a significant impact on the overall cost, which could consequently affect the final prices of vehicles in Jordan.

Significance of the Study

The importance of this study lies in examining the impact of logistics in international supply chains on the prices of imported cars in Jordan. This subject holds considerable relevance for stakeholders whose operations are highly vulnerable to frequent disruptions due to the complex

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and dynamic nature of international supply chains. Logistics — including shipping, transportation, storage, and flow of goods — is a crucial component of these chains. Its influence on the cost of delivering cars to the designated place and time, along with the stability of procedures and information flow during transportation, renders it a key factor in the pricing process.

Objectives of the Study

This study seeks to achieve the following objectives:

1. To identify whether there is an effect of logistics (transportation, storage, management and control operations) within international supply chains on the prices of imported cars in Jordan.

2. To arrive at conclusions that can guide the formulation of recommendations beneficial to stakeholders in car importing organizations.

Problem Statement and Research Questions

The automotive, machinery, and equipment sectors are among the most extended production chains due to issues in the global supply of metals and energy. These production chains have a profound impact on developing countries that import capital equipment and vehicles (Global, 2022).

Logistics within international supply chains are considered the most susceptible to fluctuations and changes. This volatility can disrupt entire chains, leading to an increase in the final cost of the car — and thus, its price.

Accordingly, the problem of this study can be formulated in the following main research question:

Is there an effect of logistics (transportation, storage, management and control operations) within international supply chains on the prices of imported cars in Jordan?

Research Hypothesis

In light of the main research question, the following primary hypothesis has been formulated:

(H0): There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of logistics (transportation, storage, management and control operations) in international supply chains on the prices of imported cars in Jordan.

Methodology of the Study

To achieve the objectives of the study, the analytical descriptive method has been adopted. This method is based on analyzing the current reality regarding the impact of logistics within international supply chains on the prices of imported vehicles in Jordan. A field study was conducted using a specially designed questionnaire, and a simple random sampling technique was employed to distribute the questionnaire.

Study Model

The study model includes a structural detailing of the study variables aligned with its objectives and hypotheses. The model identifies **(the impact of logistics in international supply chains)**

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as the **independent variable**, and **(the prices of imported cars in Jordan)** as the **dependent variable**, as illustrated in the following figure (Figure 1):

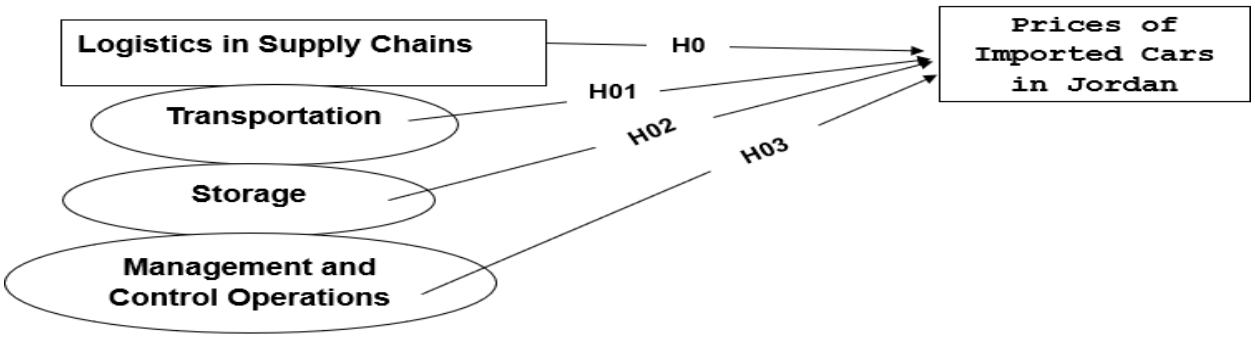

Figure (1): Study Model

Theoretical Framework

Definition of the International Supply Chain

It encompasses all activities required by any organization to produce a product and deliver it to the consumer. (Almamlaka, 2022)

Definition of Logistics in International Supply Chains

It refers to the management of the movement of materials and products throughout all stages of the supply chain, including transportation, production, packaging, storage, and distribution — from the point of origin to the point of consumption — in a highly efficient manner that satisfies consumers. (Xiang, 2014)

Importance of Logistics in International Supply Chains

The international supply chain plays a crucial role in the success of industrial and commercial organizations across various sectors. This success depends on the existence of an efficient supply chain that ensures the timely and accurate delivery of products. Efficient international supply chains rely heavily on their components, with logistics being one of the most influential due to its direct impact on product costs. It encompasses several elements such as transportation, storage, distribution, the smooth flow of goods, procedures, and information throughout the chain (Kenton, 2020), particularly in the lengthy and time-consuming supply chains of imported vehicles (Global, 2022).

Objectives of the Supply Chain

The supply chain aims to achieve several objectives, including cost reduction, customer satisfaction, optimal inventory levels, and flexibility in responding to customer demands. (Al-Rifai, 2006)

Characteristics of the International Supply Chain

The international supply chain has a set of characteristics, including operating within a complex system that links different countries to facilitate the flow of materials, supplies, and goods to

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the requesting parties efficiently. It requires high coordination to avoid risks and ensure success and depends on modern technology and its tools to maintain the integration of its operations. It is also exposed to external work environment risks such as political, legal, economic, and cultural changes. (Albustanji, 2025)

Study Methodology

The study employed the descriptive-analytical approach as it is most suitable for the nature of the research. Questionnaires were distributed to the study sample, and data were collected accordingly.

Study Population and Sample

The study population comprised organizations involved in the trade of imported vehicles located in the free zone of Zarqa City. The study instrument was distributed electronically via the WhatsApp application, and a total of 54 traders responded.

Sources of Data Collection

The study relied on two types of data sources:

- **Secondary Data**: Based on reviewing various theoretical literature relevant to the study topic.
- **Primary Data**: The study tool was developed to answer the research questions and test the hypotheses. It consisted of two parts:

1. Demographic information about the study sample.
2. The domain related to the impact of logistics in international supply chains on the prices of imported cars in Jordan.

Demographic Variables

The following table illustrates the distribution of the study sample according to demographic variables: organization age, number of countries from which vehicles are imported, as shown in Table (3-1):

Table (3-1): Sample Distribution by Demographic Variables

Demographic Variable	Category	Frequency	Percentage %
Organization Age	Less than 10 years	13	24.1%
	10 – 20 years	17	31.5%
	20 years or more	24	44.4%
Number of Vehicle Import Countries	One Country	3	5.6%
	Two Countries	14	25.9%

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Demographic Variable	Category	Frequency	Percentage %
	Group of Countries	37	68.5%
Total		**54**	**100%**

It is evident from Table (3-1) that most organizations involved in vehicle import are relatively old and that they import from a variety of countries.

Study Results

Main Research Question:
Is there an impact of logistics (transportation, storage, management and control operations) in international supply chains on the prices of imported vehicles in Jordan?

To answer this question, means, standard deviations, and practice degree ranks were calculated for the impact of logistics in international supply chains on the prices of imported cars in Jordan, as shown in Table (3-2):

Table (3-2):
Means, Standard Deviations, and Practice Degrees of the Impact of Logistics on the Prices of Imported Vehicles in Jordan

No.	Field	Mean	Std. Deviation	Practice Degree	Rank
1	Transportation	3.8148	1.3315	High	1
2	Storage	3.7731	1.3218	High	2
3	Management & Control Ops	3.7398	1.3760	High	3
	Overall Mean	3.7759	1.0073	**High**	-

The results in Table (3-2) indicate that the study sample believes there is an impact of logistics (transportation, storage, management and control operations) on the prices of imported cars in Jordan, with mean values ranging between (3.7398–3.8148), an overall mean of (3.7759), and a standard deviation of (1.0073), representing a high level.

Transportation Domain

To analyze this domain, means, standard deviations, and practice degrees were calculated as shown in Table (3-3):

Table (3-3):
Means, Standard Deviations, and Practice Degrees – Transportation

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No.	Statement	Mean	Std. Dev.	Practice Degree	Rank
1	Transportation costs significantly affect imported vehicle prices	3.8148	1.3042	Medium	2
2	Transport costs are affected by global oil and transport prices	3.7888	1.2983	High	3
3	Transport costs are affected by the length of the supply distance	3.9778	1.3412	High	1
4	Transport costs vary between countries during the supply process	3.6778	1.3827	Medium	4
	Overall Mean	3.8148	1.3315	**High**	-

The results of Table (3-3) regarding the field of **Transportation** indicate that the arithmetic means ranged between (3.6778–3.9778), with an overall mean of (3.8148) and a standard deviation of (1.3315), reflecting a high level. Accordingly, it can be concluded that **transportation has an impact within international supply chains on the prices of imported vehicles in Jordan**.

Storage Field

To answer this domain, arithmetic means, standard deviations, and practice degree ranks were calculated for the **storage field**, as shown in Table (3-4) below:

Table (3-4)

Arithmetic Means, Standard Deviations, and Practice Degree Ranks for the Storage Field

No.	Storage Field Item	Mean	Std. Dev.	Practice Degree	Rank
5	Storage fees significantly affect the prices of imported vehicles	3.7407	1.27657	High	3
6	Storage duration in international centers varies from one country to another	3.8704	1.28923	High	1
7	Storage duration in international centers is often long	3.7778	1.32703	High	2
8	Storage fees differ from one country to another	3.7037	1.39581	High	4
	Overall Mean	3.7731	1.3218	**High**	-

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The results of Table (3-4) concerning the **storage field** indicate that the arithmetic means ranged between (3.7037–3.8704), with an overall mean of (3.7731) and a standard deviation of (1.3218), reflecting a high level. Therefore, it can be concluded that **storage plays a significant role in international supply chains affecting the prices of imported vehicles in Jordan**.

Management and Control Operations Field

To address this question, the arithmetic means, standard deviations, ranks, and degrees of practice were calculated for the **management and control operations field**, as illustrated in Table (3-5) below:

Table (3-5)

Arithmetic Means, Standard Deviations, and Practice Degree Ranks for Management and Control Operations Field

No.	Management and Control Operations Field Item	Mean	Std. Dev.	Practice Degree	Rank
9	Management and control operations affect the flow of imported vehicles at the required times/places	3.8113	1.34531	High	1
10	Management and control of imported vehicle flow is extremely complex	3.7963	1.39243	High	2
11	Significant changes occur during the supply operations	3.7593	1.35890	High	3
12	Information used for planning and execution in supply is rapidly changing	3.5926	1.40778	High	4
	Overall Mean	3.7398	1.3760	**High**	-

The results of Table (3-5) concerning the **management and control operations field** show that the arithmetic means ranged between (3.5926–3.8113), with an overall mean of (3.7398) and a standard deviation of (1.3760), reflecting a high level. Consequently, it can be concluded that **management and control operations in international supply chains significantly impact the prices of imported vehicles in Jordan**.

Hypothesis Testing

(H_0): There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of logistics (transportation, storage, management and control operations) in international supply chains on the prices of imported vehicles in Jordan.

The testing of this hypothesis involved using appropriate statistical methods for its nature, and the results are presented in Table (3-6) below:

Table (3-6)

Results of the Main Hypothesis Testing

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Significance Level (Sig.)	Calculated T	Hypothesis
0.000	32.033	Logistics (H_0)
0.000	33.963	Transportation (H_{01})
0.000	31.162	Storage (H_{02})
0.000	28.313	Management and Control Operations (H_{03})

The results of the analysis in Table (3-6) reveal the presence of **a statistically significant impact of logistics (transportation, storage, and management and control operations)** in international supply chains on the prices of imported vehicles in Jordan. The calculated T-values for logistics and its components were all high and statistically significant at a level less than (0.05).

Study Findings

The study concluded that there is a **statistically significant impact at the significance level ($\alpha \leq 0.05$)** of **logistics (transportation, storage, management and control operations)** within international supply chains on the prices of imported vehicles in Jordan.

Study Recommendations

In light of the study's findings, it is recommended to **give greater attention to logistics**, as it has a significant influence on costs, which are reflected in vehicle prices. The study also recommends **expanding research into alternative strategies** that help organizations **avoid excessive costs or unnecessary risks**.

References

1. Xiang Li. (2014). *"Operations Management of Logistics and Supply Chain: Issues and Directions"*, Discrete Dynamics in Nature and Society, vol. 2014, Article ID 701938, 7 pages.
2. Kenton, W. (2020). *What Are Logistics?* Retrieved 2020, from: https://www.investopedia.com/terms/l/logistics
3. Rating S.C. (2022). *S&P Global Ratings Institutions*, 98(107), 96–104.
4. Y. A. B. Ahmad, M. Allahham, W. I. Almajali, F. T. Ayasrah and S. Sabra, "Building Trust: The Role of Strategic Decision-Making in Digital Market Confidence," 2024 25th International Arab Conference on Information Technology (ACIT), Zarqa, Jordan, 2024, pp. 1-6, doi: 10.1109/ACIT62805.2024.10877254.
5. F. T. Ayasrah, K. AlArabi, I. M. Aburezeq, A. Y. A. Bani Ahmad and M. M. Hijazi, "Social Media Transparency: How Digital Marketing Shapes Strategic Decisions," 2024 25th

Received: August 09 , 2025

Volume 38 No. 9s, 2025

ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

International Arab Conference on Information Technology (ACIT), Zarqa, Jordan, 2024, pp. 1-6, doi: 10.1109/ACIT62805.2024.10877078.

6. Allahham, M. A. H. M. O. U. D., Sharabati, A. A. A., Hatamlah, H. E. B. A., Ahmad, A. Y. B., Sabra, S., & Daoud, M. K. (2023). Big data analytics and AI for green supply chain integration and sustainability in hospitals. WSEAS Transactions on Environment and Development, 19, 1218-1230.

7. A. Y. A. Bani Ahmad, M. Allahham, W. I. Almajali, F. T. Ayasrah and S. Sabra, "Blockchain's Role in Emerging Markets: Accelerating Digital Supply Chain Management and Unlocking New Opportunities," 2024 25th International Arab Conference on Information Technology (ACIT), Zarqa, Jordan, 2024, pp. 1-6, doi: 10.1109/ACIT62805.2024.10877053.

8. Ramadan, A., Alkhodary, D., Alnawaiseh, M., Jebreen, K., Morshed, A., & Ahmad, A. B. (2024). Managerial competence and inventory management in SME financial performance: A Hungarian perspective. Journal of Statistics Applications & Probability, 13(3), 859-870.

9. Y. A. B. Ahmad, M. Allahham, W. I. Almajali, F. T. Ayasrah and S. Sabra, "From Insights to Impact: Business Intelligence's Influence on Jordan's Industrial Decision-Making," 2024 25th International Arab Conference on Information Technology (ACIT), Zarqa, Jordan, 2024, pp. 1-5, doi: 10.1109/ACIT62805.2024.10877161.

10. Zhan, Y., Ahmad, S. F., Irshad, M., Al-Razgan, M., Awwad, E. M., Ali, Y. A., & Ayassrah, A. Y. B. A. (2024). Investigating the role of Cybersecurity's perceived threats in the adoption of health information systems. Heliyon, 10(1).

11. A. Y. A. Bani Ahmad, M. Allahham, W. I. Almajali, F. T. Ayasrah and S. Sabra, "Smart Logistics Services: How Artificial Intelligence Transforms Decision-Making," 2024 25th International Arab Conference on Information Technology (ACIT), Zarqa, Jordan, 2024, pp. 1-4, doi: 10.1109/ACIT62805.2024.10876978.

12. Ahmad, A. Y. B., Ali, M., Namdev, A., Meenakshisundaram, K. S., Gupta, A., & Pramanik, S. (2025). A Combinatorial Deep Learning and Deep Prophet Memory Neural Network Method for Predicting Seasonal Product Consumption in Retail Supply Chains. In Essential Information Systems Service Management (pp. 311-340). IGI Global.

13. A. Y. A. Bani Ahmad, M. Allahham, W. I. Almajali, F. T. Ayasrah and S. Sabra, "From Interaction to Action: How User Input Shapes Logistics and Decisions in Jordan's E-Industry," 2024 25th International Arab Conference on Information Technology (ACIT), Zarqa, Jordan, 2024, pp. 1-6, doi: 10.1109/ACIT62805.2024.10877225.

14. Stock, J., & Lambert, D. (2001). *Strategic Logistics Management*, McGraw-Hill International Edition.

15. Almamlaka TV. (Apr. 30, 2022). [YouTube video] https://www.youtube.com/watch?v=z3S_nkj8H5g

Received: August 09 , 2025

Volume 38 No. 9s, 2025

ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

16. Al-Bustanji, Khaled Abdulmonem. (2025). *International Business Management*, Dar Al-Yazouri Publishing and Distribution, Jordan.
17. Hassan, Mohamed Ahmed. (2009). *Supply Chain and Distribution Management*, Al-Dar Al-Jami'iyah, Egypt.
18. Al-Rifai, Mamdouh Abdulaziz. (2006). *Supply Chain Management: An Analytical Approach*, Ain Shams Library, Egypt.
19. Al-Ali, Abdul Sattar, & Al-Kannani, Khalil Ibrahim. (2006). *Supply Chain Management*, Dar Al-Maseera Publishing and Distribution, Jordan.
20. *Al Jazeera*. (2024, Dec 26). *Suez Canal Losses 2024*. https://www.aljazeera.net/ebusiness/2024/12/26/suez-canal-losses-2024

Received: August 09 , 2025