

The Impact of Logistics Performance on International Seaborne Trade

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Summary

This paper explores the impact of logistics performance on international seaborne trade. The analysis draws on Tunisia's overall logistics performance and its six sub-dimensions. The main objective of this paper is to inventory the logistical obstacles that impede the flow of goods between Tunisia and worldwide countries. The paper will examine the evolution of the six sub-dimensions of the logistics performance and their impacts on Tunisia's seaborne trade. The empirical analysis involved a comparison, both the evolution of the logistics performance index and the seaborne trade in Tunisia. Findings show that the overall logistics performance and its six sub-dimensions are statistically significantly correlated with seaborne trade in Tunisia. The findings could help decision-makers to identify deficiencies in logistics performance and improve them to improve Tunisia's competitiveness in seaborne international trade.

Key words:

Seaborne trade; logistics performance; logistics services; Tunisia.

1. Introduction

Geographical factors and seaports infrastructure are among the most relevant determinants that affect seaborne trade. The geographical distance between a country and its main trading partners and trade agreements have considered the main factors that explain seaborne trade. However, it is important to analyse the impact of other factors related to logistics services on seaborne trade.

Logistics services play an important role in the development of seaborne trade, enhancement at a local economic activity and connection of the local economy to the international economy. [15] indicated that logistics services have an economic importance where its role is not limited to, assisting flow of goods across space and is not only a connective function in the fields of delivery of raw materials for manufacturing needs and for distributing final products, it provides added value and it contributes to Gross Domestic Product. The quality and efficiency of logistics services can be considered as one of keys to development seaborne trade. Logistics performance facilitates international trade exchange and generates what is known external economies that are often not visible. The

development of logistics performance has a prominence of seaborne trade because it allows firms to effectively complete import and export of goods, improve logistics can increase seaborne trade volume.

Since 2007 the World Bank has developed Logistics Performance Index overall score to measure the logistics performance of any country. With the publication of a widely-accepted definition of the logistics performance, may explain the appearance of analyses that directly appreciate the impact of logistics performance on seaborne trade. However the most current studies only concern with the effect of individual aspects of the logistics chain on seaborne trade. Logistics Performance Index overall score as defined by the World Bank reflects the perceptions of the country's logistics based on six sub-dimensions of logistics performance. The first one is the efficiency and effectiveness of customs clearance processes such as speed, simplicity and predictability of formalities. The second one is the quality of trade and transport-related infrastructure such as ports, railroads, roads, information technology. The third one is the ease and affordability of handling shipments inside and outside the country. The fourth one is competence in the local logistics services industry, which measures the competence and quality of logistics service providers such as transport operators and customs brokers. The fifth one is the ability to track shipments throughout the logistics chain. Sixth, the frequency with which shipments reach consignee within scheduled or expected time. The Logistics Performance Index overall score represents the average of the six sub-dimensions of logistics performance. All these six sub-dimensions and the logistics performance index overall score index ranges from 1 (very low) to 5 (very high), with a higher score representing a better performance.

Despite the role of logistics services provider in supporting seaborne trade, there is lack of studies that focus on the relationship between logistics performance and seaborne trade. It is essential to study the contribution of logistics sector on the development of seaborne trade. The aim of logistics performance impact studies is to confirm the importance of the economic contribution of the logistics sector in seaborne trade.

In addition to the introduction that looked at sub-dimensions and the logistics performance index and its relationship with seaborne trade, the following sections are organized as follows. Section 2 for the literature review relevant to this paper; section 3 presents Tunisia's logistics performance and seaborne trade, and section 4 for the conclusion.

2. Literature Review

Logistics performance and its impact on international seaborne trade have been attracting a great deal attention of researchers. [13] examined the effects of developments in logistics performance on the international trade of the European Union and Middle East and North Africa countries. Findings show that subcomponents that form the logistics performance such as customs, infrastructure, international shipments, logistics quality and competence, tracking-tracing and timeliness play a pivotal role in explaining the foreign trade performance among countries. They confirmed that logistics performance could be one of the fundamental determinants for the competition amongst countries. [5] discussed the performance of the logistics sector in Jordan using the LPI's six sub-dimensions over eight years. Findings show that Jordan's LPI score has dropped. The challenges in the logistics sector are clearly reflected in the overall LPI score value and its sub-dimensions. The results show a decline in sub-dimensions: efficiency and effectiveness of the clearance process by customs and other border control agencies, ease and affordability of arranging priced shipments, competence in the local logistics industry (e.g. freight forwarders, transport operators, customs brokers) and timeliness of shipments in reaching destination has been significant. Considering 91 countries with seaports, [11] have conducted an empirical inquiry into the broader economic contribution of seaborne trade, from a seaports infrastructure quality and logistics performance perspective. Findings reveal that it is important for developing countries to continuously improve the quality of seaports infrastructure as it contributes to better logistics performance, and to increase seaborne trade, and to contribute to economic growth. They confirmed also that this association is weakened as the developing countries become richer. [10] analysed the impact of each one of the LPI sub-dimensions on trade. Their findings confirmed that improvements of LPI's six sub-dimensions are likely to positively affect the volume of trade. Concerning landlocked Countries [14] examined the impact of port transport-logistics Infrastructure and logistics performance index for economic growth. They confirmed that some countries which have not directly access to sea are inferior to other countries in terms of economic growth. [18]

analyzed how logistics performance affects international trade volume and compared the different effects between developing and developed countries by employing a gravity model with panel data from 43 countries. The findings show a significant positive impact on logistics performance index (LPI) on export volume than on import volume. Also, it has a more powerful influence on trade in developing countries than developing countries. [8] studied the relationship between the quality of logistics performance and trade. They indicated that higher quality logistics services are positively correlated with higher bilateral trade. They also concluded that all aspects of logistics services, including customs procedures and regulations have a significant impact on trade more than distance or freight costs. [1] examined the impact of the quality of the transport infrastructure and logistics services on trade between East and South Asia. Findings show that maritime transport, which is the dominant type of freight traffic between these two regions require significant improvements in the border crossing procedures and logistics services. [3] examined the impact of Korea's Free Trade Agreements on the flow of international trade, the volume of seaborne trade, and the creation of additional demand for logistics services for port and containerized cargoes. Findings show an increase in ports and containerized cargo. [7] investigated the relationship between countries' merchandise exports and quality logistics performance, seaport infrastructure quality, and liner shipping connectivity. Results suggest that the quality of seaport infrastructure, customs clearance processes, as well as time to export and maritime connectivity, should be explanatory factors of country's merchandise exports. [2] estimated an augmented gravity model of trade that specifically includes logistics and transport infrastructure indicators as explanatory variables by using bilateral exports from 19 Spanish regions to 64 destinations. The findings show also that logistics are important for the analysis of trade flows of goods, especially in terms of number, size and quality of logistics facilities. [4] examined the impact of logistics performance in international trade. Findings show that the overall logistics performance is positively and statistically significantly correlated with exports and imports. [6] studied the impact of logistics performance on global bilateral trade using World Bank database. Findings show that logistics performance is statistically significantly related to the volume of bilateral trade among 80 countries. [17] studied the relationship between green logistics and international trade. Their findings show that the logistics performance index of exporting and importing countries are positively correlated with trade volume. Also, the green logistics performance of importing countries has a negative impact on the export volume of exporting countries.

3. Tunisia's Logistics Performance and Seaborne Trade

3.1. Trends of Tunisia Seaborne Trade

Figure 1 presents Tunisia seaborne trade trend since 2010 to 2017 based on Tunisia Office of Merchant Marine and Ports data [12]. Figure 1 shows that Tunisia seaborne trade has dropped since 2010.

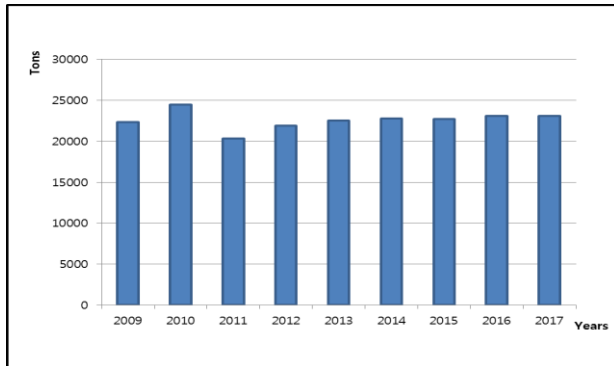


Fig. 1 Tunisia's Seaborne Trade

Figure 2 shows that 2011 was the worst year for Tunisia seaborne trade, when the growth rate was declining to -17% compared to 2010.

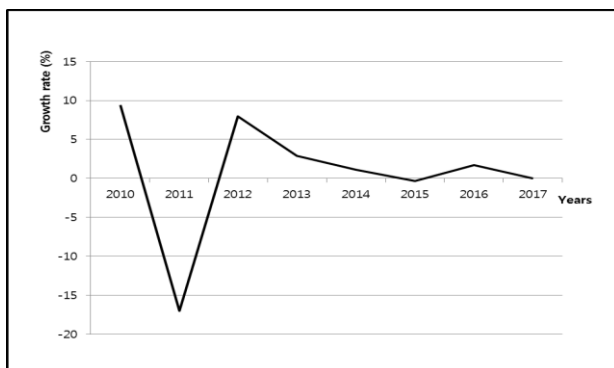


Fig. 2 Annual Percentage Growth of Tunisia's Seaborne Trade

The successive Tunisian governments have worked before and after 2010 on liberating trade, development of transport infrastructure and reducing transport costs, containerization adoption, the development of communication technology, adopting the international division of labor and globalization of manufacturing and distribution processes, expanding economic integration and interdependence between countries, and development of logistics services. With the government's tendency to develop seaborne trade in Tunisia and not reviewing

multilateral and bilateral trade agreements, it remains to be wondering about the impacts of logistics services and the quality of transport infrastructure and transport costs on Tunisia's seaborne trade.

3.2. Trends of Tunisia's Six LPI Sub-Dimensions

Figure 3 shows the Logistics Performance Index overall score for Tunisia according to the World Bank collection of development indicators, compiled from officially recognized sources. Examining the LPI overall score values revealed a significant drop in LPI score from 2012. Such decline of LPI was unprecedented and it is the result of several factors, including Tunisia's political transition and the economic and social volatility, rising commodity prices, weak export and Tunisia Dinar depreciation value. All these negative factors have limited the ability of the transport auxiliary truck and handling operators to renew and develop their fleet and equipment.

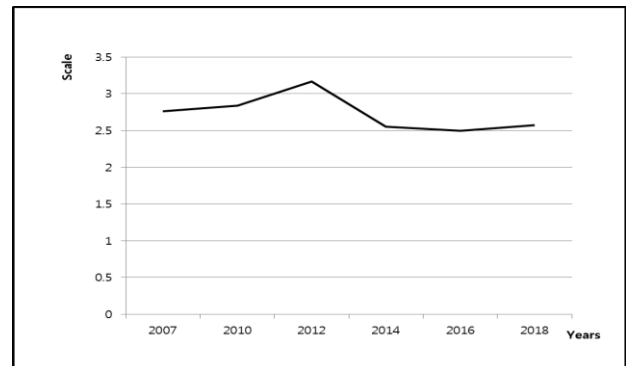


Fig. 3 Logistics performance index: Overall Score

Certainly, the fluctuation in the LPI value is a direct result of a decline in one or more of the LPI sub-dimensions. Figures 4 to 9 illustrate the evolution of Tunisia's six LPI sub-dimensions. Examining these sub-dimensions, it is evidence to see significant drops in Tunisia's LPI score of 2012. All the six sub-dimensions showed a decline from 2012. The major drop was observed at an efficiency of the customs clearance process. The minor drop was seen in the frequency with which shipments reach the consignee within scheduled or expected time.

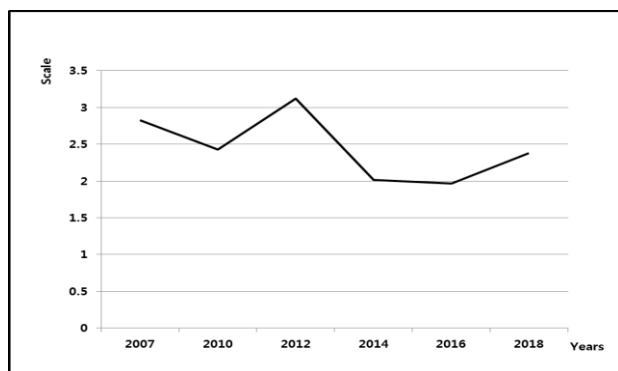


Fig. 4 Logistics Performance Index: Efficiency of Customs Clearance Process (1=low to 5=high)

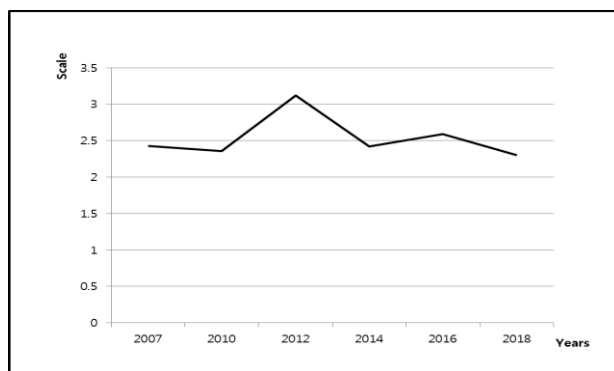


Fig. 7 Competence and Quality of Logistics Services (1=low to 5=high)

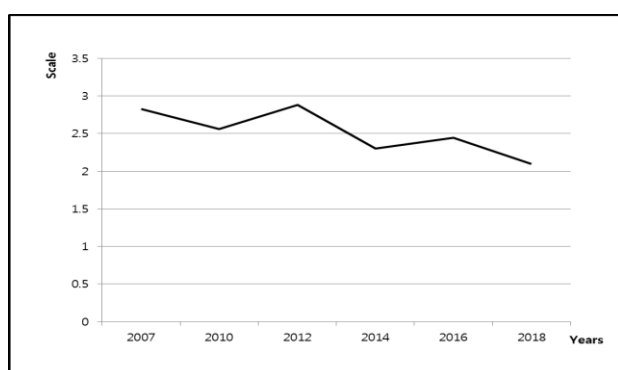


Fig. 5 Quality of Trade and Transport-Related Infrastructure (1=low to 5=high)

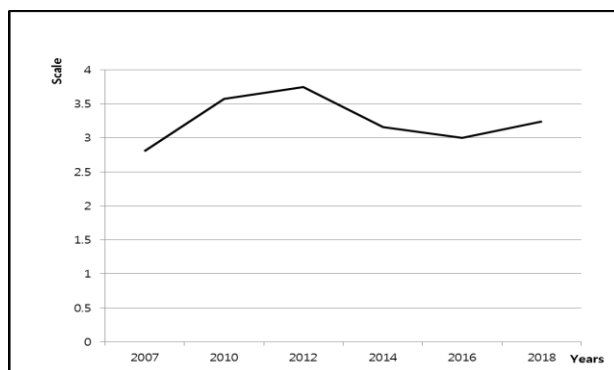


Fig. 8 Frequency with which Shipments Reach Consignee within Scheduled or Expected Time (1=low to 5=high)

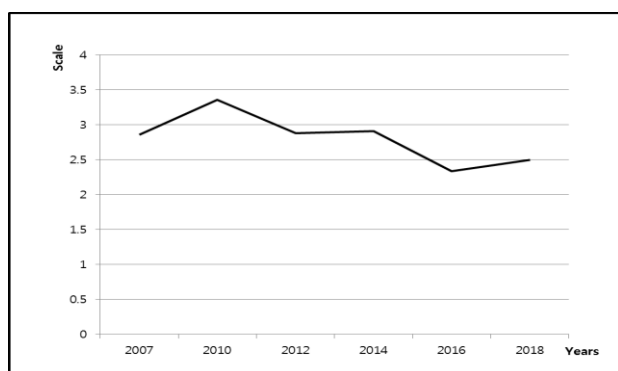


Fig. 6 Ease of Arranging Competitively Priced Shipments (1=low to 5=high)

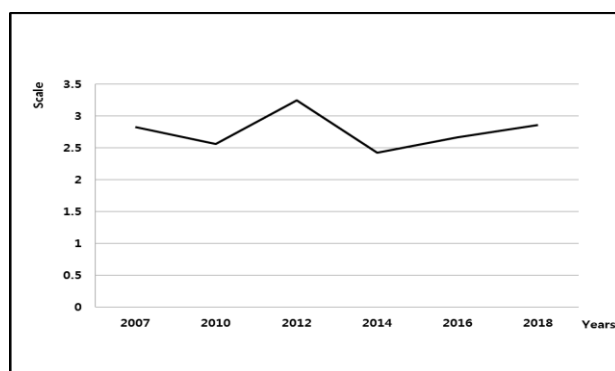


Fig. 9 Ability to Track and Trace Consignments (1=low to 5=high)

The acute decline observed at the efficiency of the customs clearance process, the thing proved that customs procedures are not fully streamlined at the borders or the inefficiency of transport auxiliaries (freight forwarders, transport operators, customs brokers) to speed up the process of borders handling goods. The World Bank data refers to an average 27 hours as the time to complete documents required to import transaction and 3 hours as the time to complete documents required to export transaction. These times are below the time of the

European Union (Tunisia's main trading partner) 1.39 hours for export and 1.07 hours for import. Also, it takes on average 50 hours to clear direct export through customs and 80 hours to clear direct import. However, it takes about 1.7 hours in the European Union countries to clear direct export through customs and 8.1 hours to clear direct import.

The quality of trade and transport-related infrastructure dropped from 2.8 in 2012 to 2.1 in 2018 confirms the decline in competence and the quality of logistics services. Moreover, there are dropping of operational quality of the transportation operations offered in Tunisia such as the road network, rail network, air freight companies, air cargo terminal, maritime transport companies, seaport networks, handling companies, freight forwarders services, and customs brokers.

The ease of arranging competitively priced shipments showed a significant dropping in recent years. It declined from 2.9 in 2014 to 2.5 in 2018. Despite Tunisia authorities' efforts to grant incentives to the truck and handling operators to renew and to develop their fleets and equipment, a few operators have upgraded their fleet along the period 2012 to 2018. With the drop of the indicator of the ease of arranging competitively priced shipments the freight cost of containers and other general cargo from Tunisia's seaports to the rest of Tunisia's interior regions saw a remarkable rise thing that affects negatively seaborne trade.

The competence and quality of logistics dramatically dropped from 3.12 in 2012 to 2.3 in 2018. This decline reflects the decline of overall competence and quality of logistics services and operational quality of the transportation operations offered in Tunisia. This decline has a significant impact on Tunisia's seaborne trade. That proves that freight forwarding and logistics industry is not well-developed in Tunisia. Tunisia's freight forwarding and logistics providers are not large companies and they are not growing commensurate with the geographical location of Tunisia and the size of its foreign trade. There is a necessity to bring freight forwarding activities and logistics towards international standards. Tunisian authorities must improve investment in logistics activities and create a real partnership between public and private logistics operators and develop the freight forwarding and maritime industry.

The Frequency with which shipments reach consignee within scheduled or expected time is down from 3.75 in 2010 to 3.24 in 2018. Many factors contributed to increase this sub-dimension in Tunisia such as pre-shipment inspection, border crossing procedures, weak logistics services, nature of transit goods, political instability, and administrative strikes in Tunisia's ports, inefficient road transport services, and strikes at auxiliary transport activities.

Ability to track and trace consignments in Tunisia was dropped from 3.25 in 2012 to 2.86 in 2018. This dropping confirmed that the most important exports and imports companies of Tunisia were affected by political and social unrest since 2011 and affected also by the political and social unrest in the neighboring countries which considered as major trading partners such as Libya and Algeria.

3.3. Transposition of Seaborne Trade and LPI Sub-Dimension

Figure 10 presents the matching of seaborne trade with logistics performance and confirms the relationship between them.

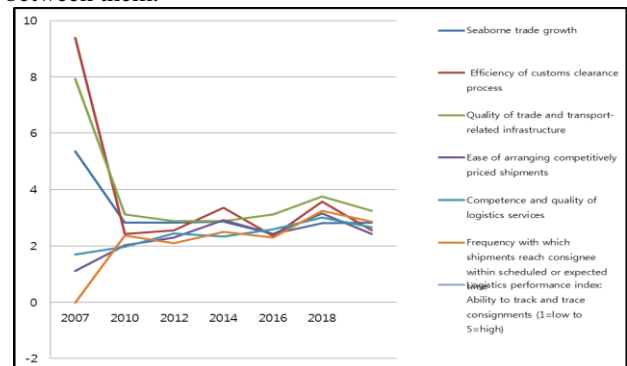


Fig. 10 Tunisia Seaborne Trade and Logistics Performance

The previous figure shows the efficiency of the customs clearance process and the quality of trade and transport-related infrastructure which are regarded the most influential in Tunisia's seaborne trade. They have contributed directly to the shrinking volume of seaborne trade since 2012. That findings proves that Tunisia's logistics services such as a facility of customs procedures on the border, efficiency of the customs clearance process at the seaports, good quality of transportation related infrastructure, higher level of liner shipping connectivity, higher ability to tracking and tracing consignments, wide terminal handling and speeding clearance of goods, availability of cold storage facilities at the ports, all need to improve to contribute to the development of seaborne trade.

4. Conclusion

This paper examines the relationship between logistics performance and seaborne trade in Tunisia. Tunisia's seaborne trade depends on the efficiency of trade support structures such as providers of logistics services. The findings of this study revealed significant correlation of overall logistics performance with seaborne trade. The study also extended the analysis by examining the relationship of the LPI sub-dimensions with seaborne trade.

The findings of the study also confirm the significant correlation of all the six LPI sub-dimensions with seaborne trade. The significant drop in Tunisia's LPI score observed after 2012 has negatively impacted the seaborne trade. Lastly the findings of the study confirm a strong relationship between LPI sub-dimensions and seaborne trade. Several aspects of logistics still pose substantial difficulties in easing up seaborne trade. Although Tunisia has made significant advances in streamlining of customs procedures at border points, more work still needed to achieve greater efficiency and effectiveness customs agencies and it needs streamlining and harmonizing customs procedures to meet international standards. In addition the development of Tunisia' seaborne trade needs a coherent national transport strategy and better logistics.

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