UNITED NATIONS E

ECONOMIC AND SOCIAL COUNCIL

Distr.
LIMITED
E/ESCWA/C.5/2023/6
19 September 2023
ORIGINAL: ENGLISH

Economic and Social Commission for Western Asia (ESCWA)

Committee on Transport and Logistics
Twenty-fourth session
Cairo, 10–11 January 2024

Item 7 of the provisional agenda

Logistics performance in the Arab region: overview of developments

Summary

Logistics is considered the backbone of international trade, as it contributes to fostering the efficient transfer of goods between stakeholders. The Arab region has a long and illustrious history of maritime trade and seafaring traditions owing to its advantageous location astride Asia, Europe and Africa, making the region a crucial transit point for products moving between the three continents. Nevertheless, a region that is strategically located has to be efficient and competitive in order to be considered a global hub.

Some Arab countries have risen to the challenge and become well-known for their efficiency and performance. Others are still trying to follow suit. Several difficulties, however, have emerged, particularly in relation to logistics performance and its effects on trade costs and competitiveness. Inadequate infrastructure, ineffective business practices and administrative bottlenecks are just a few of the causes of inefficiency which can create substantial delays and disruptions in the flow of goods, leaving an impact on trade efficiency. However, solutions exist, especially with the massive technological advancements that have occurred in recent years.

Other developments such as the emergence of e-commerce and the recalibration of global supply chains following the COVID-19 pandemic have induced changes in logistics, creating new opportunities and challenges. The Committee on Transport and Logistics is invited to review the contents of the present document and comment thereon.

Contents

Introduction

1. Logistics is considered the backbone of international trade, fostering the movement of goods among stakeholders around the world. The importance of logistics has risen with the growth in global value chains, whereby a final product's parts and components are often transported between multiple regions, countries and even continents before being assembled. This production model has rendered the efficiency of logistics crucial for competitiveness and participation in global trade.

2. However, despite the economic growth and wealth that international trade has generated, several difficulties have emerged, particularly in relation to port congestion, cost of trade, competition among global powers and the formation of alliances and hubs and spokes to dominate production and markets. Changing patterns of the global supply chain towards nearshoring, friend shoring and reshoring, as well as the elevated use of e-commerce vs. in-store shopping following the COVID-19 pandemic, among other developments, have increased demand for efficient logistics services. As the world strives for more efficiency and competitiveness in trade and more environmentally friendly practices such as the elimination of CO_2 emissions, the efficiency of logistics has become of paramount importance.

3. Luckily, significant developments have occurred in recent years that could help improve the efficiency of logistics, namely the technological developments brought about by the 4th industrial revolution, which encourage solving certain logistics problems through automation using artificial intelligence (AI), blockchain, automated vehicles and equipment, and big data. The efficiency of logistics is also affected by the adoption of various measures and policies aimed at streamlining and simplifying processes of handling and clearing shipments, including the implementation of the World Trade Organization Trade Facilitation Agreement and the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific.

4. The Arab region is very concerned with logistics efficiency as it seeks to continue thriving as a hub for international shipping due to its strategic location and its historical linkages to the industry. The port industry in the region is one of the most important sectors and has witnessed many investments and developments over the past decades, resulting in some of the region's ports being at the forefront of the global industry either in capacity of handling or in efficiency.

5. The present document attempts to shed light on the major development of the logistics sector in the Arab region, while highlighting some of the issues associated with logistics performance, namely port congestion. It is a continuation of previous work carried out by the United Nations Economic and Social Commission for Western Asia (ESCWA) in this field, aimed at providing a closer look at the sector and its importance to the Arab region.[1]

I. Logistics performance

A. Liner shipping connectivity

6. The liner shipping connectivity index (LSCI) provides insight into how well a country is connected to global shipping networks. It is based on five components collected annually, including the number of shipping lines servicing a country, the size of the largest vessel used on these services (in twenty-foot-equivalent-units (TEU)), the number of services connecting a country to other countries, the total number of vessels deployed in a country, and the total capacity of those vessels (in TEU). The higher the score on the index, the better the connection of a country to international maritime container lines. This means that shipping to and from the country is easier and cheaper due to the availability of vessels.

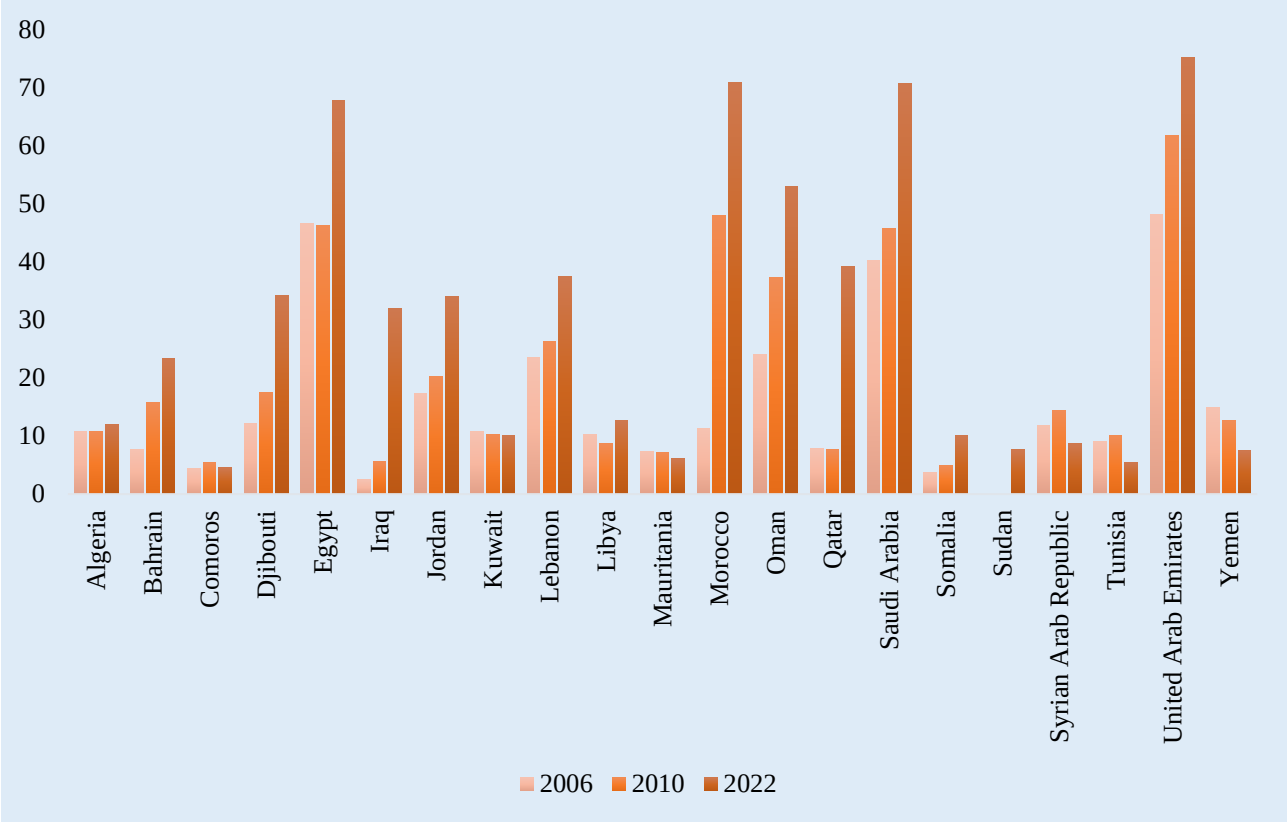
7. In 2022, some Arab countries have made significant progress in their LSCI rankings, namely Egypt, Morocco, Saudi Arabia and the United Arab Emirates. Saudi Arabia recorded the highest increase in

[1] See E/ESCWA/EDID/2016/IG.1/4(Part II).

performance from 2010 (54 per cent), going from a 45.8 LSCI score to a 70.7 in 2022. The LSCI scores of Morocco and Egypt also increased significantly in the past 12 years by 47.5 per cent and 46.5 per cent, respectively.

8. Notwithstanding advancements observed in recent years, certain countries, namely Algeria, Iraq, Libya and Somalia, continue to face challenges in achieving sufficient connectivity. Additionally, a decline in connectivity has been observed in several other countries, including the Comoros, Mauritania, the Syrian Arab Republic, Tunisia and Yemen (figure 1).

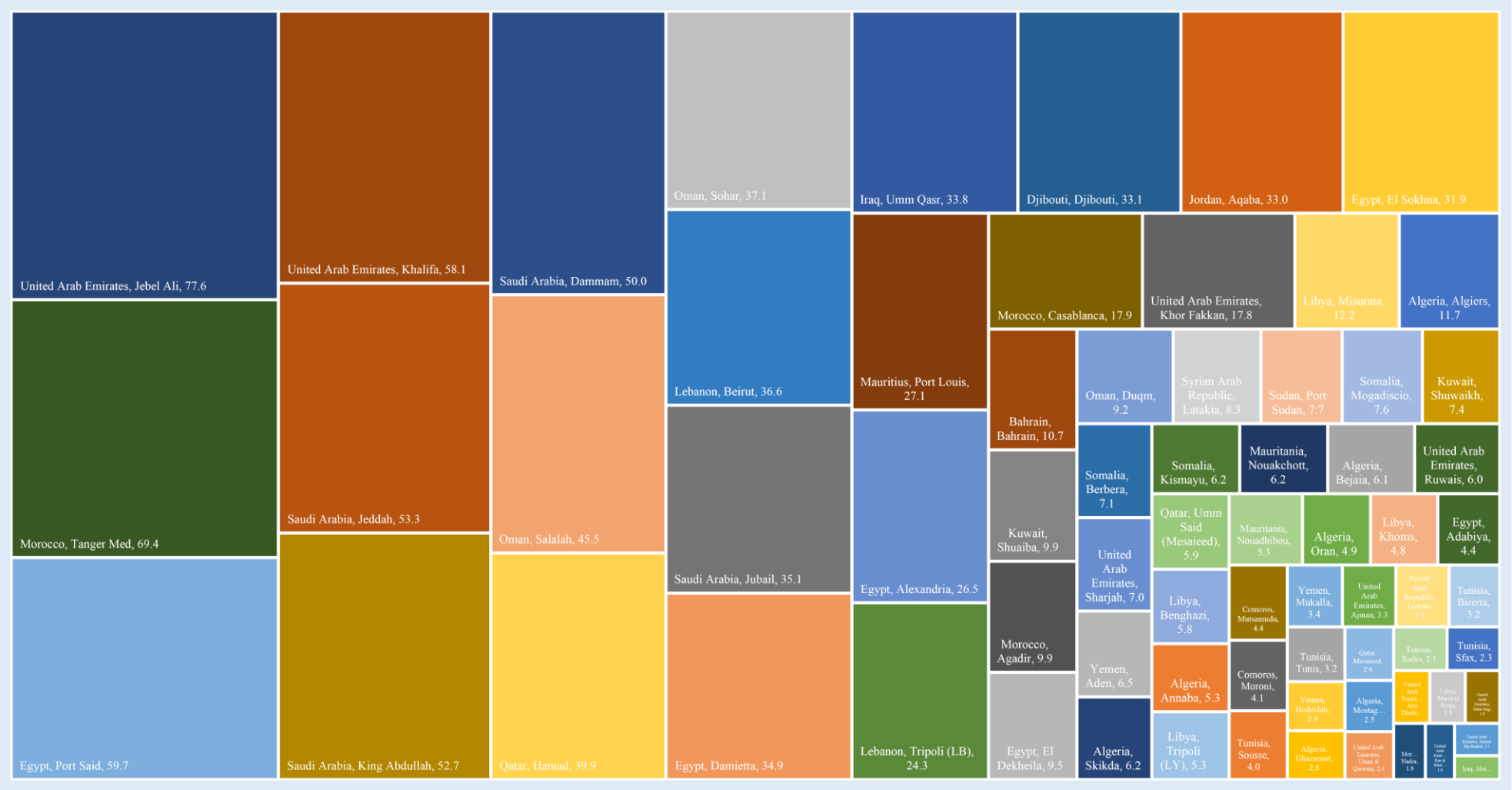
Figure 1. Evolution of connectivity over the years



Source: LSCI data from the United Nations Conference on Trade and Development (UNCTAD), available at https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=92.

9. The UNCTAD Port LSCI (PLSCI) reflects a port's position in the global liner shipping network. The PLSCI complements the country LSCI, using the same methodology but at the level of ports. In figure 2, the index further portrays the status of countries in 2022, by assessing each port individually. Jebel Ali Port in the United Arab Emirates is among the most connected ports in the region, with an overall score of 77.6, followed by Tanger Med in Morocco (69.4) and Port Said in Egypt (59.7).

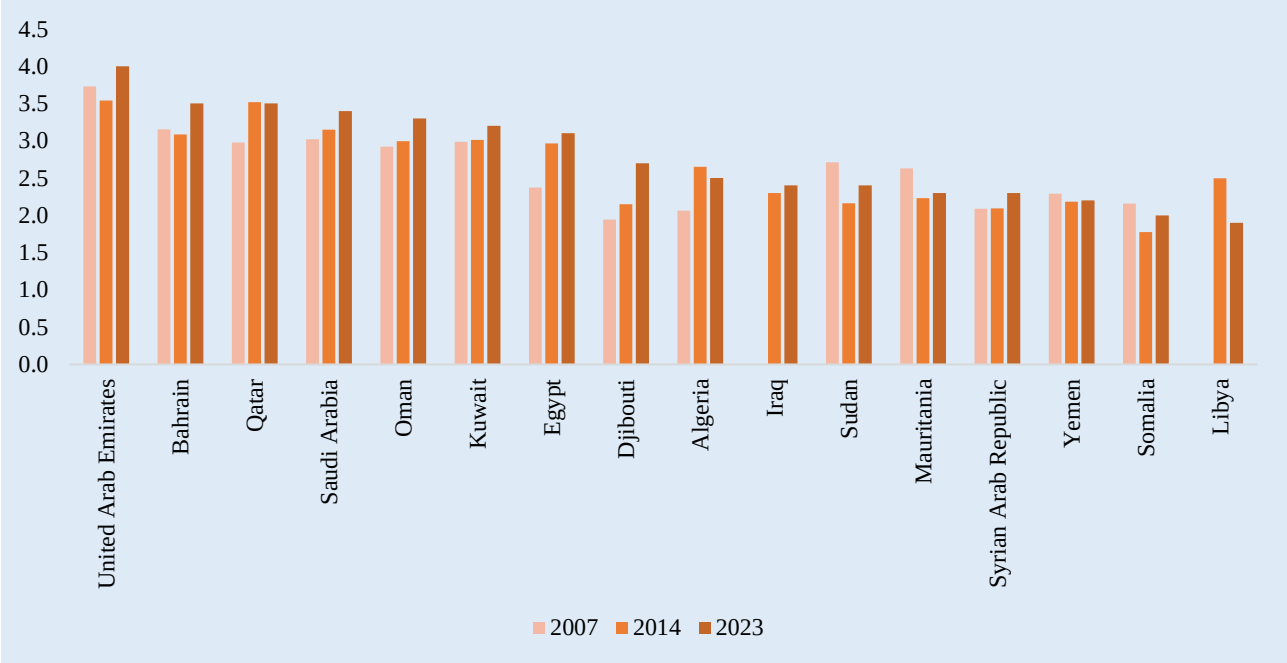
Figure 2. Port Liner Shipping Connectivity Index



Source: 2022 UNCTAD data on PLSCI, available at https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026.

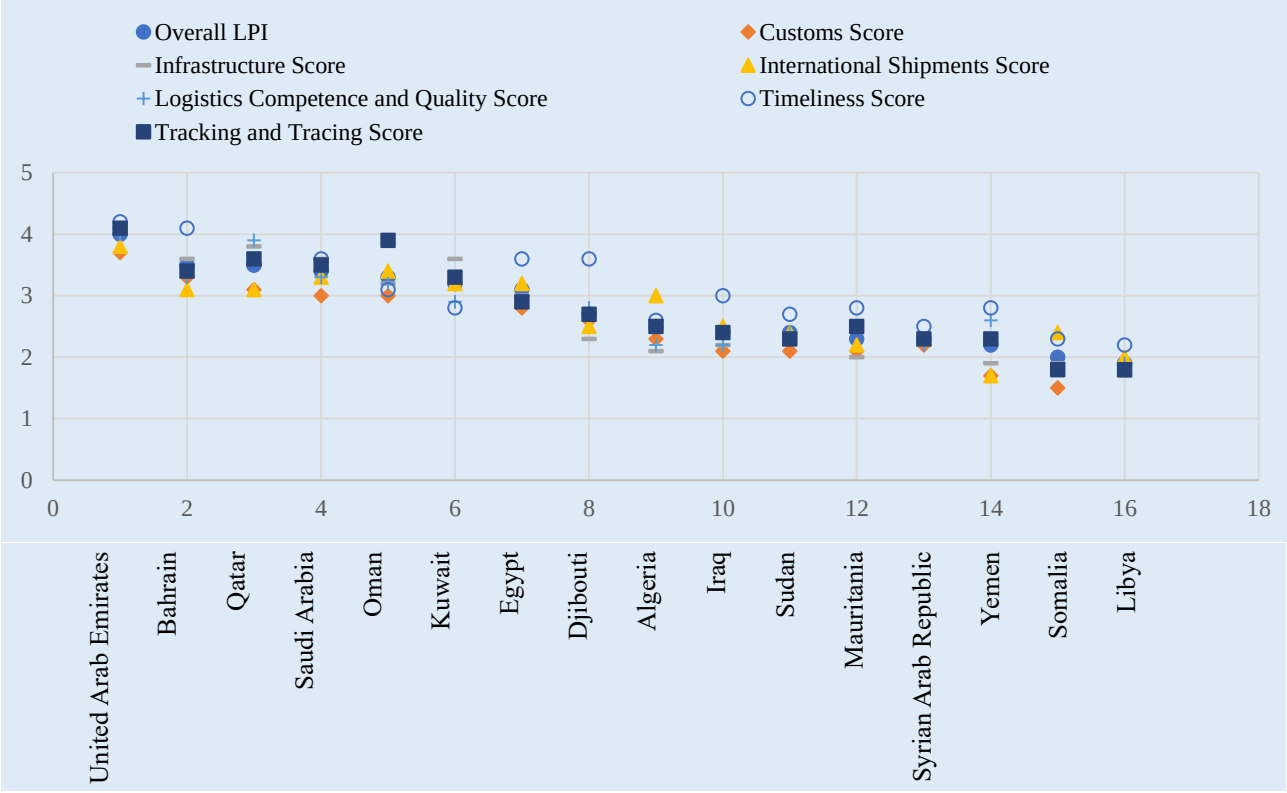
B. Logistics Performance Index

Figure 3. Logistics Performance Index scores over the years



Source: World Bank data on the Logistics Performance Index (LPI), available at https://lpi.worldbank.org/international/global.

Figure 4. LPI by category, 2023



Source: World Bank data on LPI, available at https://lpi.worldbank.org/international/global.

10. The World Bank Logistics Performance Index (LPI) is a summary indicator of the performance of the logistics sector, combining data on six core performance components into a single aggregate measure. The components include efficiency of customs, quality of trade and transport infrastructure, ease of shipments, quality of logistics services, tracking and tracing, and timeliness. The index is built using surveys of user perceptions rather than factual figures.

11. LPI scores in 2023 vary between Arab countries. Gulf Cooperation Council (GCC) countries are in the lead, with some being among the best performers globally. However, lower- and lower-middle-income countries such as Somalia (2.0) and Libya (1.9) are among the bottom ten scorers globally in 2023.

12. The LPI performance in each category is shown in figure 4. Results reveal that customs is the worst performing pillar in most countries. The low LPI scoring of a few countries in this category, such as Libya, Mauritania, Somalia, the Sudan, the Syrian Arab Republic and Yemen, could be attributed to the lack of proper infrastructure. Meanwhile, GCC countries perform best in this category.

C. Container port performance

13. The Container Port Performance Index (CPPI), created by the World Bank and S&P Global Market Intelligence, ranks international container ports based on their efficiency, which is determined by the amount of time it takes a ship to complete its cargo exchange after it arrives at a port and leaves the berth. The ranking aims to highlight key areas of improvement for the benefit of parties involved in international trade, such as the Government, shipping lines, port and terminal operators, shippers, logistics firms and consumers.

Table 1. Container Port Performance Index 2022

Overall rank					Rank per ship size range				
Port name	**Country**	**Rank**	**Total calls**	**Change from 2021**	**<1,500**	**1,501–5,000**	**5,001–8,500**	**8,501–13,500**	**>13,500**
Salalah Port	Oman	2	1,397	0		12	4	1	1
Khalifa Port	United Arab Emirates	3	896	2	86	47	10	7	5
Tanger-Med Port	Morocco	5	3,097	1	163	50	11	12	2
Hamad Port	Qatar	8	257	-5		1	14	16	11
Port Said	Egypt	11	1,106	4	52	48	23	15	14
King Abdullah Port	Saudi Arabia	16	164	-15	83	6	158	2	6
Djibouti Port	Djibouti	24	248	-5	40	39	22	42	32
Jeddah Port	Saudi Arabia	28	1,292	-20	265	172	21	10	23
Dammam Port	Saudi Arabia	33	290	-19	6	83	80	37	41
Jebel Ali Port	United Arab Emirates	40	1,931	-2	201	129	67	39	43
Sohar Port	Oman	45	148	2	28	70	54	54	54
Al Aqaba Port	Jordan	57	187	-22	14	32	55	72	65
Jubail Port	Saudi Arabia	65	173	184		66	60	80	60
Khalifa Bin Salman Port	Bahrain	73	120	-11	12	21		40	
Shuaiba Port	Kuwait	119	163	66	17	67			
Sharjah Port	United Arab Emirates	120	62	35	84	45			
El Dekheila Port	Egypt	144	182	-5	112	165	135		
Al Shuwaikh Port	Kuwait	152	185	37	68	132			
Damietta Port	Egypt	154	550	-96	152	248	129	97	61
Latakia Port	Syrian Arab Republic	180	75	-6	123	182			
Tripoli Port	Lebanon	205	91	-118	60	33		135	
Beirut Port	Lebanon	318	382	39	162	181	178	114	93

Source: CPPI 2022, World Bank and S&P Market Intelligence.

14. Ports in the Arab region were able to secure four out of the top five spots in the CPPI for 2021. King Abdullah Port in Saudi Arabia came at the top of the list, followed by Salalah Port in Oman and Hamad Port in Qatar, while Khalifa Port in the United Arab Emirates came in fifth.[2] In 2022, however, only three ports – Salalah, Khalifa and Tanger-Med – were able to secure spots in the top five ranking, with Hamad Port dropping to the eighth rank and King Abdullah Port to the sixteenth (table 1). Salalah Port ranked first in the West Central and South Asia region and second overall among the world's most effective container ports for the past two years. In addition to its world-class operations, Salalah Port's advantages in terms of location and expanding connections give all port clients a competitive edge that is unmatched in a fiercely competitive region.[3]

15. Khalifa Port's ranking as the third-most efficient container port in the world in 2022 is the result of ongoing investments in the port's infrastructure and concentrated efforts to improve operational efficiency, which continues to be a commercial differentiator and has drawn together three of the biggest container shipping lines as strategic partners. This has significantly improved the connectivity of Abu Dhabi and the appeal of the United Arab Emirates as a hub for international trade.[4]

16. The CPPI placed Hamad Port eighth overall and fourth in the Arab region. In 2022, the port handled 1.5 million tons of bulk cargo, more than 1.40 million TEUs, and 1,569 vessels. This accomplishment shows the effective operation of Hamad Port and the development of its infrastructure and facilities in accordance with the highest international standards.[5]

D. Trade facilitation performance

17. Trade facilitation is essential for the effective operation of ports and the overall competitiveness of the country. ESCWA, along with the other four regional commissions of the United Nations and UNCTAD, has been monitoring the implementation of digital and sustainable trade facilitation measures by conducting a global survey, biennially, since 2015. The results of the 2023 survey portray the implementation of 58 trade facilitation measures in 18 Arab countries, across several categories as shown in table 2.

Table 2. Trade facilitation measures

Groups	Subgroups	Measures
General trade facilitation	**Transparency** (5 measures)	Advance publication/notification of new trade-related regulations before their implementation
		Advance ruling on tariff classification and origin of imported goods
		Independent appeal mechanism
		Stakeholders' consultation on new draft regulations (prior to their finalization)
		Publication of existing import-export regulations on the internet
	Formalities (8 measures)	Trade facilitation measures for authorized operators
		Acceptance of copies of original supporting documents required for import, export or transit formalities
		Expedited shipments
		Pre-arrival processing
		Separation of release from the final determination of customs duties, taxes, fees and charges
		Risk management
		Post-clearance audits

[2] World Bank, Middle East container ports are the most efficient in the world, 2022.

[3] Mohamed Sabry, Performance Index: Arab ports dominate global ranking, 2023.

[4] AD Ports Group, Khalifa Port is ranked the 3rd most efficient container port globally, 2023.

[5] Mohamed Sabry, Performance Index: Arab ports dominate global ranking, 2023.

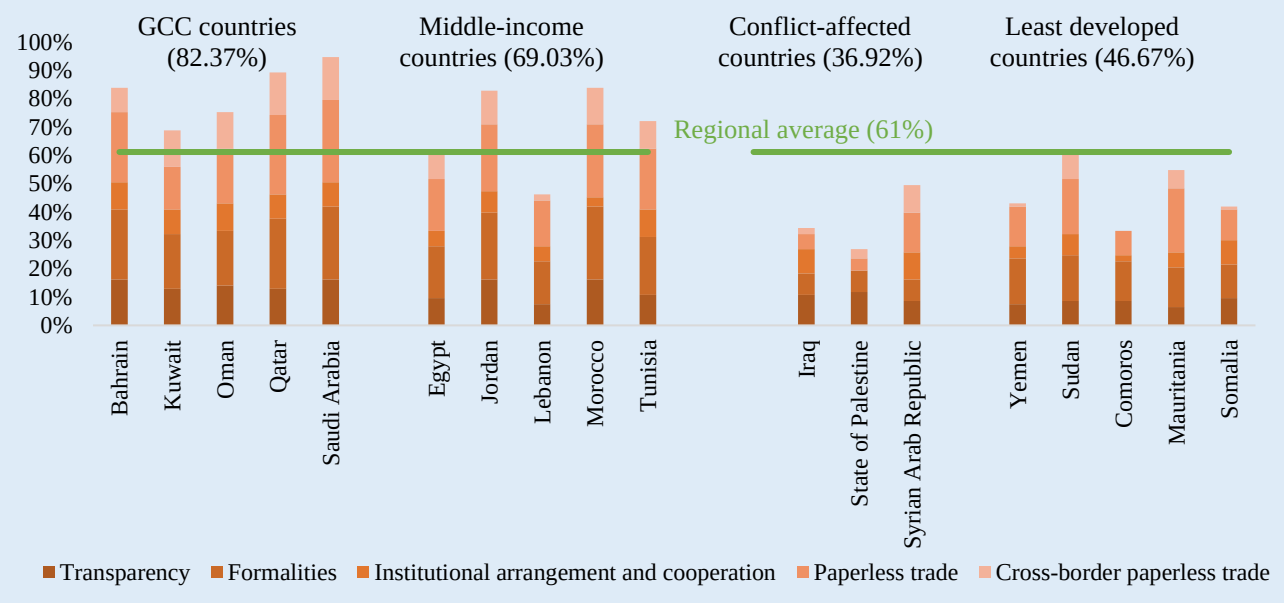
Groups	Subgroups	Measures
		Establishment and publication of average release times
	Institutional arrangement and cooperation (5 measures)	Government agencies delegating controls to customs authorities
		National legislative framework and/or institutional arrangements for border agencies cooperation
		National Trade Facilitation Committee or a similar body
		Alignment of working days and hours with neighbouring countries at border crossings
		Alignment of formalities and procedures with neighbouring countries at border crossings
	Transit facilitation (4 measures)	Supporting pre-arrival processing for transit facilitation
		Customs Authorities limit the physical inspections of transit goods and use risk assessment
		Cooperation between agencies of countries involved in transit
		Transit facilitation agreement(s)
Digital trade facilitation	**Paperless trade** (10 measures)	Electronic application for customs refunds
		Electronic application and issuance of preferential certificate of origin
		Electronic single window system
		E-payment of customs duties and fees
		Electronic submission of air cargo manifests
		Electronic submission of sea cargo manifests
		Electronic application and issuance of import and export permit
		Electronic submission of customs declarations
		Internet connection available to customs and other trade control agencies
		Automated customs system
	Cross-border paperless trade (6 measures)	Electronic exchange of sanitary and phytosanitary (SPS) certificate
		Recognized certification authority
		Electronic exchange of certificate of origin
		Paperless collection of payment from a documentary letter of credit
		Laws and regulations for electronic transactions
		Electronic exchange of customs declaration
Sustainable trade facilitation	**Trade facilitation in small and medium-sized enterprises (SMEs)** (5 measures)	Other special measures for SMEs
		SMEs in the authorized economic operator scheme
		SMEs access to single window
		SMEs in the National Trade Facilitation Committee
		Trade-related information measures for SMEs
	Agricultural trade facilitation (4 measures)	Electronic application and issuance of SPS certificates
		National standards and accreditation bodies to facilitate compliance with SPS standards
		Testing and laboratory facilities available to meet SPS standards of main trading partners
		Special treatment for perishable goods
	Women in trade facilitation (3 measures)	Female membership in the National Trade Facilitation Committee
		Trade facilitation policy/strategy incorporates special consideration of female traders
		Trade facilitation measures aimed at female traders

Groups	Subgroups	Measures
Other Trade Facilitation	**Trade finance facilitation** (3 measures)	Customs and/or other regulatory authorities engaged in blockchain-based supply chain projects covering trade finance
		Single window facilitates traders with access to finance
		Variety of trade finance services available
	Trade facilitation in times of crisis (5 measures)	Coordination of emergency trade facilitation measures with other countries
		Implementation of additional (cross-border) paperless trade measures in times of crises and emergencies
		An agency available to manage trade facilitation measures in times of crises and emergencies
		Publication of emergency trade facilitation measures online
		Preparedness of trade facilitation measures for future crises
	Trade facilitation for e-commerce (1 measure)	Trade facilitation measures for cross-border e-commerce
	Wildlife trade facilitation (1 measure)	Electronic exchange of permits/certificates of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Source: United Nations Digital and Sustainable Trade Facilitation data from 2023.

18. Focusing on the core 31 trade facilitation measures relevant to all Arab countries and included in previous surveys, the overall implementation rate in participating Arab countries was 61 per cent in 2023, compared to 54 per cent in the previous survey. Saudi Arabia had the highest performance with a 95 per cent overall implementation rate, followed by Qatar with 89 per cent and Bahrain with 84 per cent (figure 5). The Comoros and the State of Palestine had the lowest two performance rates, at 27 and 33 per cent, respectively.

Figure 5. Overall implementation of trade facilitation measures in Arab countries, 2023

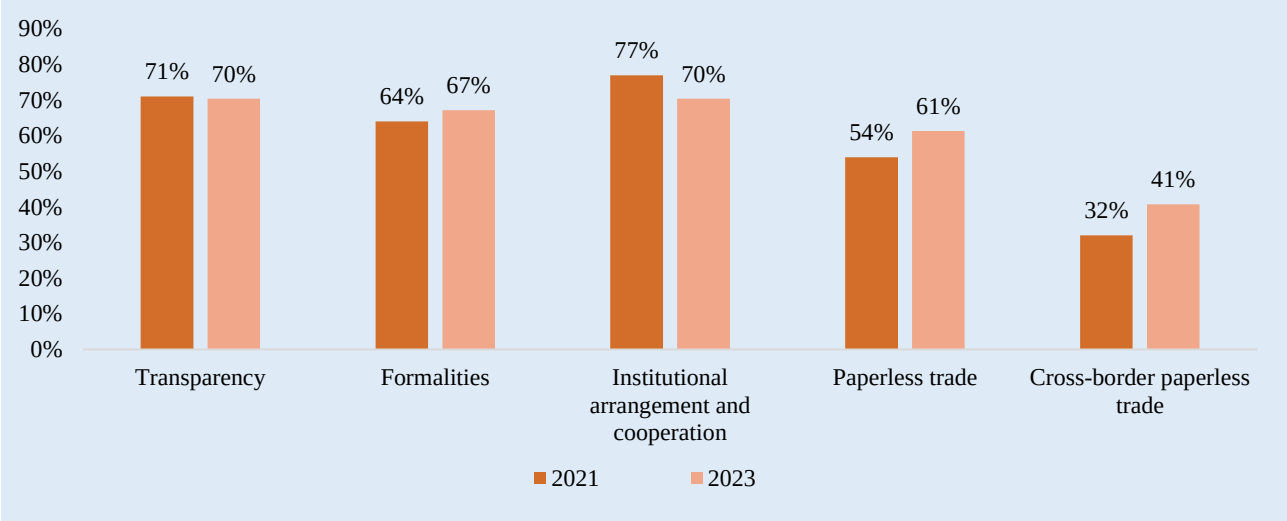


Source: Responses to the 2023 United Nations Global Survey on Digital and Sustainable Trade Facilitation (report forthcoming).

19. GCC countries demonstrated the highest subregional average (around 82 per cent), followed by middle-income countries (around 69 per cent). The implementation rate in these two subregional groups exceeded the Arab regional average of 61 per cent. Countries affected by conflict and occupation and least-developed countries are still lagging in terms of trade facilitation measures, as significant inefficiencies are still impeding smooth and efficient trade across their borders, particularly in cross-border paperless trade and institutional arrangement and cooperation.

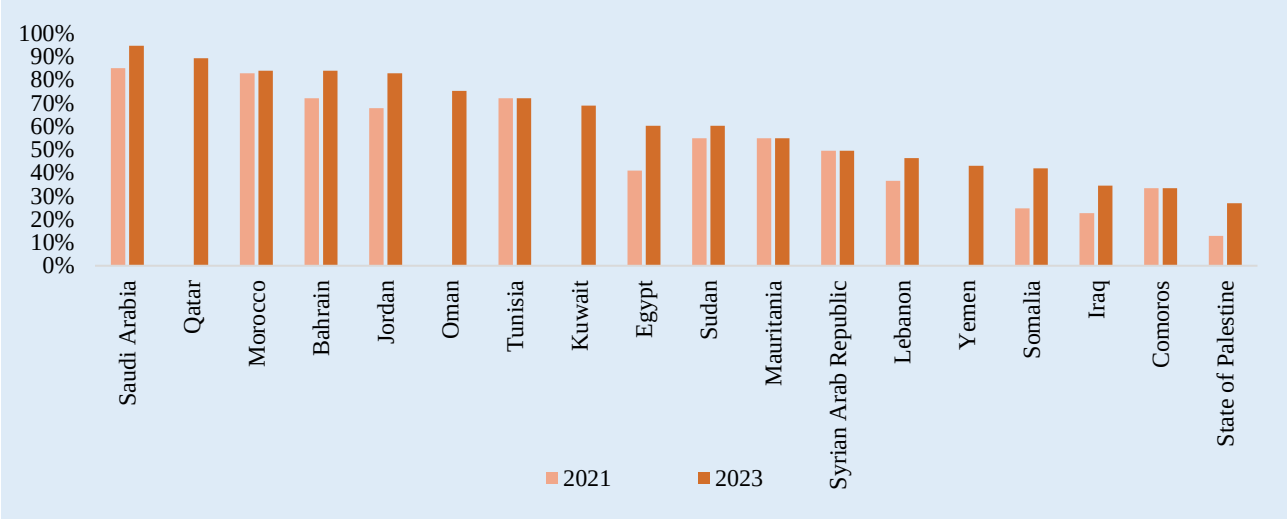
20. Focusing on the performance of Arab countries whose responses were available in both the 2021 and 2023 trade facilitation surveys, significant progress was achieved in some categories. The largest progress was realized in the cross-border paperless trade category, whereby the implementation rate increased by 9 per cent. This category is still, however, relatively weak despite having the largest progress.

Figure 6. Implementation of different groups of trade facilitation measures in the Arab region, 2021 and 2023



Source: United Nations Global Survey on Digital and Sustainable Trade Facilitation 2021 and 2023.

Figure 7. Trade facilitation implementation by Arab country, 2021 and 2023



Source: United Nations Global Survey on Digital and Sustainable Trade Facilitation 2021 and 2023.

Note: the comparison focuses on 31 trade facilitation measures and includes only 11 countries for which survey data are available for both 2021 and 2023.

21. The formalities category witnessed a slight improvement of only 3 per cent. The transparency and institutional arrangement and cooperation categories decreased by 1 per cent and 7 per cent, respectively, while still being the two most implemented categories.

22. In terms of individual country performance, Egypt recorded the largest progress in implementing trade facilitation measures, with its implementation rate increasing from 40 per cent in 2021 to 60 per cent in 2023

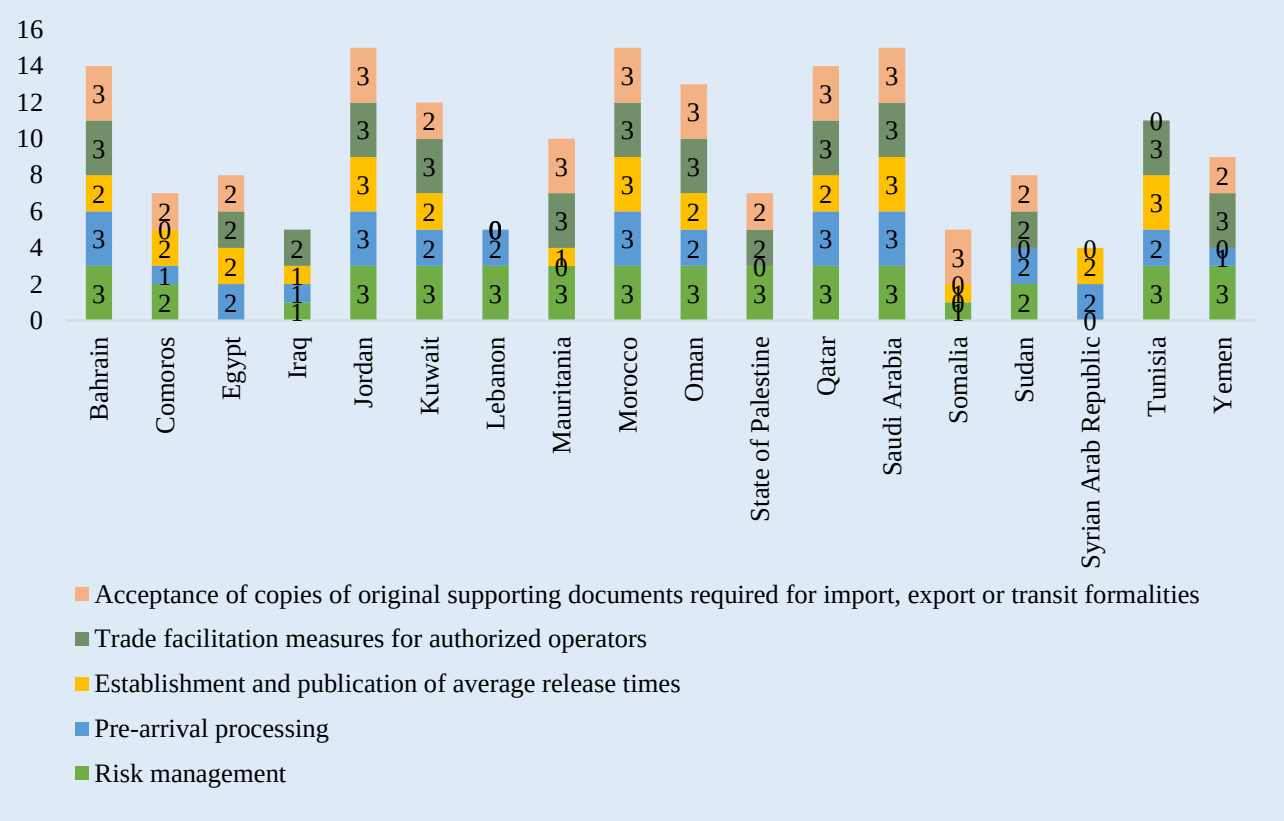
(figure 6). The implementation rate of the State of Palestine increased from 12 per cent in 2021 to 28 per cent in 2023, driven by improvements in measures related to formalities and cross-border paperless trade. In Somalia, the implementation rate increased from 24 per cent in 2021 to 41 per cent in 2023, driven by improvements in measures related to formalities and paperless trade.

23. Pre-arrival processing, which entails submitting necessary paperwork and data ahead of a ship's arrival, enables customs authorities to carry out crucial risk assessments and allocate resources appropriately. Shipping businesses and agents can speed up the customs clearance procedure and ease congestion at ports by submitting paperwork timely and accurately. Similar coordination between customs authorities, port operators and shipping agents is made possible by effective cross-border trade procedures, such as standardized documentation and electronic data interchange. These methods reduce port congestion by enabling quicker inspections, customs declarations and the discharge of cargo, while also improving overall efficiency. Additionally, initiatives that facilitate transit, such as streamlined transit processes and agreements between customs administrations on mutual recognition, support the efficient flow of commodities through numerous countries. Minimizing transit durations, avoiding worthless inspections and maximizing the use of port resources would lead to better ship process timing and less congestion.

24. Figure 8 assesses the formalities of customs. For pre-arrival processing, it is noted that most countries have not fully implemented this measure, including Egypt, Kuwait, Lebanon, Oman, the Sudan, the Syrian Arab Republic and Tunisia. The Comoros, Iraq and Yemen are still in their pilot stages, with full implementation being seen within GCC countries and Jordan.

25. Risk management is also a crucial factor, limiting the time needed for the physical inspection of goods, with almost 70 per cent of countries having full implementation.

Figure 8. Trade facilitation implementation results: formalities



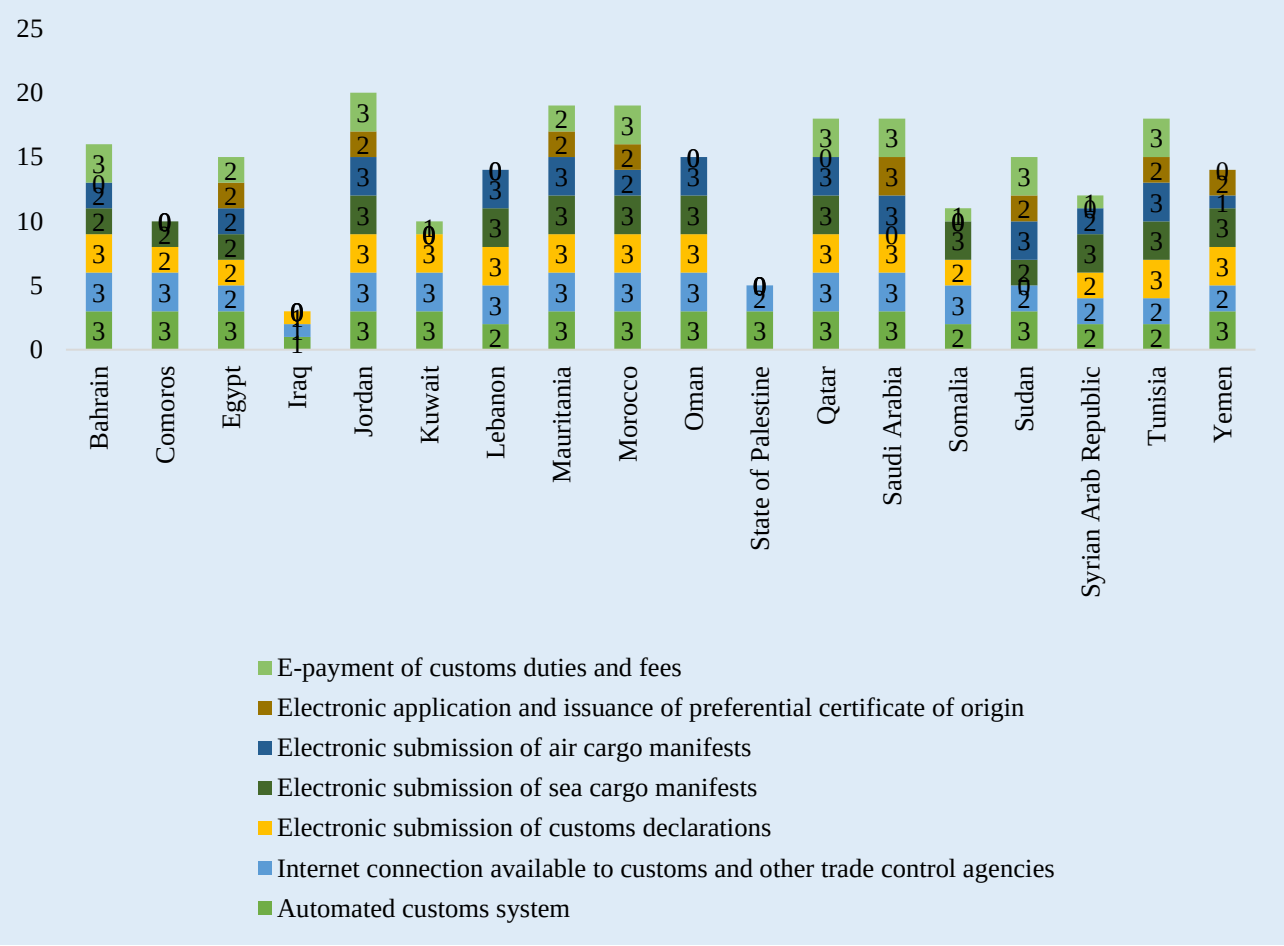
Source: United Nations Global Survey on Digital and Sustainable Trade Facilitation 2023.

26. In paperless trade, e-payment of customs duties and fees is yet to be implemented. The Comoros, Iraq, Lebanon, the State of Palestine and Yemen indicated that this measure was not being implemented in their country's customs operations, while Egypt and Mauritania said it was being partially implemented.

27. Automated customs systems are yet to be fully established in Iraq, Lebanon, the State of Palestine, Somalia, the Syrian Arab Republic and Tunisia, with the rest indicating successful automation of customs procedures and systems.

28. Automation of the customs system is necessary to ease port congestion and boost overall trade productivity. Supply chains can be severely disrupted, and port congestion, which may be caused by delays in customs clearance procedures, can have a negative impact on trade operations. The processing of import and export documentation can be streamlined by automated customs systems, saving time and effort on inspections, declarations and approvals. Automated technology makes it easier for shipping brokers, importers and exporters to exchange data quickly, which leads to more effective operations and fewer traffic jams at ports. Automation of customs processes ultimately enables the prompt transit of products across borders, which is necessary for reducing port congestion, enhancing trade flows and fostering economic growth.

Figure 9. Trade facilitation implementation results: paperless trade



Source: United Nations Global Survey on Digital and Sustainable Trade Facilitation 2023.

29. Promoting global trade, connectivity and economic expansion requires effective transit facilitation. It entails accelerating and simplifying the movement of people, vehicles and goods via transit corridors. Adopting effective transit facilitation mechanisms has many advantages. Firstly, they shorten transit times and prices, increasing trade efficiency and competitiveness. As a result, businesses are drawn to the area and foreign

investment is promoted, stimulating economic growth. Secondly, transit facilitation encourages the seamless flow of products across borders and strengthens regional integration by promoting closer relationships between countries and stronger economic cooperation. Additionally, it enhances logistical effectiveness by reducing hold-ups, administrative hassles and bureaucratic procedures, leading to more efficient supply chains and trade in general.

30. Risk assessment is also a crucial factor that speeds up clearing processes, which is a factor that is present in almost all countries, except for Comoros, Iraq, the State of Palestine and Yemen.

II. Port congestion

31. Port vessel congestion is a shared concern around the world and usually occurs when vessels are unable to dock in a port and load or unload cargo. Vessels that face this situation find themselves waiting outside at anchorage till a berth becomes available.

32. Port congestion can manifest in various forms and impact different aspects of port operations. Below is an elaboration on the different types of port congestion:

(a) **Container vessel congestion**: this happens when there is a backlog of ships waiting to dock or enter the port because there is not enough berthing space, there are not enough resources for handling the cargo, or there have been delays in earlier operations;

(b) **General cargo vessel congestion:** this refers to a similar situation as container vessel congestion but specifically involving ships carrying non-containerized goods or bulk commodities;

(c) **At-port congestion**: this refers to a situation where a port's facilities are overburdened with vessels and cargo, leading to longer turnaround times for vessels and extended dwell times for cargo. This can occur when the port lacks the necessary equipment or resources to handle the incoming or outgoing cargo efficiently;

(d) **Cargo congestion:** this happens when the port's storage facilities, such as warehouses and container yards, fill up with goods or containers. It may occur as a result of uneven cargo flows, processing bottlenecks or a lack of available storage space;

(e) **Truck congestion:** this happens when there are several trucks lining up to enter the port for loading or unloading. Truck congestion can be caused by inadequate road infrastructure, ineffective gate procedures or a lack of coordination with vessel arrivals.

A. Causes of port congestion

33. Port congestion can occur for various types of reasons, including but not limited to:

1. *Port infrastructure/capacity*

34. Port infrastructure encompasses various components such as berths, terminals, warehouses, cranes and transport networks. Factors contributing to port congestion include inadequate infrastructure, limited berth availability, inefficient cargo handling processes, labour shortages and disputes, and inadequate inland transport networks. On top of having adequate infrastructure in place, optimizing operations, improving coordination among stakeholders and upgrading technologies are crucial to ensure a smooth and seamless flow of goods through ports.

2. *Port and customs procedures*

35. Customs delays in clearing goods can significantly nullify the advantage of having good infrastructure and port processes in place. Addressing clearance delays is crucial for minimizing congestion at ports. By

adopting streamlined processes, leveraging technology and promoting collaboration, stakeholders can work together to mitigate delays and facilitate the smooth movement of goods.

3. *Force majeure*

36. Port congestion can occur due to unexpected events taking place in or around the port. Such events can be natural, such as extreme bad weather that causes slowdown of operations, or human nature, such as labour shortage or labour strikes. They can be related to health, such as the breakout of a pandemic that causes downsizing of operations, or to operations, such as the breaking of some of the cranes and other equipment in the ports or vessel accidents in the port, all of which could cause a delay in port operation and lead to significant congestion.

B. Effects of port congestion

1. *Disrupted supply chains*

37. Global supply chains can be disrupted by port congestion, which can have an impact on businesses. Manufacturing activity may slow down if manufacturers depending on imported raw materials or components experience production delays. Similar difficulties in stock replenishment by merchants may lead to shortages on store shelves.

2. *Cost*

38. Port congestion has a significant impact on costs across various industries and supply chains. When ports experience congestion, it leads to delays in the movement of goods, resulting in increased waiting times for ships, trucks and cargo handling. These delays can disrupt supply chain schedules, leading to higher inventory carrying costs, increased transport expenses and potential production downtime. Moreover, extended waiting times can incur demurrage and detention charges, which add to the overall cost burden. In general, the effect of port congestion on cost is substantial, as it amplifies expenses associated with transportation, inventory management and operational inefficiencies, posing challenges to businesses and consumers alike. The International Monetary Fund (IMF)[6] estimates that port delay in 2021 resulting from the COVID-19 pandemic contributed to an increase in shipping time by 25 per cent, comparable to a global ad-valorem tariff of 0.9 to 3.1 per cent. The midpoint of this range is approximately equal, in absolute value, to the global applied tariff reductions achieved over the 14-year period from 2003 to 2017.

3. *CO_2 emissions*

39. Maritime transport plays a significant role in global CO_2 emissions, accounting for a notable share of the total emissions attributed to the transport sector. It is estimated to be responsible for around 2.8 per cent of global greenhouse gas emissions.[7] Vessel congestion at ports can also contribute to CO_2 emissions, exacerbating environmental concerns and the carbon footprint of maritime transportation. When vessels are stuck in congested ports, waiting for berthing space or clearance to load/unload cargo, auxiliary engines continue to run, emitting greenhouse gases into the atmosphere. This idle time results in unnecessary fuel consumption and CO_2 emissions, as ships burn fuel to maintain power for essential operations like lighting, refrigeration and onboard systems. The longer the waiting continues, the greater the emissions generated.

[6] Andras Komaromi, Diego A. Cerdeiro and Yang Liu, Supply chains and port congestion around the world, 2022.

[7] Estela Morante, Roadmap to decarbonize the shipping sector: Technology development, consistent policies and investment in research, development and innovation, UNCTAD Transport and Trade Facilitation Newsletter No. 96, 2022.

C. At-port vessel congestion

Table 3. Average weekly median vessel waiting times in some Arab ports in days, 2022/2023

Port name	Country	Average number of vessels/week	Median time off port (days)	Median time at port (days)
Aden Port	Yemen	7	1.9	3.1
Aqaba Port	Jordan	10	0.7	0.3
Alger Port	Algeria	24	0.6	3
Beirut Port	Lebanon	24	0.7	0.9
Damietta Port	Egypt	56	2	2
Djibouti Port	Djibouti	26	1.2	0.8
Hamad Port	Qatar	25	0.2	0.5
Jebel Ali Port	United Arab Emirates	161	0.5	1.3
Jeddah Port	Saudi Arabia	86	0.7	0.9
Khalifa Bin Salman Port	Bahrain	11	0.3	0.5
King Abdullah Port	Saudi Arabia	21	0.5	0.8
Latakia Port	Syrian Arab Republic	3	0.4	1
Mogadishu Port	Somalia	5	2	2.1
Nouakchott Port	Mauritania	8	2.9	2.4
Port Said	Egypt	44	0.5	1.1
Port Sudan	Sudan	13	4.5	3
Salalah Port	Oman	37	0.5	0.9
Sfax Port	Tunisia	10	1.8	2.5
Tanger-Med Port	Morocco	56	0.4	0.7
Tripoli Port	Libya	6	1.7	4.5
Umm Qasr Port	Iraq	24	1	2.3

Source: ESCWA compilation based on data from Marine Traffic, available at https://www.marinetraffic.com/en/data/?asset_type=vessels&columns=flag,shipname,photo,recognized_next_port,reported_eta,reported_destination,current_port,imo,ship_type,show_on_live_map,time_of_latest_position,lat_of_latest_position,lon_of_latest_position,notes.

40. When assessing efficient marine trade operations and transportation systems, port hours are of the utmost importance. They offer a set schedule for tasks, including loading and unloading cargo, performing inspections and maintaining vessels. Effective port hours guarantee that ships can arrive, depart and complete important tasks within a predetermined timetable, eliminating delays and enhancing the supply chain's overall efficiency. Table 3 displays data showing the average weekly median waiting time for vessels outside the ports (prior to berthing) and the duration spent at the port during a call. Additionally, the information provides an average count of vessels received each week, facilitating a comparison of efficiency among different countries in terms of speed. Size, number of vessels and process times are three indicators closely related to this assessment.

41. The assessment will be categorized into three distinct groups for meaningful comparison: ports receiving 0–20 vessels weekly, ports receiving 21–45 vessels weekly, and ports receiving 46 or more vessels weekly. This categorization allows for an effective evaluation of countries falling within these specific ranges. For the

smaller category, the ports of Khalifa bin Salman, Nouakchott, Tripoli (Libya), Sfax, Mogadishu, Aqaba, Latakia, Aden and Port Sudan fall within the 0 to 20 vessels processed weekly, with Khalifa Bin Salman Port achieving the greater performance and having the lowest off-port median time of 0.3 days and at-port median time of 0.5 days. For ports receiving between 21 and 45 vessels weekly, the ports of Umm Qasr, Hamad, Djibouti, Port Said, King Abdullah, Beirut, Salalah and Alger all fall in this category and demonstrate relatively different results. King Abdullah Port's 0.8 days at port makes it the most efficient port in this category. Djibouti's median times at port also indicate 0.8 days; however, the average standard deviation for this value stands at 3, meaning that values are very inconsistent and some vessel processing times are far from that. For the larger category with high volumes of vessels per week, Tanger-Med has significantly reduced off-port waiting times to a median of 0.4 days, with time at port averaging 0.7 days for a volume of 56 vessels per week, noting that Tanger-Med is mostly a transshipment port. Jeddah Port, which has one of the highest volumes of vessels (86), also showed an impressive performance, with off-port and at-port operations standing at 0.7 and 0.9 days, respectively. Meanwhile, Jebel Ali Port, which has 161 average weekly vessel arrivals, recorded one of the lowest off-port times of 0.5 days, while its at-port operations remain a bit high, with a median of 1.3 days. It is important to note that busier and larger ports tend to accommodate larger vessels. The time required for at-port operations directly correlates with the dimensions of the vessels and the quantity of containers being managed. Larger vessels and higher container volumes generally lead to extended periods of time spent in port for various activities.

42. Port time processing, in general, is based on the time a vessel spends in a port, including berth hours, which is the time needed to load and unload cargo or carry out other processes. However, when a vessel is not yet docked in its allocated berth, this is called the waiting time (or off-port time). To understand the waiting times, it is crucial to know the number of calls and vessels associated with this period. For instance, Jebel Ali Port in the United Arab Emirates had a weekly average of 161 vessels, higher than most of the countries listed; however, the port itself was relatively better than other ports that had much fewer processed vessels. Morocco also managed to control its waiting times, limiting them to 0.4 days off port and 0.7 days at port, with 56 average weekly calls. Tripoli Port in Libya averaged 1.7 days off port, in addition to 4.5 median days waiting at port for only 6 weekly vessels. The waiting hours do not entirely reflect when a vessel is solely waiting for a berth to become available; it can also include maintenance, wait due to changes in weather conditions, formalities, regulations or several other reasons. High waiting times can also be due to the fact that some ports are prioritizing larger call sizes, which explains the lower hours on these vessels.

D. In-port truck congestion

43. Another aspect of port congestion is congestions inside ports resulting from truck movement. To better define it, the total amount of time a truck spends in the terminal for picking up and/or dropping off a container from gate-in through gate-out is known as the truck turnaround time. It covers the time spent waiting for a truck to arrive, loading and unloading containers, checking the truck, completing paperwork and leaving the port. There are two types of movement: the container movement from vessels to yard and vice versa, and the container movement from port yard to hinterland and vice versa. The latter involves the transportation of containers carrying goods that have arrived at the port to their final destinations in the surrounding inland areas or the other way around, and mostly implies the entry of external trucks to complete these operations.

44. Trucks frequently experience delays and traffic jams as they travel through congested transport corridors and their surroundings. The effects of this congestion outside of ports are extensive and present numerous difficulties, including the difficulties faced by truck drivers, the interference with traffic, environmental problems, and even the deterioration of a port's reputation.[8]

[8] Rakin Rahman, Five problems with truck congestion at ports and how to solve them, 2023.

III. Impact of truck turnaround time

A. Port efficiency

45. Congestion in all its forms is never a good thing for the efficiency of port logistics.[9] The high turnaround times caused by truck congestion can disrupt the entire flow of operations while slowing down the outward movement of cargo from the port and increasing costs.

46. High truck congestion and delays in entering ports can be caused by various factors. One primary cause is the increased volume of trucks seeking to load or unload cargo at the port, exceeding the port's capacity to handle them efficiently. This situation might be a result of booming trade, inadequate infrastructure or inadequate planning for peak periods. Additionally, factors such as manual paperwork, inspections and security procedures can slow down the entry process, contributing to congestion and delays.

47. The consequences of such congestion include higher operating costs for trucking companies, increased emissions from trucks waiting in line to enter ports, and potential disruptions to supply chains. To alleviate this issue, investments in improved infrastructure, simplified cargo handling and improved scheduling, streamlined administrative processes, and better traffic management can help optimize the flow of trucks into ports and reduce congestion and delays.

B. Increase in the cost of logistics

48. One of the biggest expenses in port operations is the cost of logistics. The entire supply chain network is negatively impacted by long truck turnaround times. Long wait times for trucks lower their profitability and increase traffic. Congestion lengthens the time needed to load and unload the container, fuelling more price increases and raising freight rates and port logistical expenses as a result.

C. Improving truck turnaround time

49. Without adding space or staff, a gate automation system can greatly increase gate throughput by collecting data on containers, trailers and chassis as they enter and exit a truck gate.[10]

50. It is possible to further streamline the administrative process, loading-unloading procedures and gate entry procedures to spare vehicles from having to repeatedly stop and wait at separate locations for verification. This easy procedure can drastically reduce how long trucks take to turn around.

51. A tactical strategy to optimize the flow of truck traffic and raise operational effectiveness is to build truck yards at ports where trucks can wait. The truck yard can be transformed into a hub that reduces traffic and increases productivity by choosing an appropriate location, creating a well-organized structure and putting advanced technology and traffic management systems into place. In order to ensure the comfort and convenience of truck drivers, this designated location provides amenities like parking spaces, fuelling stations and rest places. The port environment benefits from seamless cooperation between truck yard owners and port authorities because it reduces wait times, improves security, reduces emissions and streamlines logistics.

IV. Managing congestion at ports

52. As discussed earlier, the issues generating congestion must be fully identified and understood by all parties concerned before remedies can be proposed.

[9] Ibid.

[10] XChange blog, How truck turnaround time affects port logistics, 2020.

53. The cause of port congestion is not limited to a single, simple problem. In fact, there are multiple components of the total supply chain and customs clearance happening at once, which lead to significant port delays. Unfortunately, there isn't just one thing that can be identified and fixed right away.

54. After carefully examining the situation and locating the main issue, the next step is to look at the appropriate solution to address it. There is no single solution that can be applied to all. Each port has different capabilities and functionalities that require separate interventions based on the specific case. Some of the solutions to consider after careful examination include:

(a) **Monitoring and evaluation:** Implement a reliable system for tracking and evaluating port operations to spot congestion trends, bottlenecks and potential areas of improvement. This can include advanced analytics, performance measurements and real-time data collection;

(b) **Investment in infrastructure:** Assess the port's infrastructure capabilities and pinpoint any areas that require development. This can entail raising the capacity of container yards, ports and storage locations as well as improving handling tools and technology. Infrastructure spending can contribute to increased throughput and reduced congestion;

(c) **Streamline the movement of products by effectively planning and coordinating port operations**: This may entail putting in place sophisticated planning and scheduling systems, optimizing vessel and berth scheduling, and enhancing the procedures for processing cargo. Operational efficiency can be increased by using automation and digitization technology;

(d) **Foster communication and cooperation amongst port stakeholders:** These include shipping lines, terminal operators, customs officials and transportation businesses. To lessen traffic and increase the port's general efficiency, encourage information exchange, collaborative planning and coordination;

(e) **Long-term planning:** To predict future demand and prepare for necessary expansions or infrastructure modifications, conduct periodical capacity evaluations and forecasts. To form long-term alliances with businesses in the private sector to draw capital and encourage the steady expansion of port infrastructure. To achieve smooth interaction with other transportation modes and infrastructure developments, coordinate port expansion plans with regional or national logistics goals;

(f) **Digital technologies:** Ports must make sure their infrastructure is prepared to receive incoming traffic while assuring operations' safety and transparency to support rising global trade and vessel fleets. To minimize port congestion and keep up with the supply chain in the digital era, the maritime industry must rely on technologies to accurately plan activity, better manage resources and improve communication. Various technology solutions are relevant to port operations, including AI, blockchain, big data, internet of things (IoT), automated vehicles and equipment, etc.

55. Positive effects of adopting digital solutions:

(a) Better organization: With the help of a real-time estimated time of arrival (ETA) prediction system, the port can prepare its crew members and equipment by knowing the exact ETA of every ship;

(b) Communication between all supply chain stakeholders can be streamlined by using data gathered from diverse sources and transformed into advanced analytics and dashboards;

(c) Quick handling: Automated cranes and vehicles make it possible to transport containers in less time. Automation gets rid of time-consuming tasks like relocating several containers to reach a single container assigned to a single truck. As a result, the equipment and people on-site can handle more freight. This will stop long lines of ships at the dock;

(d) Reduced possibility of equipment becoming unavailable for maintenance or repair. Instead of waiting for a machine failure to happen (corrective approach) or routinely replacing components whether there is a chance of a breakdown or not (preventive approach), maintenance is based on detected risk or condition (predictive approach). This will be a less expensive yet very effective plan of action.[11]

[11] Sinay, How do you fix port congestion?, 2022.

V. Conclusion and recommendations

56. Many Arab ports have established themselves as major participants in the global logistics sector, acting as hubs for transshipment of world trade. Some of them have been praised for their effectiveness and superior performance, especially where significant cargo volumes have been successfully handled by ports, facilitating international trade and fostering regional economic expansion.

57. These ports have ambitious goals for growth and development and have not rested on their laurels. They have invested in infrastructure renovations and expansion and incorporated cutting-edge technology and automated systems to improve their capabilities.

58. Logistics efficiency is a moving target. Technological advancements and the increased speed and modalities of production and consumption increase and change demand on logistics. The emergence of e-commerce, where the number of shipments increases at the expense of the size of shipment, induces new demand for logistics, mostly faster and more technological to be able to deal with significant numbers of transactions in small volumes.

59. Congestion remains an issue even in the most successful of ports. It has a multidimensional effect on economies and the environment that ranges from increasing trade costs to reducing a country's competitiveness and increasing CO_2 emissions resulting from the extended stay of vessels at the port, among others.

60. Strategies to deal with port congestion cover various areas from trade facilitation and process improvement to enhanced truck turnaround management inside the port and enhanced cargo handling and vessel loading and unloading, etc.

61. While viable solutions to mitigate the impact of congestion on the environment and the costs are proposed, such as the electrification of ports' docks to enable vessels to turn off their engines while docked, measures need to be taken to prevent congestion altogether rather than mitigating its effects.

62. Preventing congestion does not necessarily mean that port facilities should be expanded to take more ships and containers. It could mean the proper management of current facilities to solve the congestion problem and enhance the capacity of the port to take more volumes of trade. Studies show that some ports around the world were able to increase their capacity by as much as 20 per cent by improving the utilization of current facilities without investing in expensive expansion.

63. There is no one-size-fits-all solution to port congestion as every case is different. Overall, by embracing technological advancements, improving efficiency and/or sufficiency of infrastructure, streamlining procedures and fostering collaboration, Arab ports can enhance their performance, attract more trade and contribute to furthering the region's economic growth, development and integration globally and regionally.
