

EDITORIAL

Open Access



Connecting the world through global shipping networks

Jan Hoffmann^{1*}, Gordon Wilmsmeier² and Y.H. Venus Lun³

* Correspondence:

Jan.Hoffmann@UNCTAD.org

¹United Nations Conference on Trade and Development (UNCTAD), Geneva, Switzerland

Full list of author information is available at the end of the article

Shipping, or the business of transport, is an essential means that facilitates international trading activities. Due to its cost-effective intermodal operations, most of the international trade in manufactured goods and an increasing share of commodities are transported through container shipping services, which are mostly provided by liner shipping companies. They form a network that connects practically all coastal countries worldwide with each other. Liner shipping operations are now increasingly involving transshipment in seaports that act as nodes in the network. Research on global liner shipping networks has expanded significantly. In particular, the United Nations Conference on Trade and Development (UNCTAD) has published the Liner Shipping Connectivity Index (LSCI) at the country-level annually since 2004. The term “connectivity” is increasingly used to characterize national trade competitiveness, and defined at different levels, such as at the country level and bilaterally.

The UNCTAD LSCI is a useful indicator that reflects the overall position of a country within global container shipping networks (i.e., country level connectivity). In general, the average LSCI has continuously increased in many countries since its inception in 2004. An important element of the global trend in liner shipping is the container ship size. Both the average and maximum ship sizes are increasing in many countries. On the other hand, the number of companies that are providing services to and from the average country’s seaports is declining. The number of carriers that are competing for the average country’s cargo is also going down, with a decline of 34% from 21.1 carriers in 2004 to 14.6 in 2016. According to the UNCTAD, the best connected countries in 2016 are China and the Republic of Korea in East Asia, while Singapore and Malaysia have the highest LSCI (most active in trade) in Southeast Asia; Sri Lanka and India in South Asia; Morocco, Egypt and South Africa in Africa; and Panama and Colombia in Latin America and the Caribbean.

There are three main policy areas that can help to improve the LSCI of a nation:

- **Cargo volume:** Increasing hinterland access and facilitating transit from neighbouring countries are essential components for the development of international trade. Current challenges to realizing these two objectives often include expensive inland transport and inconvenient border-crossing procedures. One of the effective ways for enhancing shipping connectivity is to improve intermodal inland transport and trade connectivity by improving cross-border procedures and modernizing customs administration.

- Competitive operating environment: Markets need to be competitive. Ideally, shippers should have options among service providers. Any restrictions on transport services, for e.g., cargo reservation regimes which tend to restrict trucking operations or cabotage in shipping, will negatively affect maritime connectivity.
- Efficient and modern seaports. Physical infrastructures are an important component that determines the accommodation of ever increasing vessels. Infrastructures need to have the necessary water depth and ship-to-shore container handling cranes. Modernized port operations are also important to avoid delays and uncertainties, which in turn also help to improve transport connectivity.

Bilateral connectivity refers to the connectivity between two countries. The highest bilateral connectivity is found in intra-regional services, notably intra-Asia and intra-European services. Among the top-10 routes (as shown in Table 1) in terms of twenty foot equivalent unit (TEU) carrying capacity, only one is inter-continental (i.e., China-United States). The largest ships are deployed for Asia-Europe services, including the corresponding intra-regional connections. On the other hand, the largest megavessels have yet to serve North America. This is unlikely to change in the foreseeable future. Even after the opening of the new locks at the Panama Canal for receiving larger vessels in late June 2016, the new “Neo-Panamax Ships” will only carry up to 13,000 to 14,000 TEU, which is far less than the 19,224 TEU of the current largest container ships.

This special issue presents a thematic series for “Connecting the World through Global Shipping Networks” to examine the challenges that are related to global shipping connectivity. The aim of the collection of papers is to demonstrate the linkage between connectivity and trade. The manuscripts also examine port connectivity. The authors whose work is published in this collection include:

- Fugazza and Hoffmann (2017), who explored transport connectivity as a crucial determinant of bilateral exports. They conducted an empirical assessment on the relationship between bilateral maritime liner shipping connectivity and exports in containerized goods during the period of 2006–2013;

Table 1 Container ship deployment on top 10 routes (by TEU), 1 May 2016

Direct services	Total TEU deployed	Number of companies (vessel operators)	Largest vessel (TEU)
China-Republic of Korea	5 408 608	43	19 224
China - Singapore	5 277 023	34	19 224
China - Hong Kong (China)	4 289 451	43	16 652
China - Malaysia	4 270 653	29	19 224
Germany - Netherlands	3 645 488	35	19 224
Germany - United Kingdom	3 598 791	31	19 224
Netherlands - United Kingdom	3 311 277	40	19 224
China - United States	3 095 080	25	14 036
Malaysia - Singapore	2 787 121	47	19 224
Belgium - Germany	2 717 078	30	19 224
China - Taiwan (prov of China)	2 694 478	34	14 080

Source: UNCTAD Secretariat based on data supplied by Lloyd’s List Intelligence

- Lun and Hoffmann (2016), who investigated the concept of connectivity and trade relativity (CTR). This study presents a research model to illustrate: (1) the positive impact of shipping connectivity on two types of trade flows, and (2) the mediating effect of intra-regional trade (“intra-trade”) on the relationship between shipping connectivity and extra-regional trade (“extra-trade”). The work contributes to the concepts of trade creation and trade diversion by examining shipping connectivity. It also provides a better understanding on the relationships between shipping connectivity and trade flows (i.e., intra-trade and extra-trade);
- Kosowska-Stamirowska et al. (2016), who examined the topological changes of the maritime trade network and how they translate into navigability properties of this network. They also proposed two new measures of network navigability based on a random walk procedure: *random walk discovery* and *escape difficulty*. By studying the evolution of the structure of maritime trade networks, their findings suggested that unlike in other real world evolving networks studied in the literature to date, the maritime network does not densify over time and its effective diameter remains constant;
- Ducruet et al. (2016), who revisited the classical issue of port-city relationships by using network analytical methods to examine maritime flows that connect cities of the world. The results showed that “although the largest cities have witnessed a diminishing importance in world traffic, they have maintained their dominance in the network in terms of centrality and geographic reach”. This research contributes to issues on the ineluctable separation between ports and cities, and provides new empirical evidence on the structure and dynamics of city-systems and spatial networks in general;
- Laxe et al. (2016), who conducted a case analysis to examine the adaptation process in port governance. The particular location of a port infrastructure holds characteristics that determine the activity of the port, and the development of port activity. The aim of the study was to examine the uniqueness of the denomination Landlord and its legitimacy given the new challenges. It also opened a way to understanding the need to adapt governance to changes, given the examined experiences. The study’s analysis included the following cases: Argentina, Brazil, Chile, Colombia, France, Italy, Portugal and Spain; and
- de Langen et al. (2016), who conducted a study on port connectivity indices with an application to European Roll-on Roll-off (RoRo) shipping. They presented a methodology for measuring the RoRo connectivity of ports. The results showed that “in terms of RoRo connectivity, neither the number of links nor the link quality (frequency, number of competing providers, minimum number of indirect stops) strictly dominate the results of our proposed indicator”.

Authors' contributions

All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Author details

¹United Nations Conference on Trade and Development (UNCTAD), Geneva, Switzerland. ²Economic Commission for Latin America and the Caribbean (ECLAC), Vitacura, Chile. ³The Hong Kong Polytechnic University, Kowloon, Hong Kong.

Received: 29 March 2017 Accepted: 6 April 2017

Published online: 24 April 2017

References

- de Langen PW, Udenio M, Fransoo JC, Helminen R et al (2016) Port connectivity indices: an application to European RoRo shipping. *Journal of Shipping and Trade* 1:6. doi:10.1186/s41072-016-0008-0
- Ducruet C et al (2016) The changing influence of city-systems on global shipping networks: an empirical analysis. *Journal of Shipping and Trade* 1:4. doi:10.1186/s41072-016-0006-2
- Fugazza F, Hoffmann J (2017) Liner shipping connectivity as determinant of trade. *Journal of Shipping and Trade* 2:1. doi:10.1186/s41072-017-0019-5
- Kosowska-Stamirowska Z, Ducruet C, Rai N (2016) Evolving structure of the maritime trade network: evidence from the Lloyd's Shipping Index (1890–2000). *Journal of Shipping and Trade* 1:10. doi:10.1186/s41072-016-0013-3
- Laxe FG, Sánchez RJ, Garcia-Alonso L et al (2016) The adaptation process in port governance: the case of the Latin countries in South America and Europe. *Journal of Shipping and Trade* 1:14. doi:10.1186/s41072-016-0018-y
- Lun YH, Hoffmann J (2016) Connectivity and trade relativity: the case of ASEAN. *Journal of Shipping and Trade* 1:11. doi:10.1186/s41072-016-0015-1

Submit your manuscript to a SpringerOpen[®] journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► springeropen.com
