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Analysis of maritime connectivity in the Association of Southeast Asian Nations and small island developing States in the Pacific

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The report assesses maritime connectivity in the countries of the Association of Southeast Asian Nations and in Pacific small island developing States.

For further information, please contact the Transport Section in the Trade Logistics Branch of the UNCTAD Division on Technology and Logistics (transport.section@unctad.org) or visit the UNCTAD website at https://unctad.org/en/Pages/DTL/TTL/Infrastructure-and-Services.aspx.

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Introduction

Maritime connectivity, i.e. the relative position of a country in liner shipping networks, matters for trade prospects and competitiveness (Fugazza and Hoffmann, 2017). UNCTAD maintains several statistical datasets that enable monitoring maritime connectivity trends, on a quarterly basis, since 2006. These include the country Liner Shipping Connectivity Index (LSCI), the Liner Shipping Bilateral Connectivity Index (LSBCI) and the port LSCI which are based on carriers' liner (planned) schedules. In addition, the port calls dataset provides insights in terms of the number and characteristics of vessels calling at ports.

This paper analyses maritime connectivity trends in two regions, namely the Association of Southeast Asian Nations (ASEAN)[1] and Pacific Small Islands Developing States (SIDS)[2] using these different UNCTAD maritime transport indicators. It aims to deepen understanding of global and regional shipping connectivity trends in these two regions.

It analyses how well they are connected between them and with the rest of the world, how their connectivity levels have changed in the long-term (i.e. over the past fifteen years) and more recently (since the Covid-19 outbreak) and explores reasons behind connectivity changes.

The report is organized as follows: The first part analyses the country Liner Shipping Connectivity Index (LSCI), (i) benchmarking the two regions against global and regional connectivity levels, (ii) examining short- and mid-term changes to connectivity levels and (iii) zooming in on the behaviour of the different components underpinning the LSCI for countries in the two regions. The second part analyses the connections between countries and changes using the Liner Shipping Bilateral Connectivity Index (LSBCI). The third part analyses connectivity trends at the port level, followed by the fourth examining port call patterns.

1. UNCTAD Country LSCI[3]

The LSCI indicates a country's integration level into global liner shipping networks. The LSCI is an index set at 100 for the maximum value of country connectivity in the first quarter (Q1) of 2006, which was China. The current version of the LSCI is generated from the following six components: (i) the number of scheduled ship calls per week in the country; (ii) deployed annual capacity in Twenty-Foot-equivalent Units (TEU): total deployed capacity offered at the country; (iii) the number of regular liner shipping services from and to the country; (iv) the number of liner shipping companies that provide services from and to the country; (v) The average size in TEU of the ships deployed by the scheduled service with the largest average vessel size and (vi) the number of other countries that are connected to the country through direct liner shipping services[4]. The data on these components is provided by MDSTransmodal.

[1] ASEAN members include Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. Lao PDR is not covered in this analysis because it is a landlocked country.

[2] Pacific SIDS include Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

[3] The full dataset is accessible via http://stats.unctad.org/lsci

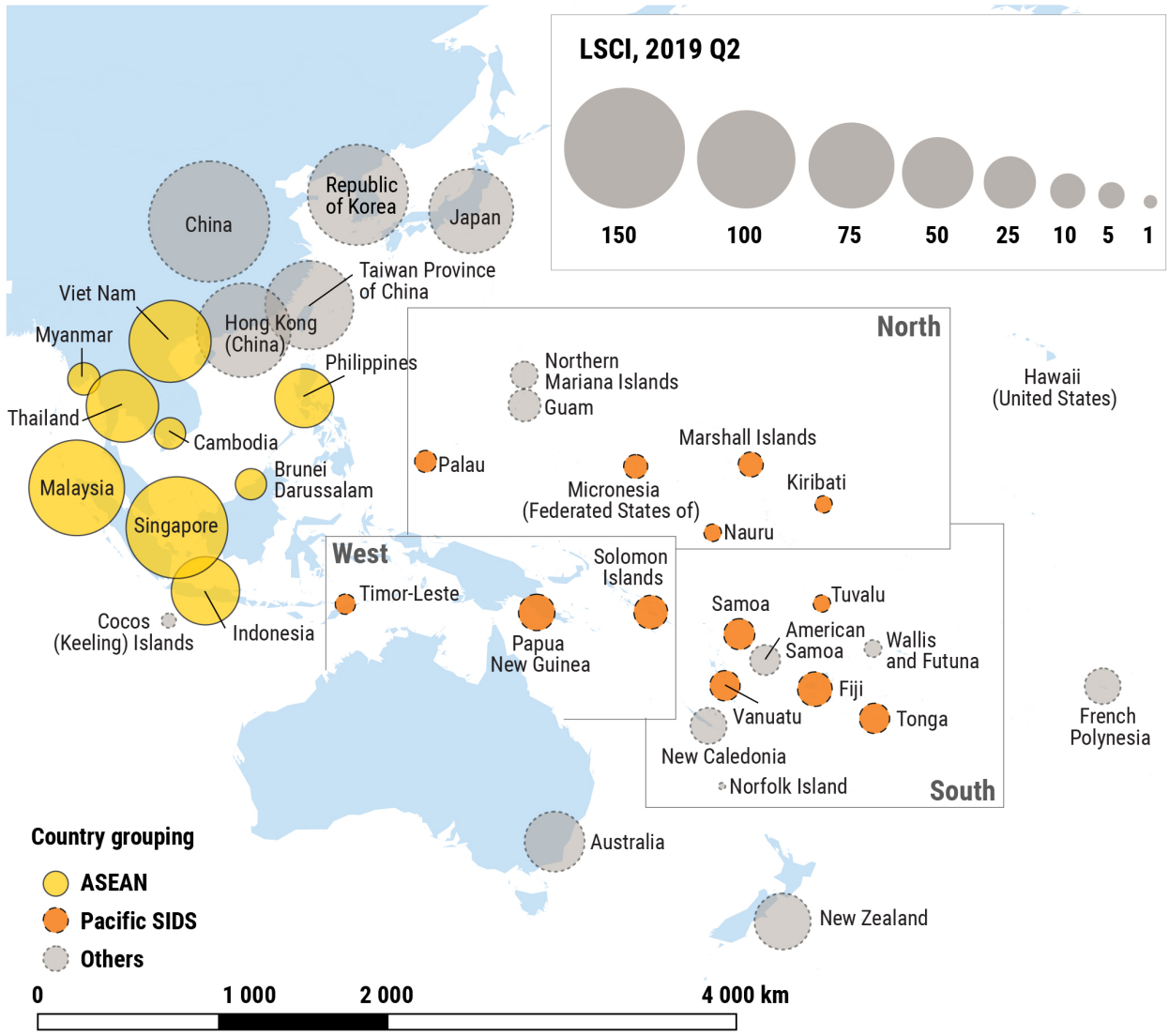
[4] A direct service is defined as a regular service between two countries; it may include other stops in between, but the transport of a container does not require transhipment

1.1. Benchmarking the two regions

The map in Figure 1 presents the geographical setting of the two regions and their LSCI levels in 2019 (second quarter)[5]. It shows that ASEAN countries are concentrated on a small area and the Pacific SIDS are widely dispersed. While being close, both country groupings are at opposite ends of the spectrum in terms of maritime connectivity, as highlighted in Table 1.

ASEAN countries are better connected given their central position along major trade routes compared to Pacific SIDS. Only some of latter are served by North-South routes such as those linking Australia and New Zealand with East Asia and North America. Pacific SIDS are also served by two regional hubs: Guam in the Northern part and Fiji in the Southern part (Arslanalp et al., 2021).

Figure 1: Countries and territories covered in this analysis: Association of Southeast Asian Nations members and Pacific small island developing States, second quarter 2019



[5] 2019 was selected for this analysis as a pre-COVID-19 reference period

Table 1: Position of ASEAN countries and Pacific SIDS in the global LSCI ranking

Country/territory	LSCI	Position, second quarter 2019	Top or bottom, second quarter 2019
China	154.93	1	Top 10
Singapore	107.68	2	Top 10
Republic of Korea	105.02	3	Top 10
Malaysia	94.30	4	Top 10
Hong Kong, China	91.23	5	Top 10
Netherlands (Kingdom of the)	87.55	6	Top 10
United States of America	86.71	7	Top 10
United Kingdom	86.70	8	Top 10
Belgium	86.62	9	Top 10
Spain	83.94	10	Top 10
Viet Nam	67.79	17	Top 50
Thailand	51.59	27	Top 50
Indonesia	45.42	34	Top 50
Philippines	32.88	55	
Myanmar	8.29	120	Bottom 50
Cambodia	7.71	123	Bottom 50
Brunei Darussalam	7.56	126	Bottom 50

ASEAN countries
Pacific SIDS

Country/territory	LSCI	Position, second quarter 2019	Top or bottom, second quarter 2019
Papua New Guinea	10.93	98	
Fiji	9.66	109	
Solomon Islands	9.11	112	
Samoa	7.47	127	
Vanuatu	7.07	132	Bottom 50
Tonga	7.05	133	Bottom 50
Marshall Islands	4.43	159	Bottom 50
Micronesia	4.04	162	Bottom 50
Palau	3.25	164	Bottom 50
East Timor	2.63	166	Bottom 50
Nauru	1.85	171	Bottom 10
Tuvalu	1.81	172	Bottom 10
Wallis & Futuna	1.81	173	Bottom 10
Kiribati	1.81	174	Bottom 10
Bermuda	1.61	175	Bottom 10
Paraguay	1.32	176	Bottom 10
Christmas Island	1.20	177	Bottom 10
Turks & Caicos	1.13	178	Bottom 10
Moldova	0.73	179	Bottom 10
Norfolk Island	0.48	180	Bottom 10

1.1.1. ASEAN LSCI ranking

Within ASEAN, although overall connectivity levels are high, important intra-regional differences exist. Two ASEAN countries, namely Singapore (107.68) and Malaysia (94.30), stand out by their extremely high LSCIs, being also among the world's top-10, at the same level of European, Asian and American best performers (2019 second quarter data), as per table 1.

These two countries are important sea-sea transshipment bases for maritime companies connecting South-Asia and East-Asia to the rest of the world, notably Europe. They compete to attract companies interconnecting deep-sea services between them or connecting these services with regional feeder networks. Therefore, a large majority of the containers transit briefly between their countries of origin and destination. Transhipment throughput is highly competitive and volatile and can change dramatically from one year to another depending on the operational decisions of maritime companies and terminal handling operators (Notteboom et al, 2019). However, given the enormous volumes of throughput handled by ports, the diversity of regions served, and their highly convenient locations in the Malacca strait, transhipment throughput is remarkably stable for these two countries.

Three other ASEAN countries are within the top-50 of global best-connected countries: Vietnam [67.79], Thailand [51.59] and Indonesia [45.42] according to the LSCI metrics (2019 Q2 data). Although these ports handle some transhipment cargo, they function mainly as gateways, serving their large national

economies and (in the case of Thailand and Vietnam) even beyond. Philippines is also part of this intermediate category, although its LSCI [32.88] is lower.

The least connected countries in ASEAN region, standing also among the world's 50 least connected countries (2019 second quarter data), are Brunei Darussalam [7.56], Cambodia [7.71] and Myanmar [8.29]. For the shippers from these countries, low levels of connectivity mean lower reliability and higher transport costs. Cargo may eventually move across inland borders to reach more competitive port alternatives in neighbouring countries (intermediate connectivity category, described in the previous paragraph). This seems to be the case for the shippers of Phnom Penh, Cambodia, who rely extensively on the ports of Vietnam and Thailand for their international trade (Shibasaki et al., 2014).

1.1.2. Pacific SIDS LSCI ranking

Overall, connectivity levels are low amongst Pacific SIDS. The best-connected countries are the most populated ones: Papua New Guinea, Fiji and Solomon Islands, with LSCI levels ranging between 9.11 and 10.93 (2019, Q2 as per table 1). Their larger market size makes them more attractive for maritime companies, which eventually use them as regional transhipment bases. All the other countries in the region are at the bottom-50 least connected countries in the world, with Kiribati, Tuvalu and Nauru at the bottom-10 (LSBCI ranging between 1.81 and 1.85).

Low levels of maritime connectivity in the Pacific SIDS are a major obstacle for their economic development. Pacific SIDS consist of remote and dispersed islands and maritime transport is the main option for moving cargo internationally and domestically:

- International connections tend to be better for the Pacific SIDS located along deep-sea routes to- and from large economies such Australia and New Zealand. However, the interest of shipping lines to call locally is limited given the small local demand and port capacity limitations. Most of the Pacific SIDS does not meet the economic threshold of demand for private shipping companies to provide regular shipping at a profit (Secretariat of the Pacific Community, 2011, cited by Bola, 2020). At their best, ports are served on either one direction or another and by one service in two. Furthermore, the limited size of local markets leaves small room for competition between maritime companies, resulting in high transport costs. In case of an unexpected event (ex. adverse meteorological conditions) maritime companies may eventually skip calls in the Pacific SIDS instead of other areas generating higher volumes of cargo.
- Domestic connections are generally financially supported by SIDS governments to ensure a minimum level of service between islands in a same country (Irwin, 2019). Alternatively, deep-sea container vessels calling at several ports within same country can move cargo domestically. However, this is not always possible due to national regulations limiting the involvement of international operators in domestic trade (UNCTAD, 2017). Domestic connectivity remains a major issue, further aggravated in the last years by the fast urbanization of capitals and the depopulation of outer islands (Irwin, 2020, Bola, 2017).

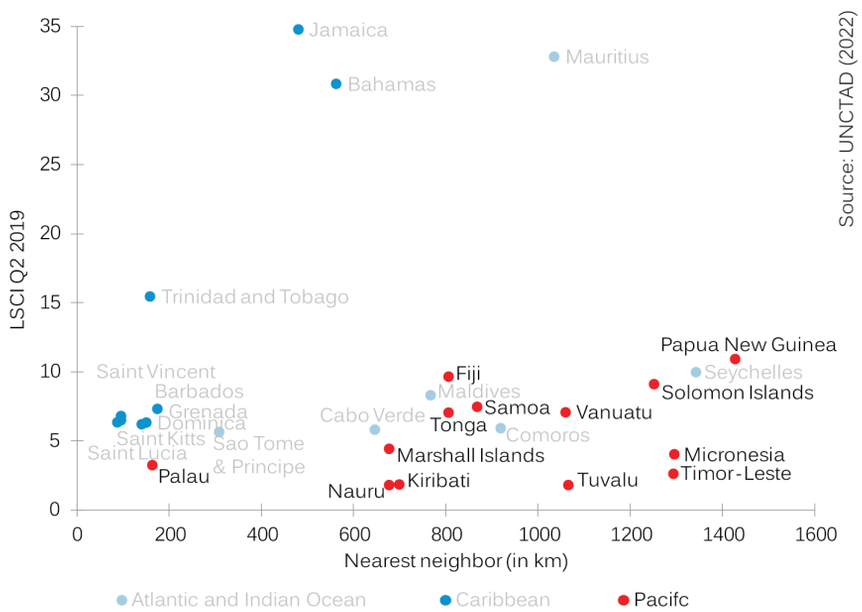
Beyond insularity, Pacific SIDS face several challenges which are common to SIDS in other regions[6]. One of these is high transport costs. On average, SIDS pay twice as much for the international transport of their imports as developed countries (UNCTAD, 2022). One means to limit these costs is to improve maritime

[6] Such as remoteness, high vulnerability to economic and environmental shocks and inability to capitalize on economies of scale (UNCTAD, 2022 p. 9)

connectivity, but this is largely beyond the control of governments. Areas in which the latter can play significant roles include upgrading ports and adopting trade facilitation measures (UNCTAD, 2015).

Compared to other SIDS in the Caribbean and Africa, Pacific SIDS are particularly remote in terms of distance to their nearest neighbours. This is well illustrated in Figure 2, which identifies Papua New Guinea as the most distant SIDS to its nearest neighbour. Figure 2 also shows that differences in maritime connectivity levels are rather small between Pacific SIDS and SIDS from other regions (except for the large transhipment areas, i.e. Jamaica, Bahamas and Mauritius). This suggests that the relationship between remoteness and maritime connectivity, within the context of SIDS, is not clear.

Figure 2: SIDS remoteness vs maritime connectivity



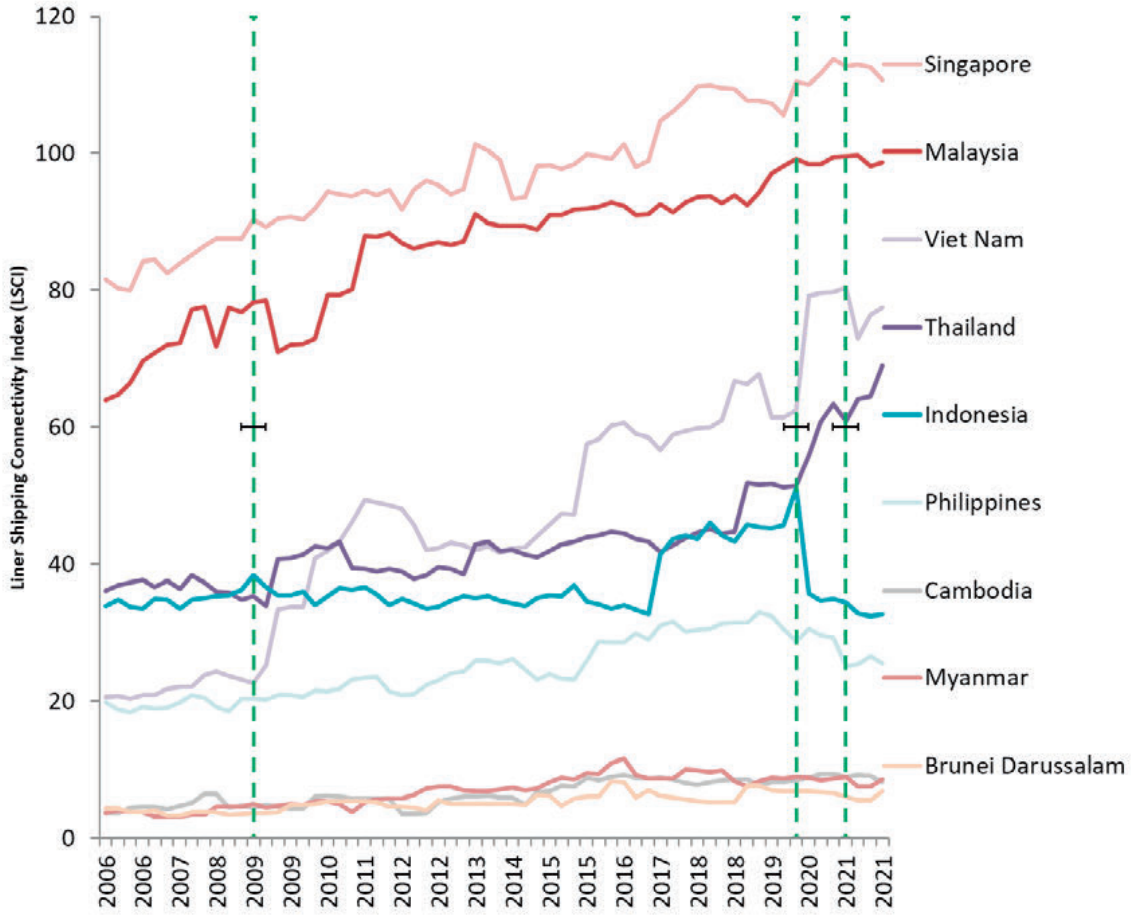
1.2. Dynamics in maritime connectivity

The LSCI analysis over the period 2006-2021 revealed important disparities in the connectivity levels of countries both between and within the two regions. The development of containerization has given rise to different hierarchical patterns. Some of the differences between countries have increased over time, while others have diminished. This section examines how connectivity has evolved over the last fifteen years, taking as references the 2008/2009 financial crisis and the Covid-19 pandemics 2020/2021 period.

1.2.1. ASEAN maritime connectivity

Within ASEAN there is a clear three-level hierarchy of countries in terms of LSCI, which has changed little over the 2006-2021 period, as shown in Figure 3. Countries in the best-connected category have seen their connectivity improve. But the most salient changes took place in the intermediate category, with a progress of the LSCI for Viet Nam (+ 277%) and Thailand (+91%), and a slight decrease for Indonesia (-5%).

Figure 3: Evolution of the LSCI in ASEAN countries, 2006-2021



It is worth noting that connectivity levels of ASEAN countries were little affected by the 2008/2009 crisis. In contrast, important changes took place during the Covid-19 period: Viet Nam, for instance, experienced an LSCI growth rate of 29.8% in Q3/2020 (vis a vis Q3/2019), of 30% in Q4/2020 (vis a vis Q4/2019) and of 28.6% in Q1/2021 (vis a vis Q1/2020). For the same periods of comparison, Thailand experienced growth rates of 17.5%, 23.8% and 18.3% respectively.

These improvements cannot be interpreted under the single prism of Covid-19 pandemics. The trade war between the United States and China may have also played a non-negligible role (UNCTAD, 2019). More generally, multinational corporations have diversified their manufacturing facilities across the ASEAN region, making some of ASEAN ports (in Thailand and Vietnam, but also in Malaysia and Indonesia) more integrated in global value chains (Nguyen et al, 2020). To address the sudden surge of demand from Thailand and Vietnam, maritime companies increased the number of calls to these countries. Moreover, the economy of Viet Nam was less affected by the Covid-19 pandemics, and even showed GDP growth during 2020 and 2021 (Nikkei, 2021)[7].

In contrast, during the same period, Indonesia and Philippines resisted less well in terms of connectivity. Indonesia witnessed LSCI decreases of --21% in Q2/2020 (vis a vis Q2/2019), -23.2% in Q3/2020 (vis a vis Q3/2019) and -32.7% in Q1/2021 (vis a vis Q1/2020). On the other hand, Philippines witnessed LSCI

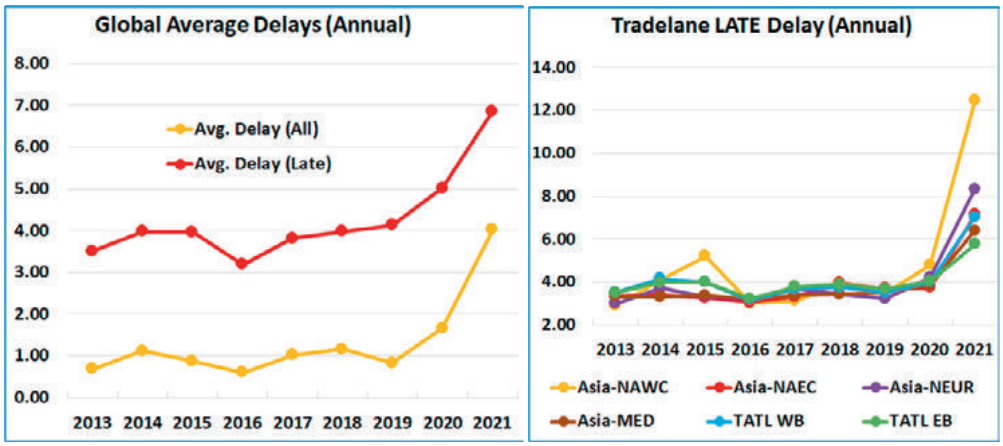
[7] Vietnam real GDP growth slows to 2.58% in 2021 as pandemic drags https://asia.nikkei.com/Economy/Vietnam-real-GDP-growth-slows-to-2.58-in-2021-as-pandemic-drags (Retrieved the 02.14.2022)

decreases of --7% in Q2/2020 (vis a vis Q2/2019), -8.8% in Q3/2020 (vis a vis Q3/2019) and -12.7% in Q1/2021 (vis a vis Q1/2020)

Thailand and Indonesia had equal connectivity levels early 2020 (51.54 and 51.11 respectively in Q1 2020) and they diverged considerably afterwards (32.71 and 68.95 in Q4 2021). Comparatively, the top-2 countries in connectivity level, i.e. Singapore and Malaysia and bottom-3, i.e. Cambodia, Myanmar and Brunei Darussalam (see Figure 3) experimented little change. These divergent trajectories partly result from the ways in which countries have contained the pandemic. Indonesia, the Philippines and Malaysia have been more severely hit by the pandemic, However, Malaysian ports, given their orientation towards transshipment, their maritime connectivity was less affected by covid impacts in the national economy.

The LSCI provides an interesting view of the difference in connectivity levels between countries and their change over time. However, it does not necessarily reflect how the quality of maritime transport changed in terms of time reliability of services. Figure 4 shows that the average delay of vessels by trade lane increased considerably since 2020 and that the most affected routes are those linking Asia with the West Coast of North America and Northern Europe.

Figure 4: Global delays (Figure 4A) and breakdown by route (Figure 4B)



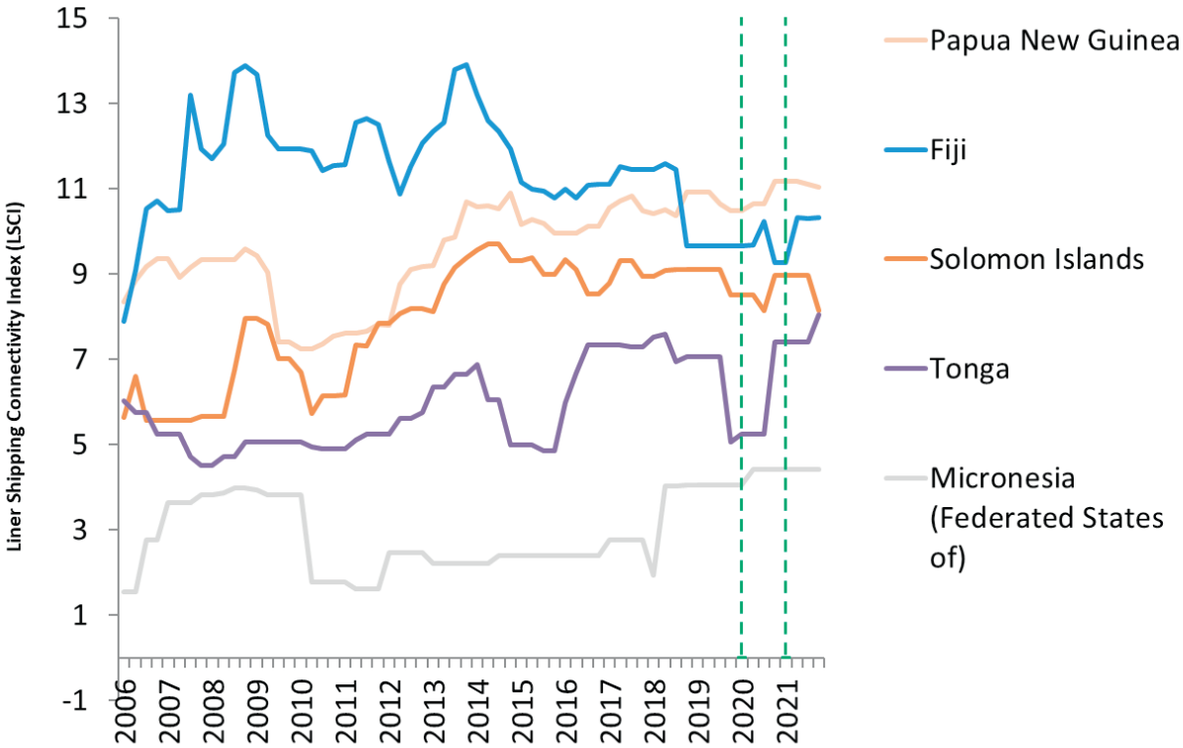
Source: Murphy, 2022

1.2.2. Pacific SIDS maritime connectivity

As opposed to ASEAN countries, Pacific SIDS are poorly connected, with overall connectivity levels below 15. Except for the largest countries among Pacific SIDS (Papua New Guinea, Fiji and the Solomon Islands) there is not a clear hierarchy and LSCIs changed considerably, as shown in Figure 5. When comparing the 2021 LSCI with 2006, connectivity levels appear to have slightly increased.

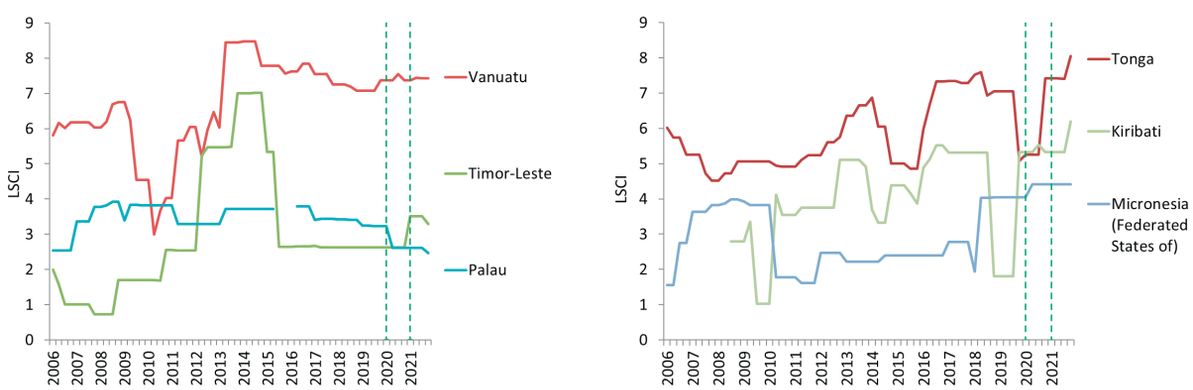
The 2008/2009 crisis seems to have heavily impacted the maritime connectivity of several Pacific SIDS (as illustrated in Figure 5 and Figure 6). For these countries, the pre-crisis levels were only reached by 2013/2014. Since then, the trend has been rather stagnation or a decline, but with important differences between countries. Figure 5 shows that Fiji, the best performer until 2013/2014, has declined considerably, dropping from 13.90 in 2013 Q4 to 10.31 in 2021 Q4.

Figure 5: Evolution of the LSCI in selected Pacific SIDS, 2006-2021 (1/2)



Comparatively, the effects of the current Covid-19 crisis on the connectivity have been less severe. Most of the countries in the region have seen their LSCI increase (see Figure 6), even within a context of reduction in imports (Arslanalp et al., 2022).

Figure 6: Evolution of the LSCI in selected Pacific SIDS, 2006-2021



1.3. An investigation into LSCI underlying components

This section analyses the six components underpinning the LSCIs for each of the countries within the two regions and their changes over time.

1.3.1. ASEAN

Except for Indonesia, LSCI levels of all the ASEAN countries has been improving since 2006, with the main driving factor generally being the deployment of larger vessels and, in turn, the increase in the level of

capacity scheduled to serve these countries. The following charts (Figures 7-27) illustrate the trends on the LSCI's components for the ASEAN countries – the countries are presented by their LSCI ranking position.

Singapore

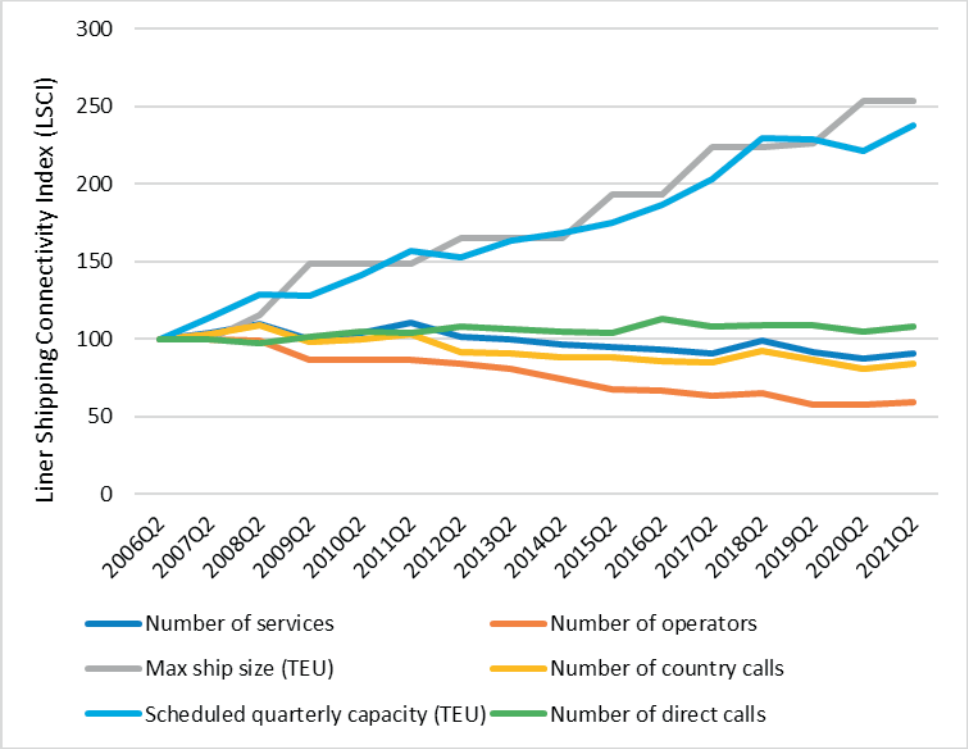
As shown in Figure 7, '*Max ship size*' and '*Scheduled quarterly capacity*' have been growing significantly since 2006 with all the other components declining (but a slower rate) or increasing only marginally over the same period. The larger vessel that Singapore can accommodate today can reach almost 24,000 TEU as compared to 9,440 TEU in 2006 (+154%). Deployment of larger vessels generally translate in higher level of capacity offered. In the case of Singapore, the increase in ship size has indeed been accompanied by more capacity, specifically, during between 2006 and 2021 scheduled capacity has increased by 138%.

The component '*Direct calls*', which shows the number of countries directly connected, has also increased since 2006, but only by 8%.

By contrast, the other components (i.e. '*Number of services*', '*Number of operators*' and '*Number of country calls')* have all declined compared to 2006, with the most significant contraction reported by '*Number of operators',* down from 95 in 2006 to 56 in 2021.

Focusing on the last few years, data shows that improvement in the LSCI from 108 in 2019Q2 to 113 in 2021Q2 is also mainly driven by increase in ship size, up by circa 12%.

Figure 7: LSCI components, Singapore, Index 2006Q2=100



Source: MDS Transmodal, Containership Database, February 2022

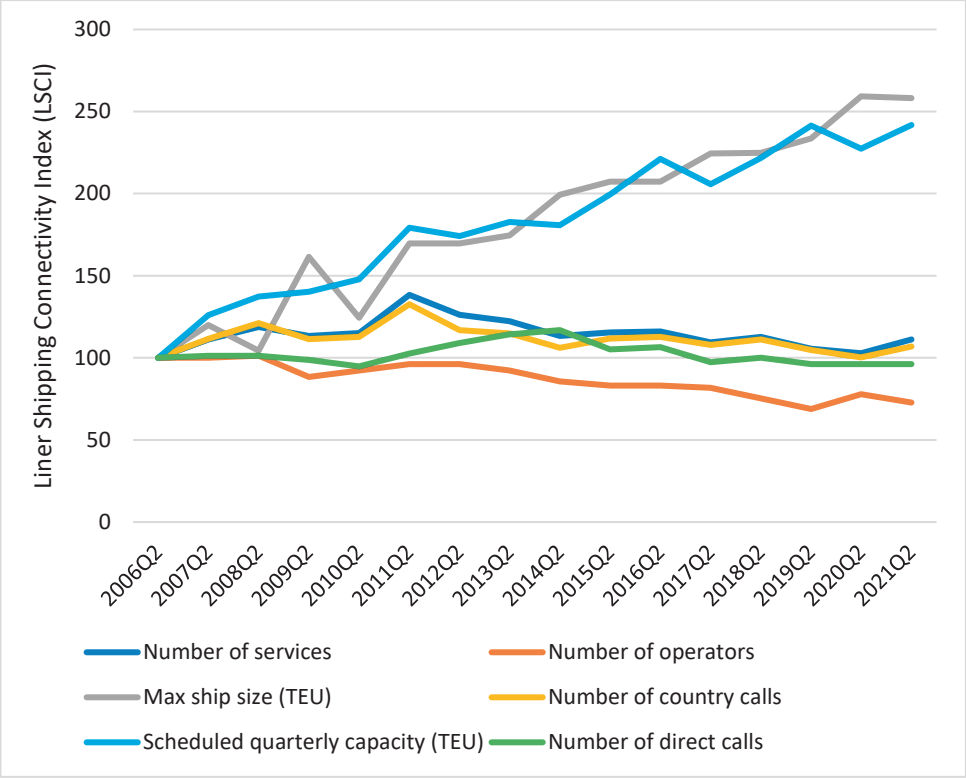
Malaysia

Between 2006 and 2021, '*Max ship size*' and '*Scheduled quarterly capacity*' for Malaysia have been growing at very similar rates seen for Singapore and, as for Singapore, the LSCI for Malaysia has been significantly affected by these two components.

Differently from Singapore, however, Malaysia has seen a marginal contraction in the number of countries directly connected, down from 77 to 74 since 2006. Down also the number of operators offering their liner services to Malaysia, down from 77 to 56.

Comparing the Malaysian LSCI before the pandemic with the level observed in 2021, we see an increase of 6 points (from 94 to 100) substantially driven by the increase in ship size (up by 11%).

Figure 8: LSCI components, Malaysia, Index 2006Q2=100

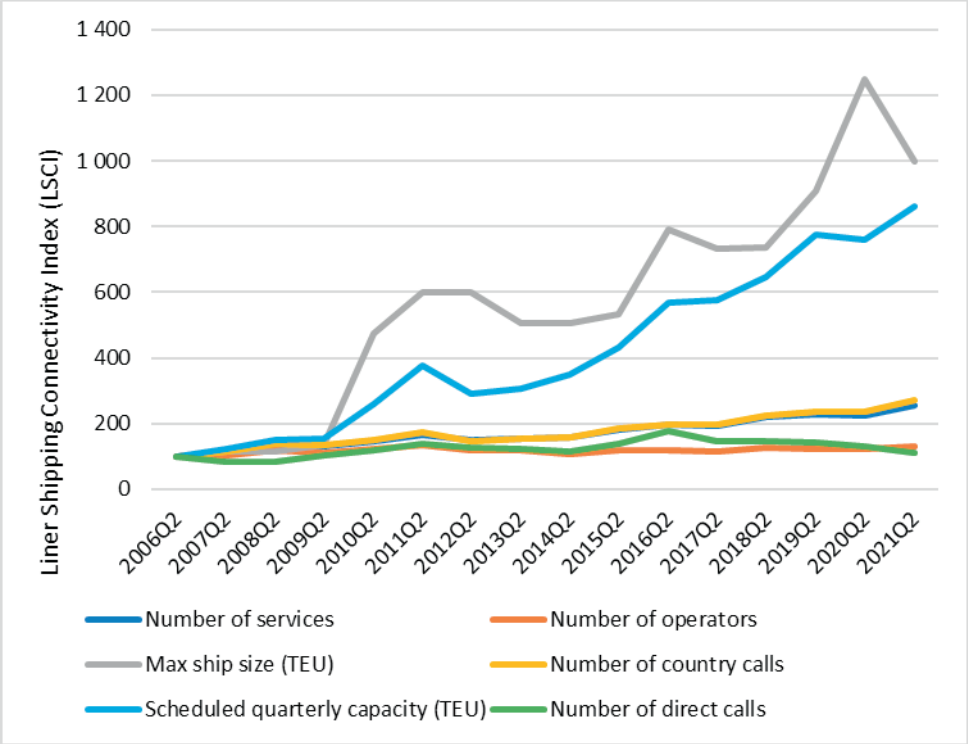


source: MDS Transmodal, Containership Database, February 2022

Vietnam

With an increase of more than 250% between 2006Q2 and 2021Q2, Vietnam has experienced the highest LSCI increase in the region. For each of the six components forming the LSCI, we observe an increase, with '*Max ship size*' and '*Scheduled quarterly capacity*' up by 900% and more than 760% respectively. Interesting to notice is that, differently from the previous two countries, in the case of Vietnam we observe an increase in all other components as well, with the number of operators offering liner services to the country up from 39 to 51; the increase might not be statistically significant but it shows interest in serving a country that has been experiencing a less peripherical role in the international trade landscape especially since the trade war between the United States and China.

Figure 9: LSCI components, Vietnam, Index 2006Q2=100



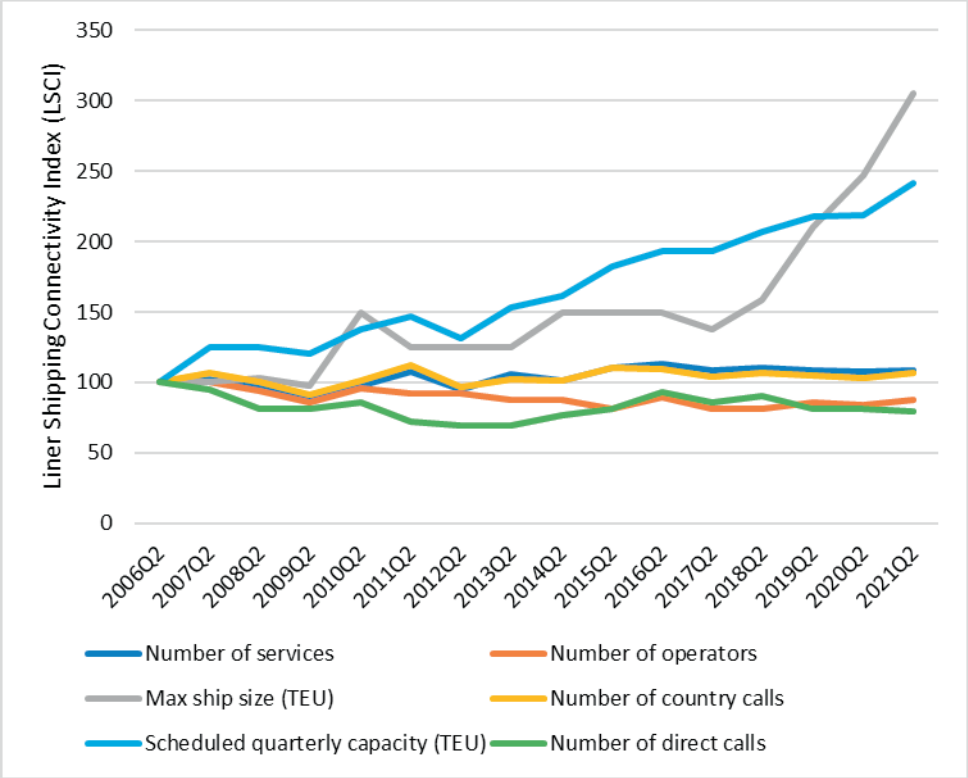
Source: MDS Transmodal, Containership Database, February 2022

Thailand

The significant increase in the size of vessels now stopping at Thailand, up from circa 6,700 TEU in 2006 to over 20,000 TEU in 2021, has translated in a significant increase in the LSCI for this country. More specifically, the LSCI has gone up from 37 in 2006 to 64 in 2021.

By contrast, the number of countries directly connected to Thailand has declined over the years, down from 43 in 2006 to 34 in 2021. Number of operators offering their liner services to Thailand has also declined during the same period, from 49 to 43.

Figure 10: LSCI components, Thailand; Index 2006Q2=100



Source: MDS Transmodal, Containership Database, February 2022

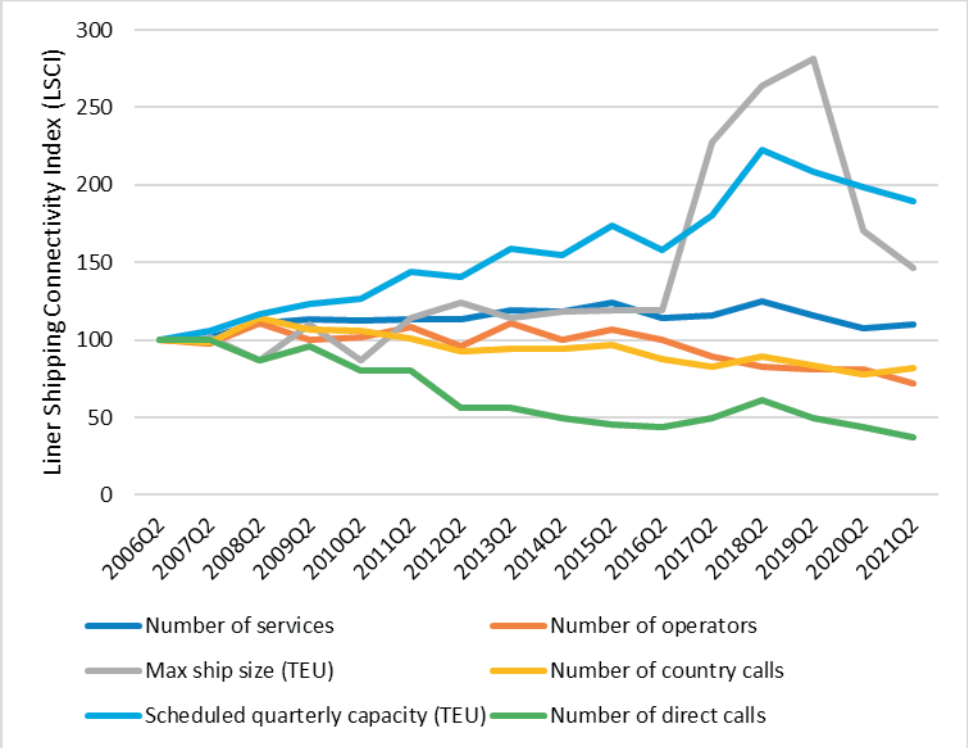
Indonesia

Indonesia is the only country whose LSCI deteriorated in 2021Q2 compared to 2006Q2, down from 34.7 to 32.8. A larger contraction is observed when we compare the LSCI for 2021Q2 with 2019Q2.

Between 2006 and 2016, the largest vessels that could be accommodated by the Indonesian ports has been in the range of 4,400 TEU and 5,000 TEU and its LSCI has been in the range of 33-37 during this period. In 2017, Indonesia has been able to accommodate vessels larger than 9,000TEU and this has translated in the most significant year-on-year increase in the LSCI, up by some 24% between 2016 and 2017. After 2017, Indonesia has continued to accommodate vessel of this size, of larger but up to 2019; in 2020 and 2021, in fact, we observe a contraction in vessel size, as shown in the chart below.

The reduction vessel size observed between 2019 and 2021 has been accompanied by a reduction in all other LSCI components, with the LSCI now down to 33 points, which is lower than 2006.

Figure 11: LSCI components, Indonesia, Index 2006Q2=100

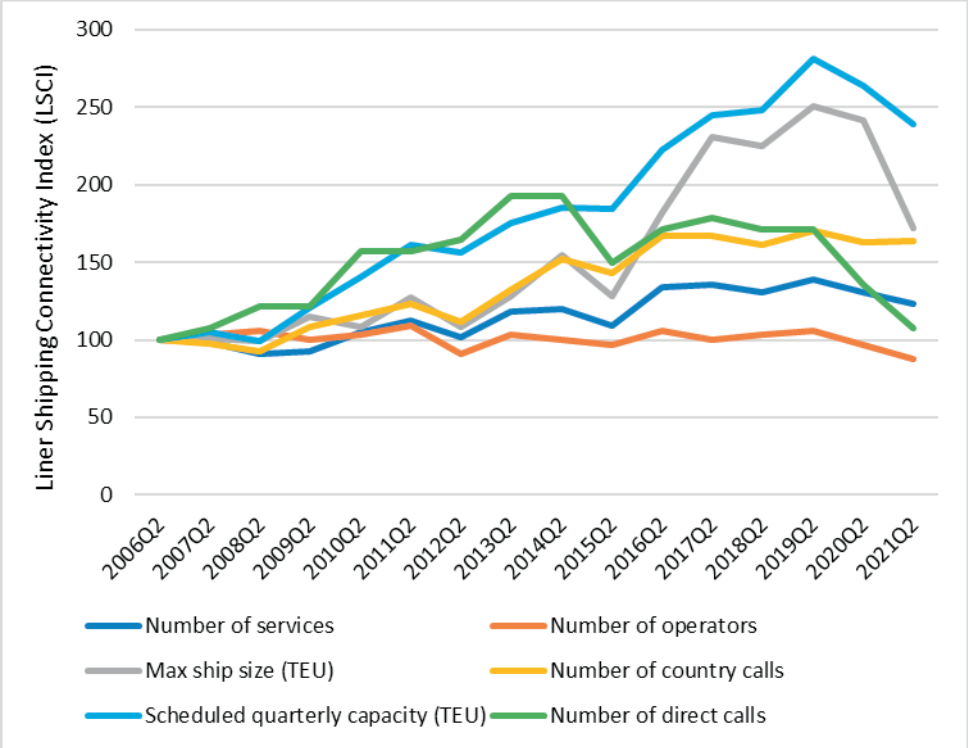


Source: MDS Transmodal, Containership Database, February 2022

Philippines

In 2019Q2 the Philippines's LSCI reached its highest level, equating to 32.9, up from 30.6 achieved in the previous. The increase was mainly driven by the deployment of larger vessels (of 6,900 TEU, up from some 6,180 TEU in the previous year) and, in turn, the level of capacity offered by the shipping line to this country. After 2019, however, the country has seen a decline in its LSCI as all its components deteriorated.

Figure 12: LSCI components, Philippines, Index 2006Q2=100

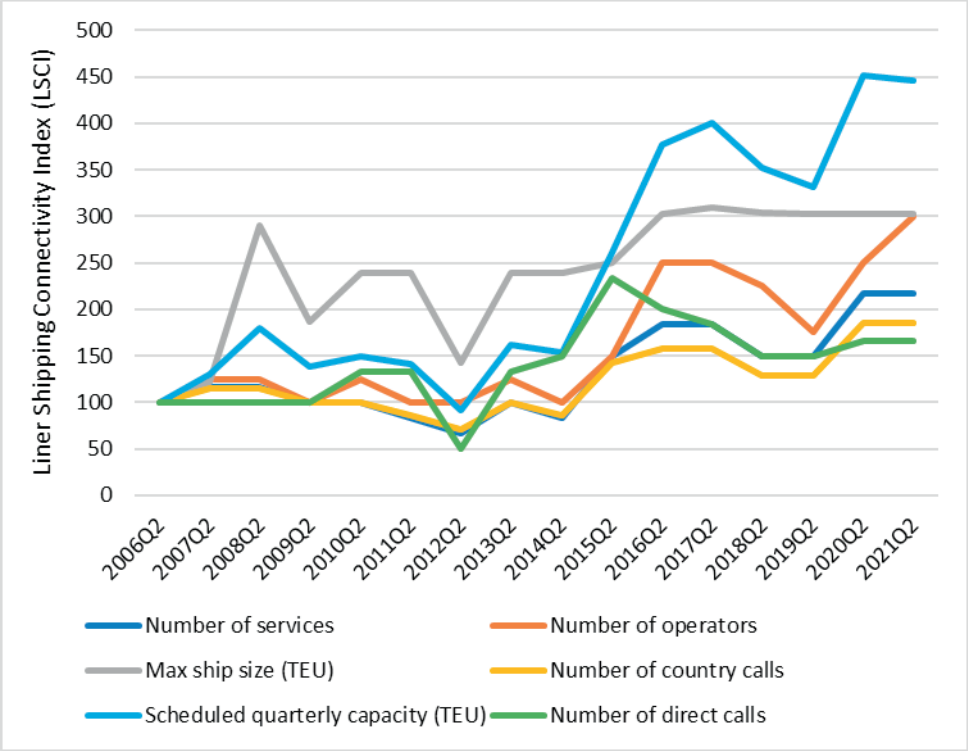


Source: MDS Transmodal, Containership Database, February 2022

Cambodia, Myanmar and Brunei Darussalam Brunei Darussalam

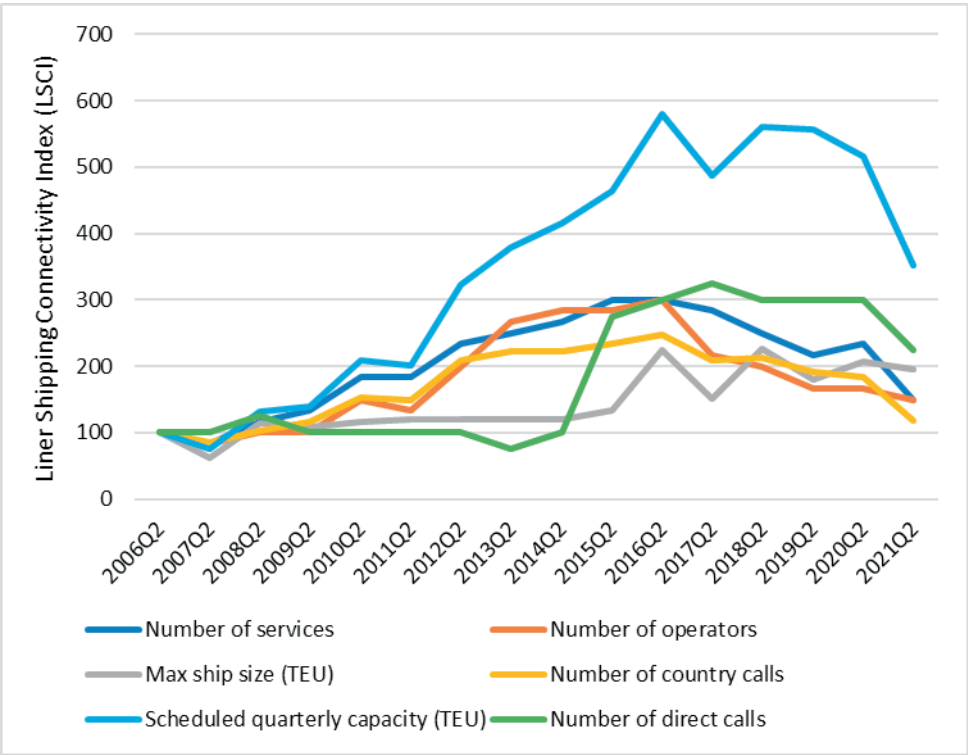
The following three charts show the LSCI's components for Cambodia, Myanmar and Brunei Darussalam, countries whose LSCIs are generally below 10. In 2021, all of them have seen an improvement in their LSCIs as compared to 2006. The driving factors, however, vary amongst them. In more detail, for Cambodia and Myanmar we observe an improvement in all the six LSCI components whereas for Brunei Darussalam, the driving factor has been the increase in the size of ship accommodated by the country, up from 860 TEU in 2006Q2 to 1,750 TEU in 2021Q2.

Figure 13: LSCI components, Cambodia, Index 2006Q2=100



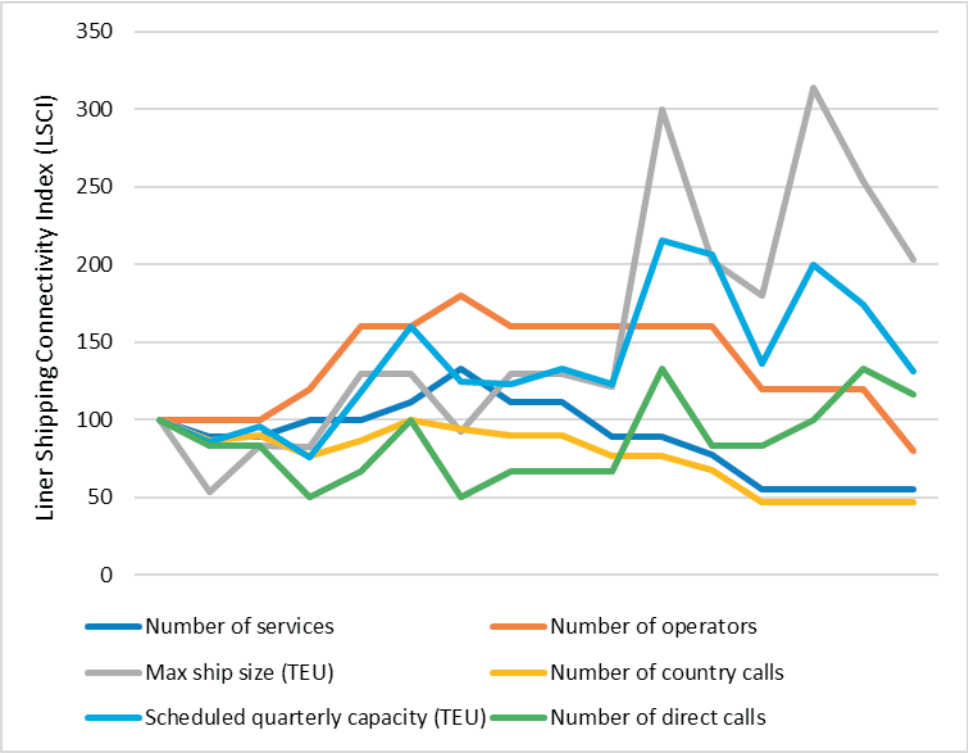
Source: MDS Transmodal, Containership Database, February 2022

Figure 14: LSCI components, Myanmar, Index 2006Q2=100



Source: MDS Transmodal, Containership Database, February 2022

Figure 15: LSCI components, Brunei Darussalam, Index 2006Q2=100



Source: MDS Transmodal, Containership Database, February 2022

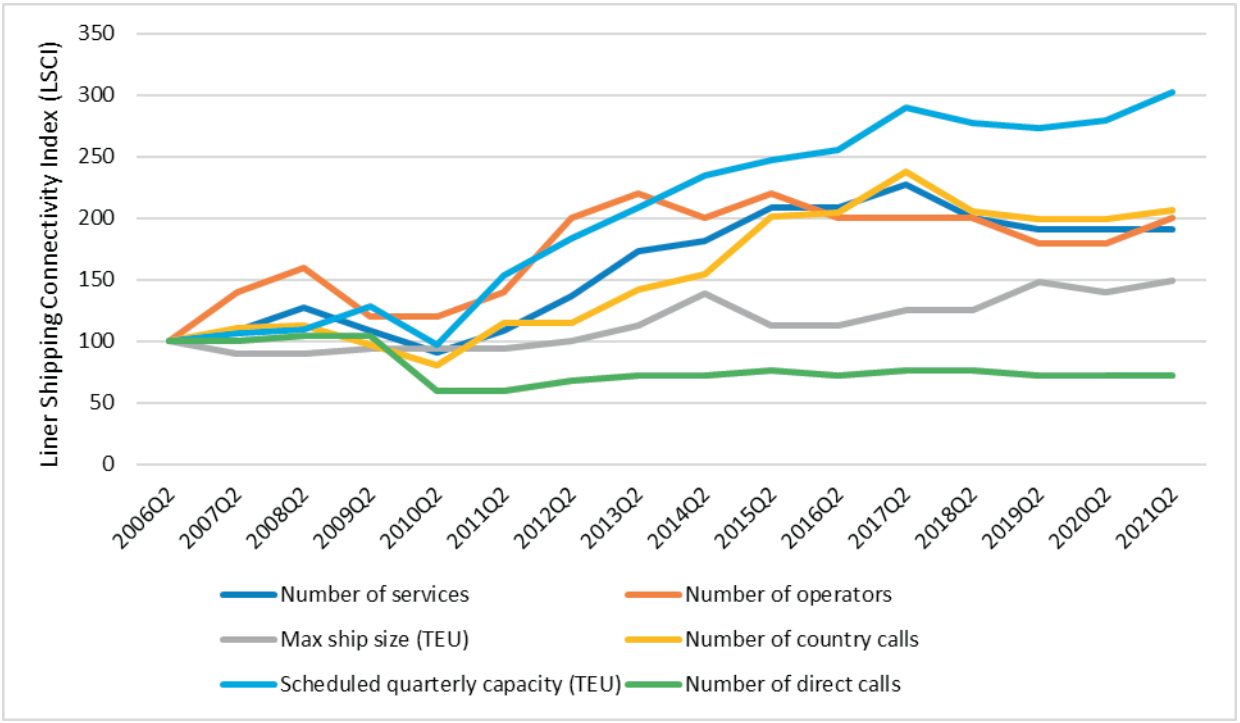
1.3.2. Pacific SIDS

The Pacific SIDS are generally ranked at the bottom of the Country LSCI, with the only country to report a double digit LSCI in 2019Q2 being Papua New Guinea and Nauru, Tuvalu and Kiribati within the bottom 10 countries in the same year quarter. Analysing the second quarter of all the years between 20006 and 2021, we also notice that some of these countries do not always have a LSCI meaning that there have been periods in which some countries were not directly served by shipping lines; specifically: Kiribati (no direct services in 2006Q2, 2007Q2 and 2008Q2), Tuvalu (no direct services in 2006Q2, 2007Q2 and 2012Q2) and Nauru (no direct services in 2006Q2, 2007Q2, 2008Q2, 2009Q2, 2010Q2, 2013Q2 and 2021Q2).

Papua New Guinea

Papua New Guinea has seen its LSCI growing from 9 to 11 points between 2006Q2 and 2021Q2, driven by an increase in all the LSCI expect the number of countries directly connected, down from 25 to 18 during the same period. Important to notice that the number of services scheduled to serve Papua New Guinea in 2021Q2 were 21, up from 11 in 2006Q2 with the number of shipping lines operating these services increased from 5 to 10 during the same period. The size of the largest vessels calling at this country has also increased: from 1,800 TEU to 2,700 in 2021Q2.

Figure 16: LSCI components, Papua New Guinea, Index 2006Q2=100

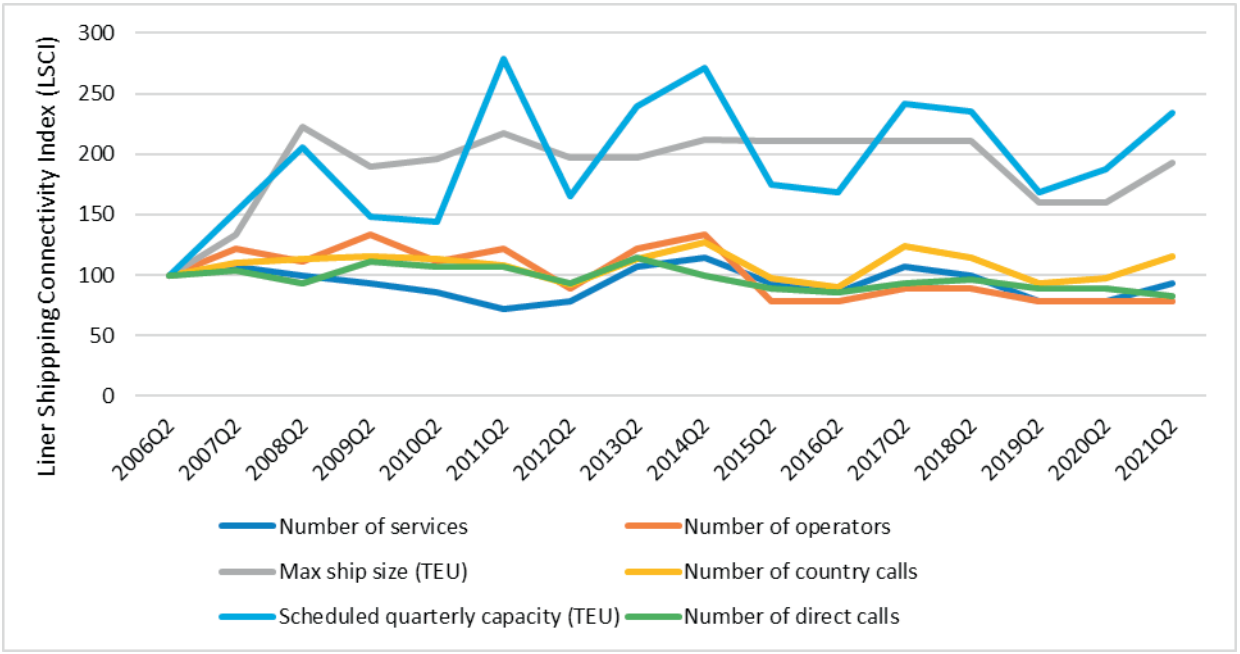


Source: MDS Transmodal, Containership Database, February 2022

Fiji

In 2021Q2, Fiji had an LSCI of 10.3 points, slightly higher than 9.1 reported in 2006Q2; however, during the years, Fiji has seen a fluctuation in its LSCI due to a fluctuation in the number of services serving it and, in turn, the volume of capacity scheduled to be deployed in those services.

Figure 17: LSCI components, Fiji, Index 2006Q2=100

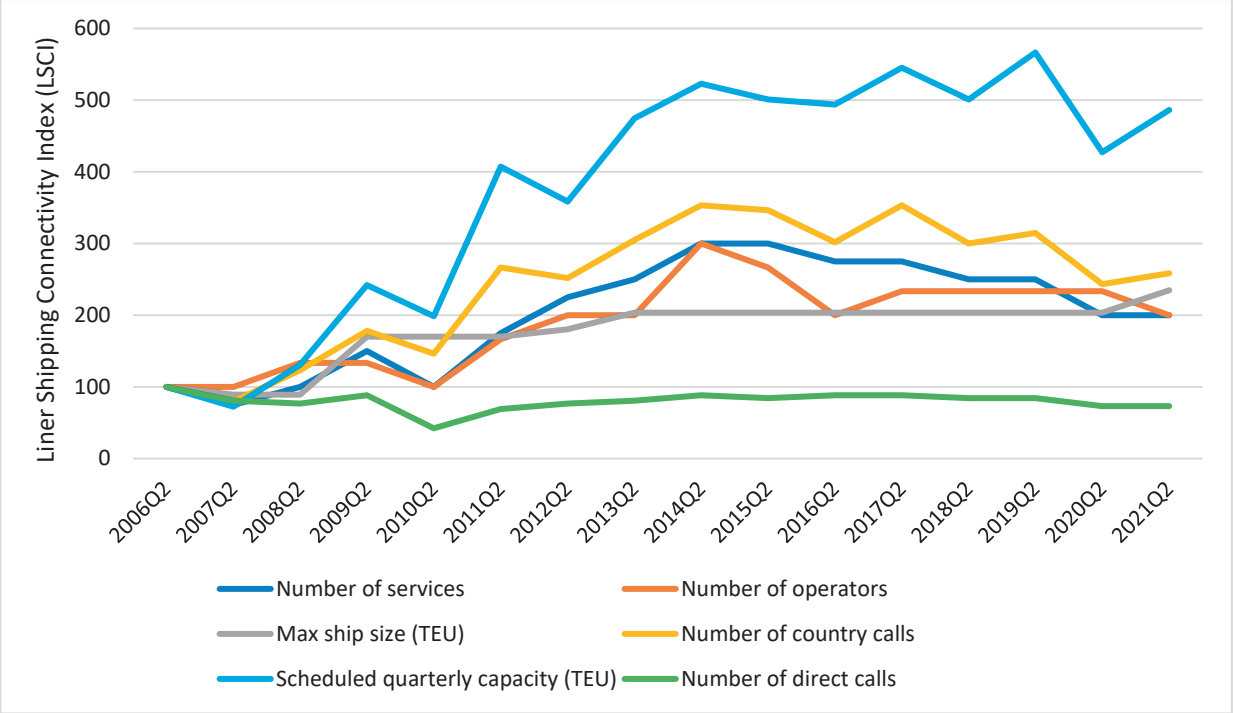


Source: MDS Transmodal, Containership Database, February 2022

Solomon Islands

Solomon Islands has seen a marginal improvement in its LSCI between 2006Q2 and 2021Q2 mainly driven by an increase in the level of scheduled capacity, increased by more than 380% during the same period as both number of services and maximum ship size doubled.

Figure 18: LSCI components, Solomon Islands, Index 2006Q2=100

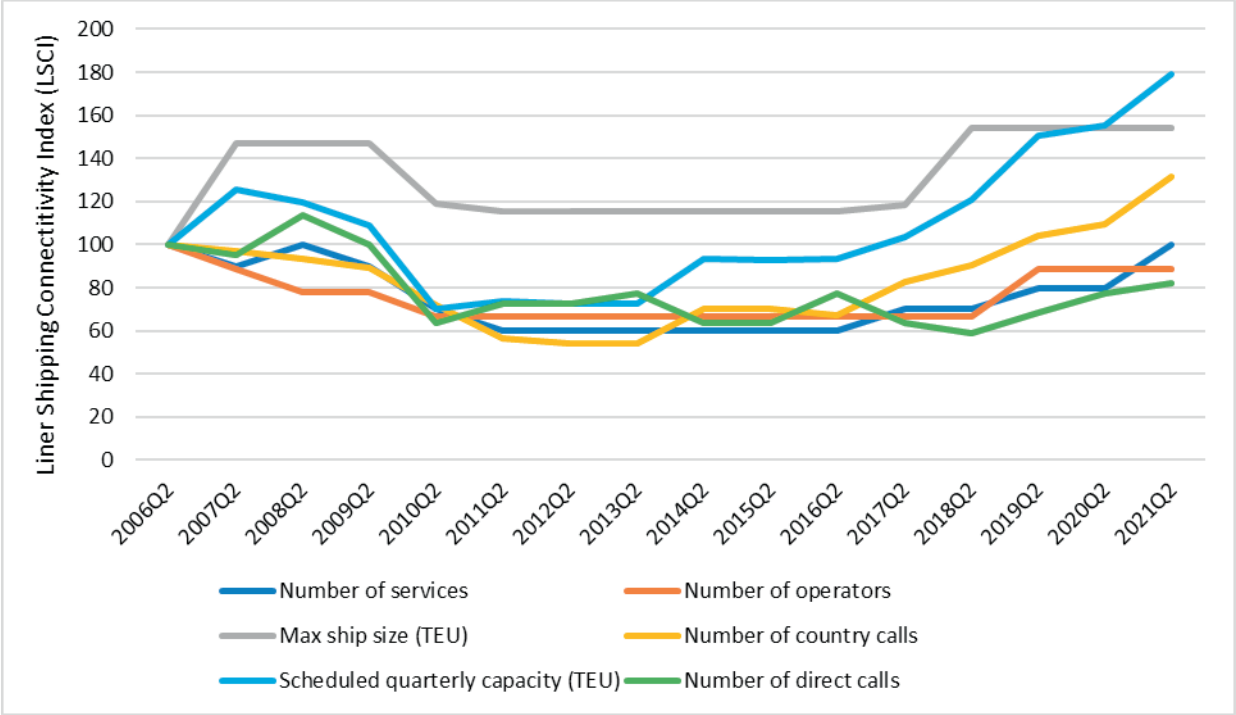


Source: MDS Transmodal, Containership Database, February 2022

Samoa

The LSCI for Samoa increased by less than one point between 2006Q2 and 2021Q2 as the increase in both ship size and schedule capacity have been offset by the contraction in the number of shipping lines serving the countries as well as in the number of direct calls.

Figure 19: LSCI components, Samoa, Index 2006Q2=100

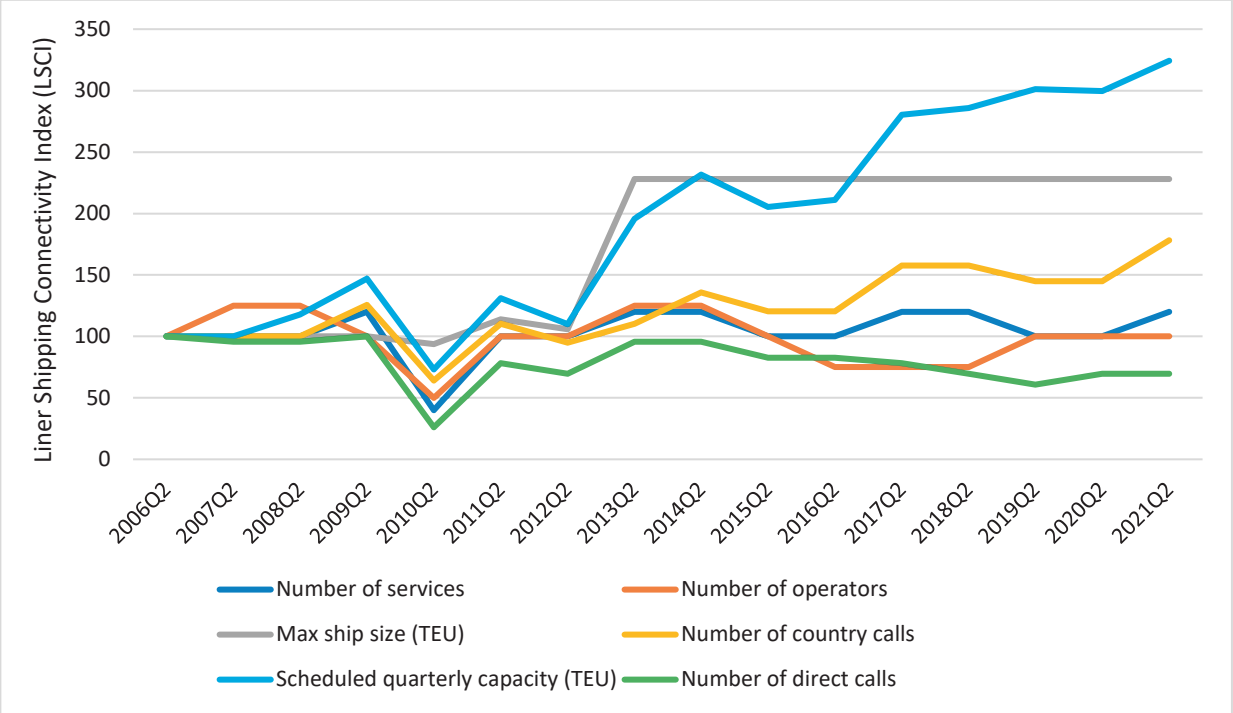


Source: MDS Transmodal, Containership Database, February 2022

Vanuatu

Vanuatu's LSCI has increased marginally between 2006Q2 and 2021Q2 with ship size and scheduled capacity increasing faster than the other components. However, during the same period, the country has seen a contraction in the number of countries directly connected: from 23 in 2006Q2 to 16 in 2021Q2.

Figure 20: LSCI components, Vanuatu, Index 2006Q2=100

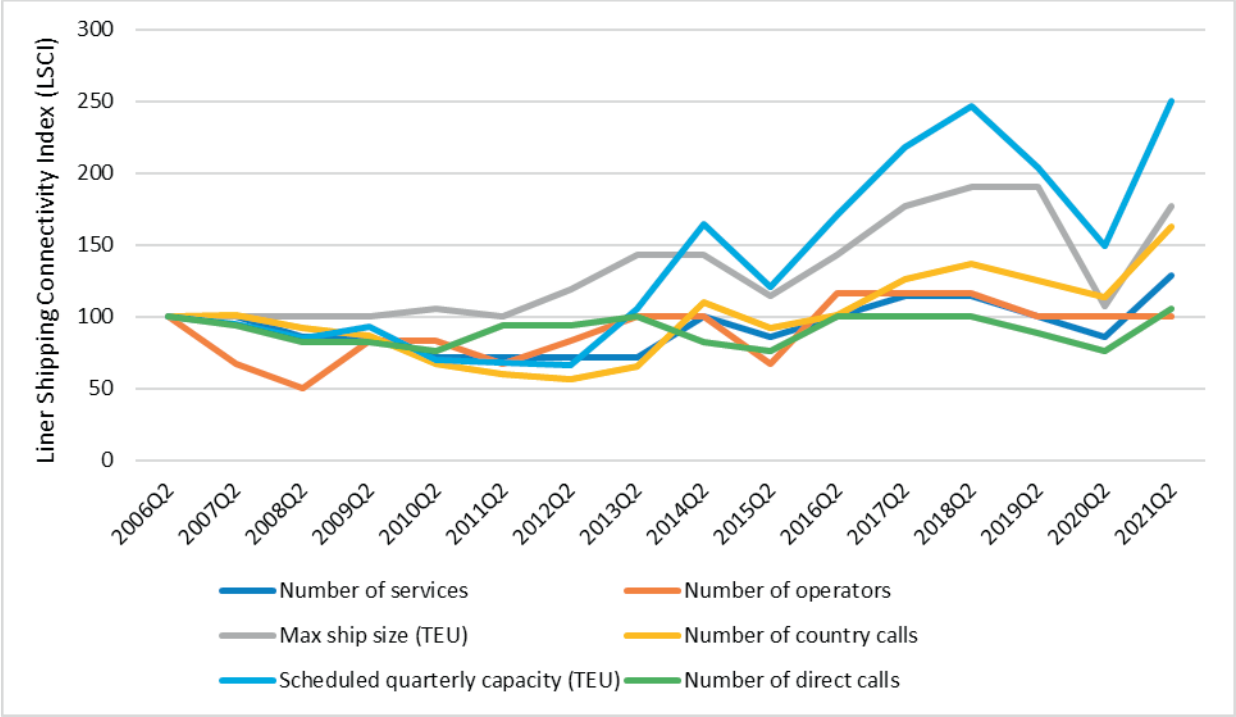


Source: MDS Transmodal, Containership Database, February 2022

Tonga

Tonga has seen an increase in its LSCI between 2006Q2 and 2021Q2 thanks to all components improving during this period except the number of shipping lines, which have remained stable. It is important to note that the LSCI reached its peak in 2018Q2 and subsequently declined but is now substantially back to the higher level observed during this period. The decline between 2018Q2 and 2021Q2 was the result of a reduction in services and ship size deployed which resulted in a contraction in scheduled capacity.

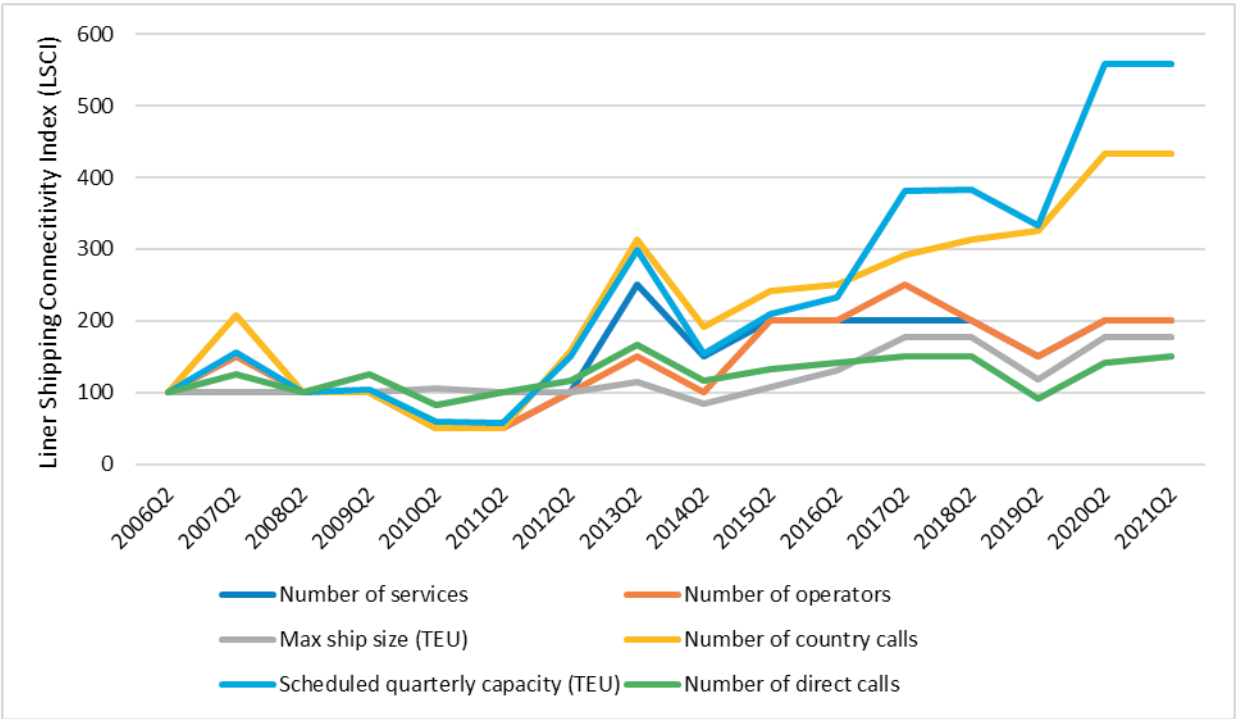
Figure 21: LSCI components, Tonga, Index 2006Q2=100



Source: MDS Transmodal, Containership Database, February 2022

Marshall Islands

Figure 22: LSCI components, Marshall Islands, Index 2006Q2=100

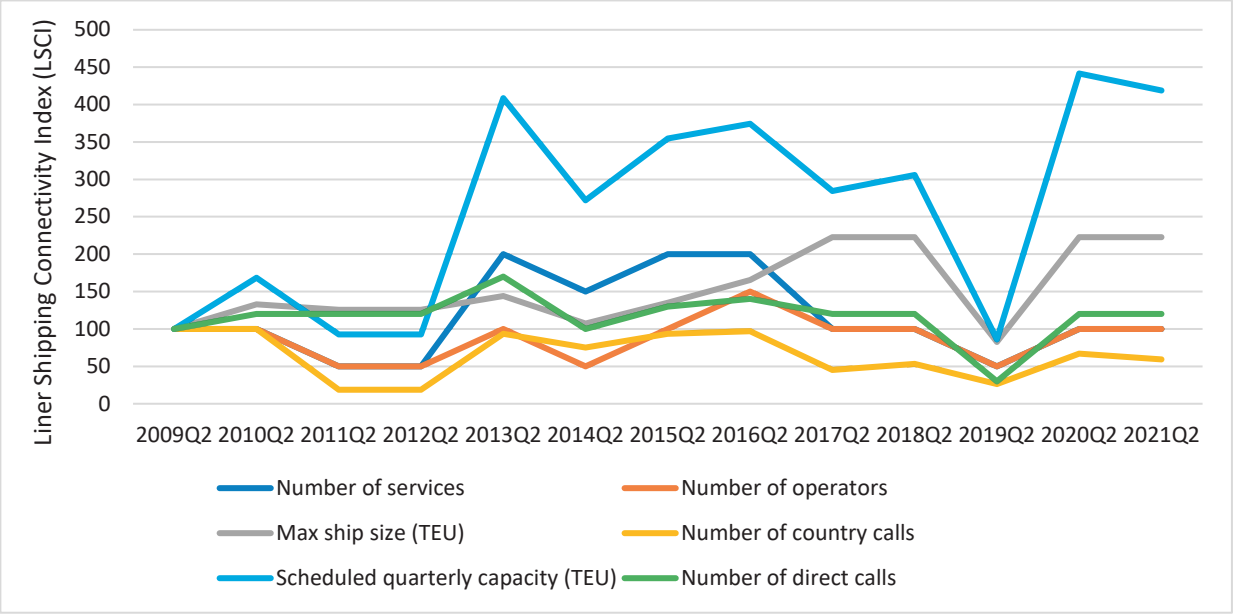


Source: MDS Transmodal, Containership Database, February 2022

Kiribati

No direct liner services were offered before 2009Q2 for Kiribati, which now (2021Q2) is served by only 2 services and two shipping lines. Given the very small numbers, the LSCI for this country is very volatile as shown in Figure 23. It is important to notice that Kiribati can now accommodate vessels larger than 1,600TEU versus the circa 700 TEU in 2009Q2; this means that, despite the number of services having remained stable, the scheduled capacity has increased substantially during this period.

Figure 23: LSCI components, Kiribati, Index 2009Q2=100



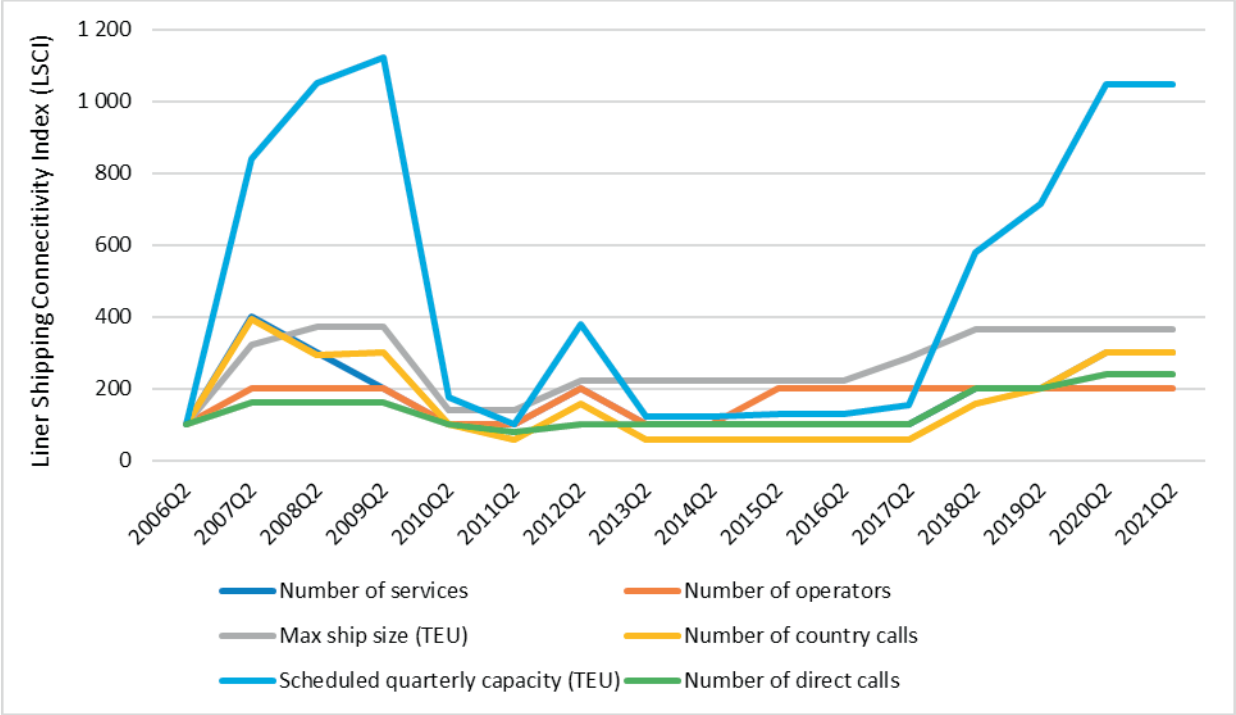
Source: MDS Transmodal, Containership Database, February 2022

Micronesia

The level of capacity scheduled to call at Micronesia increased significantly between 2006Q2 and 2009Q2, driven by the increase in both number of services as well as maximum ship size calling at Micronesia. From 2010Q2 we notice a substantial drop as the larger vessels calling at this country declined from more than 1,100 TEU to circa 400 TEU. During the subsequent years, the maximum size of ships calling at Micronesia have remained substantially stable up to 2018Q2 when the larger vessels calling at this country (of 1,100) have returned to the region.

It is worthwhile noticing that Micronesia is served by a limited number of services (never higher than 5 during the period we have observed), therefore, relatively small changes in the services' features can translate in big changes in percentages terms.

Figure 24: LSCI components, Micronesia, Index 2006Q2=100

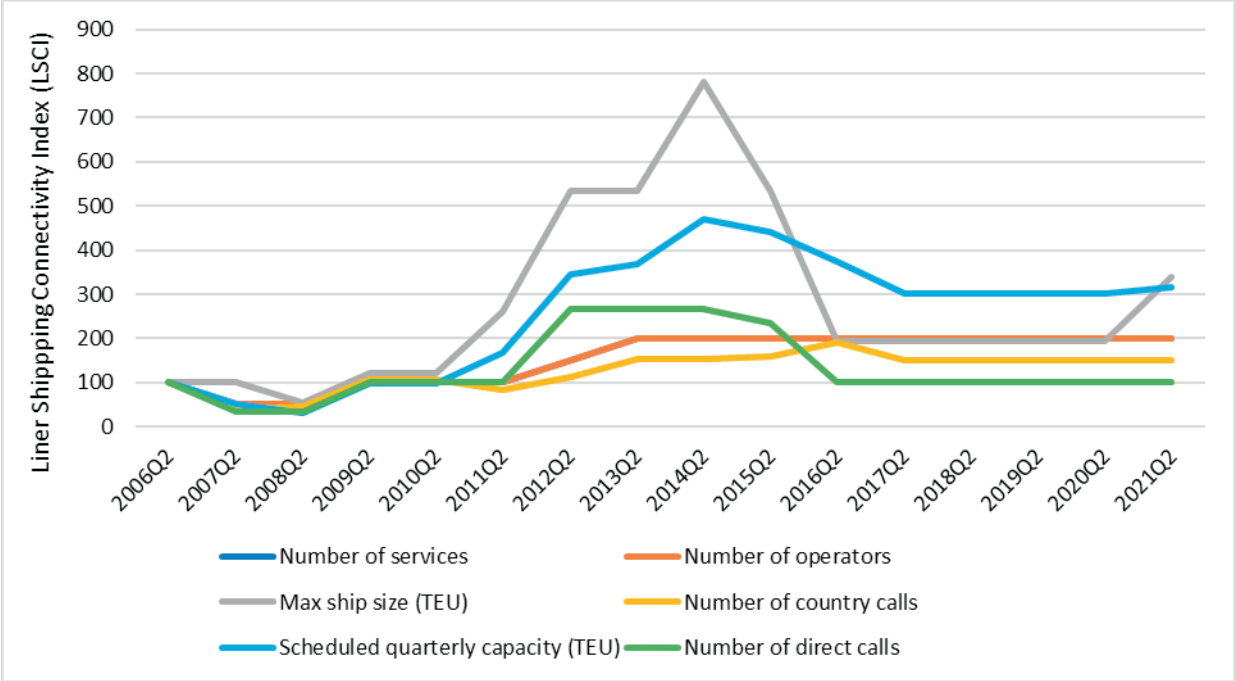


Source: MDS Transmodal, Containership Database, February 2022

East Timor

East Timor has accommodated vessels larger than 2,500 TEU in 2014Q2, which translated in its LSCI reaching a level of 7.01 in that same year quarter. After that peak, East Timor has seen a decline in its LSCI as the vessels calling at this country declined substantially. The larger vessels calling at East Timor in 221Q2 were just above 1,100 TEU.

Figure 25: LSCI components, East Timor, Index 2006Q2=100

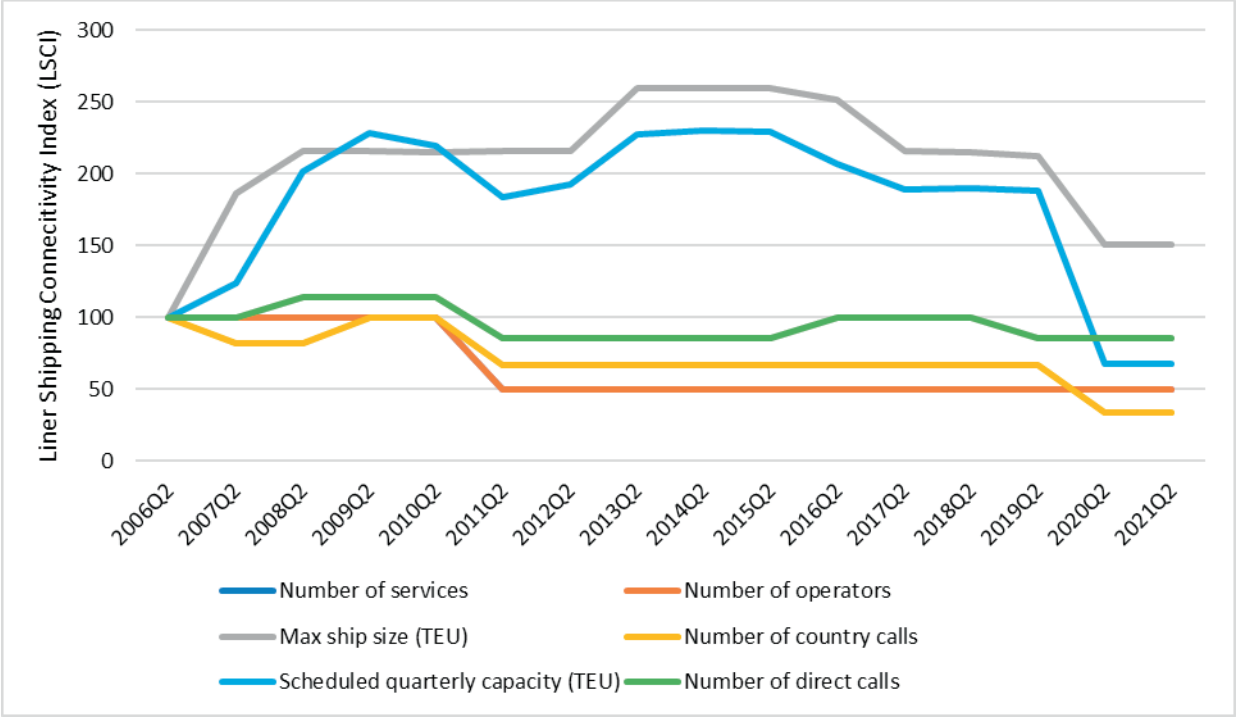


Source: MDS Transmodal, Containership Database, February 2022

Palau

Palau has been served by only one liner services since 2011Q2, prior to then two services called at this country. Being served by only one service means that the LSCI for this country is very sensitive to the changes in the features of that one service, with the most significant factor being generally the size of the vessels deployed.

Figure 26: LSCI components, Palau, Index 2006Q2=100

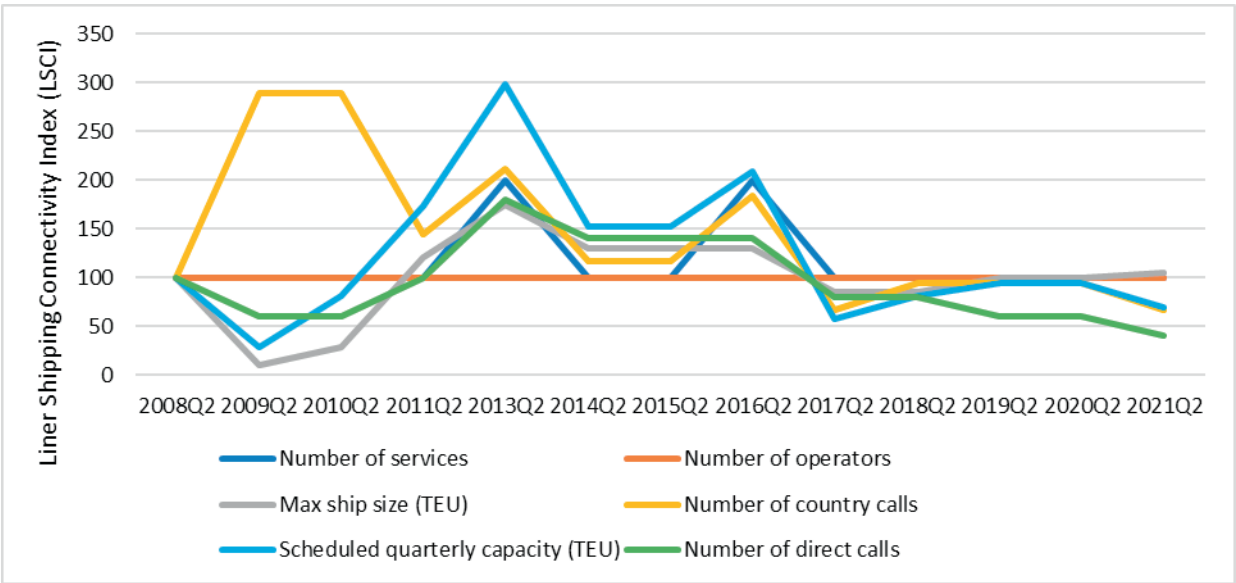


Source: MDS Transmodal, Containership Database, February 2022

Tuvalu and Nauru

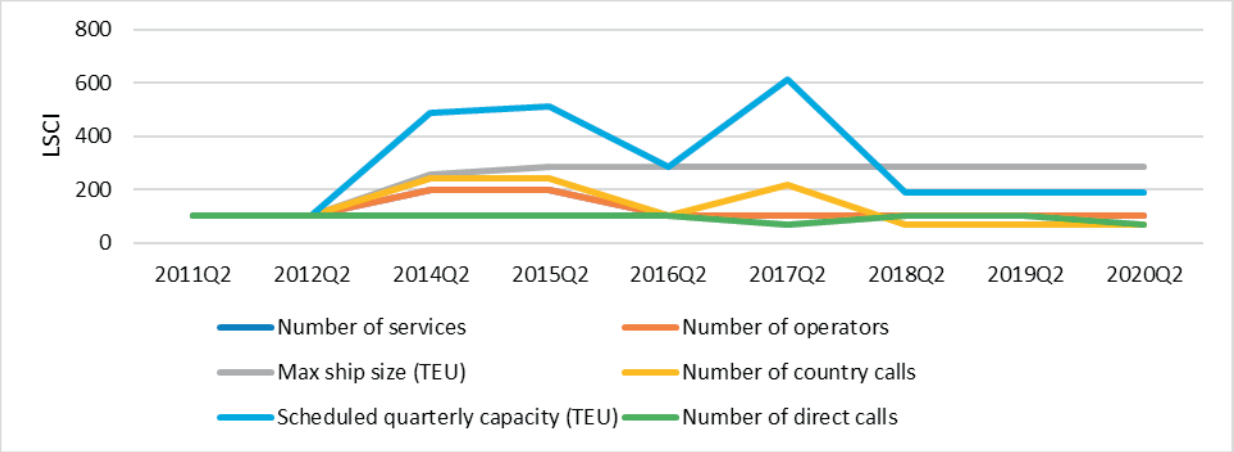
Both Tuvalu and Nauru have very low LSCI with the trends of the components of their LSCI being very volatile as shown in Figure 27 and Figure 28.

Figure 27: LSCI components, Tuvalu, Index 2008Q2=100



Source: MDS Transmodal, Containership Database, February 2022

Figure 28: LSCI components, Nauru, Index 2011Q2=100



Source: MDS Transmodal, Containership Database, February 2022

2. Exploring the maritime connections that matter most: an analysis of the UNCTAD Bilateral LSCI

In the former sections the connectivity of countries has been approached as a global score, which eventually changes over time. Although maritime connectivity is a critical aspect of life for SIDS, not all maritime connections matter equally. This is particularly the case for the Pacific SIDS which trade with a very limited number of partners (ADB, 2020).

To take account of the connections that really matter, this section builds on an analysis of the Liner Shipping Bilateral Connectivity Index (LSBCI)[8]. The LSBCI is meant to reflect the liner shipping connectivity between pairs of countries and is based on a bilateralization transformation of the LSCI. The current version of the LSBCI includes 5 components. For any pair of countries A and B represented in our sample, the LSBCI is based on: i) the number of transshipments required to get from country A to country B; (ii) the number of direct connections common to both country A and B; (iii) the number of common connections by country pair with one transhipment; (iv) the level of competition on services that connect country A to country B and (v) the size of the largest ship on the weakest route connecting country A to country B. The data on these components is provided by MDSTransmodal.

The analysis in this section aims to respond to the following questions: what are the main intra-regional and inter-regional links and how have they changed over the 2006-2019 period? Have Pacific SIDS diversified their connections? To answer these questions, the first subsection analyses intra-regional connectivity for Pacific SIDS and other neighbouring territories sharing common characteristics such remoteness and the limited size of their economies. It also examines how these bilateral links have changed over the 2006-2019 period. The second subsection explores similar issues related to inter-regional connectivity, including connections with ASEAN partners.

2.1. Pacific SIDS and intra-regional connectivity

Maritime connections between the Pacific SIDS are poorly developed. Often, moving cargo between the Pacific SIDS is more costly than to/from other regions (Irwin, 2020). This situation limits the possibilities

[8] The full dataset is accessible via http://stats.unctad.org/lsbci

of intra-regional trade, which represents less than a third of the value of the overall trade of the Pacific SIDS. The main exporters within the region are also those with the highest LSCIs (cf. section 1): Papua New Guinea, Fiji and the Solomon Islands (ADB, 2020).

Figure 29 presents the best intra-regional connections (LSBCI) in 2019. It shows that the links within the same subregion are generally better than those between subregions. The North is poorly connected with the other subregions, the only exceptions being the three largest countries (Papua New Guinea, Solomon Islands and Fiji). Comparatively the South, the West and the Others are well connected. Timor-Leste is poorly connected even with countries in the same sub-region.

Figure 29: LSBCI of the Pacific SIDS. Intra-regional (2019)

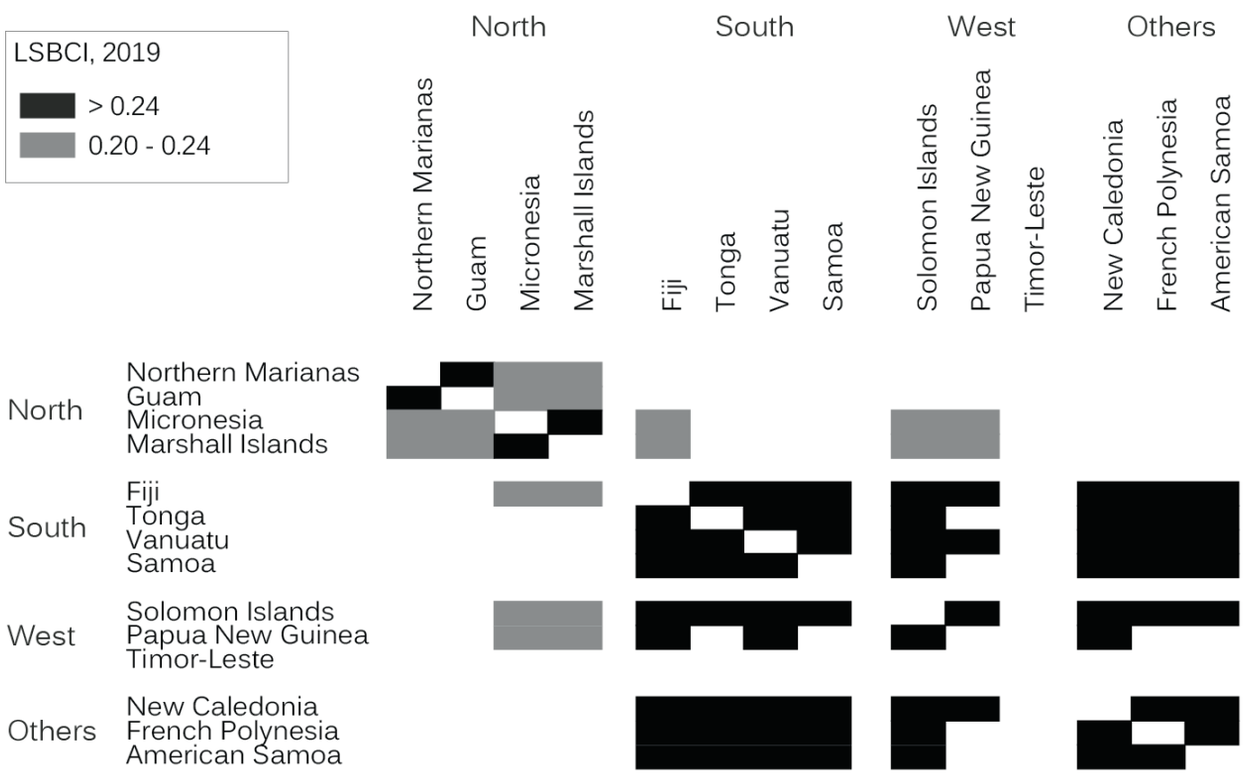


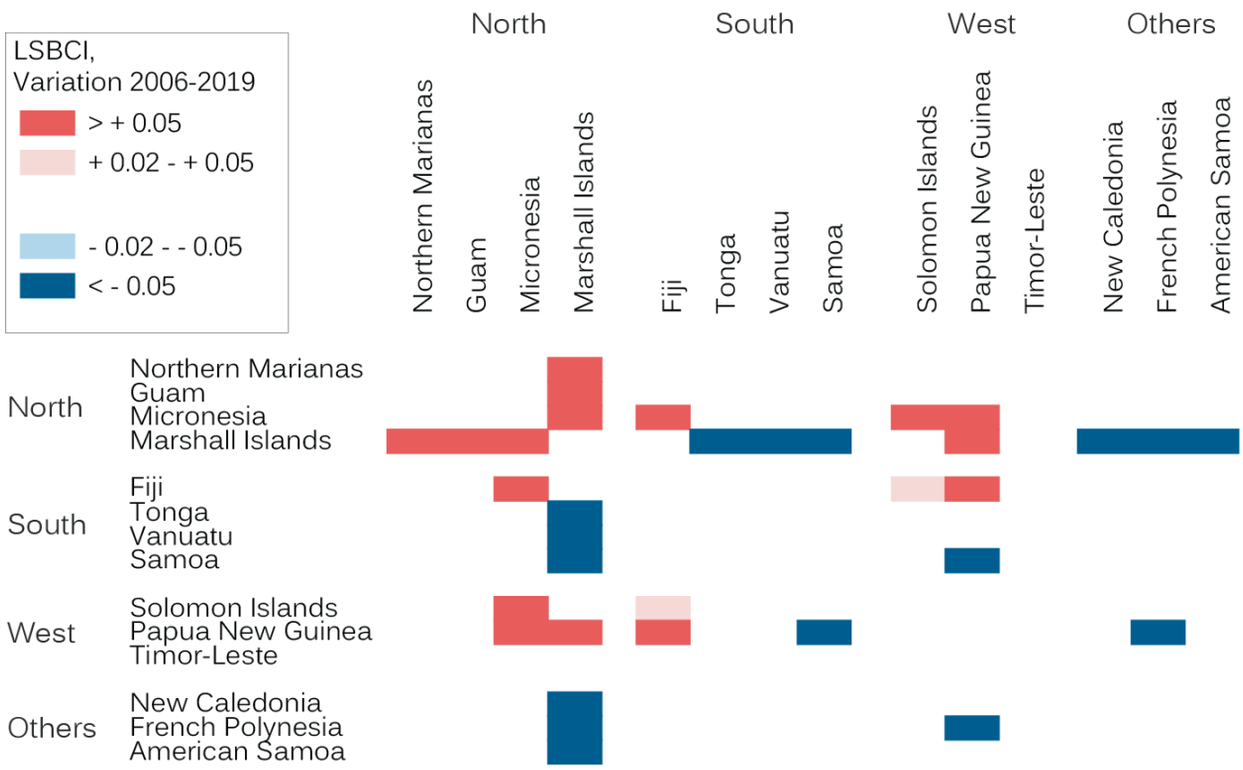
Figure 30 draws the main shifts in intra-regional connectivity between 2006 and 2019. It shows an improvement in the connections of the Marshall Islands with its partners within the same region. It also shows important changes on the links of North Pacific with South Pacific, which worsened for all countries except for Fiji. The connections of the North Pacific (Micronesia and Marshall Islands) also improve with the West (Solomon Islands and Papua New Guinea). The links of the Marshall Islands with the all the "Others" (New Caledonia, French Polynesia and American Samoa) declined.

There are also changes on the connectivity between West Pacific and South Pacific. Solomon Islands and Papua New Guinea improved their connectivity with Fiji, but Papua New Guinea lost connectivity with Samoa and with the French Polynesia.

The improvements in the connectivity of Fiji with the countries of the other subregions confirm its emerging role as the transshipment base for the South. The other side of the coin is that its neighbours in

the South lost momentum in their links with other subregions, as in the case of Samoa, which may be increasingly served by feeder via Fiji.

Figure 30: LSBCI of the Pacific SIDS. Intra-regional (Variation 2006-2019)



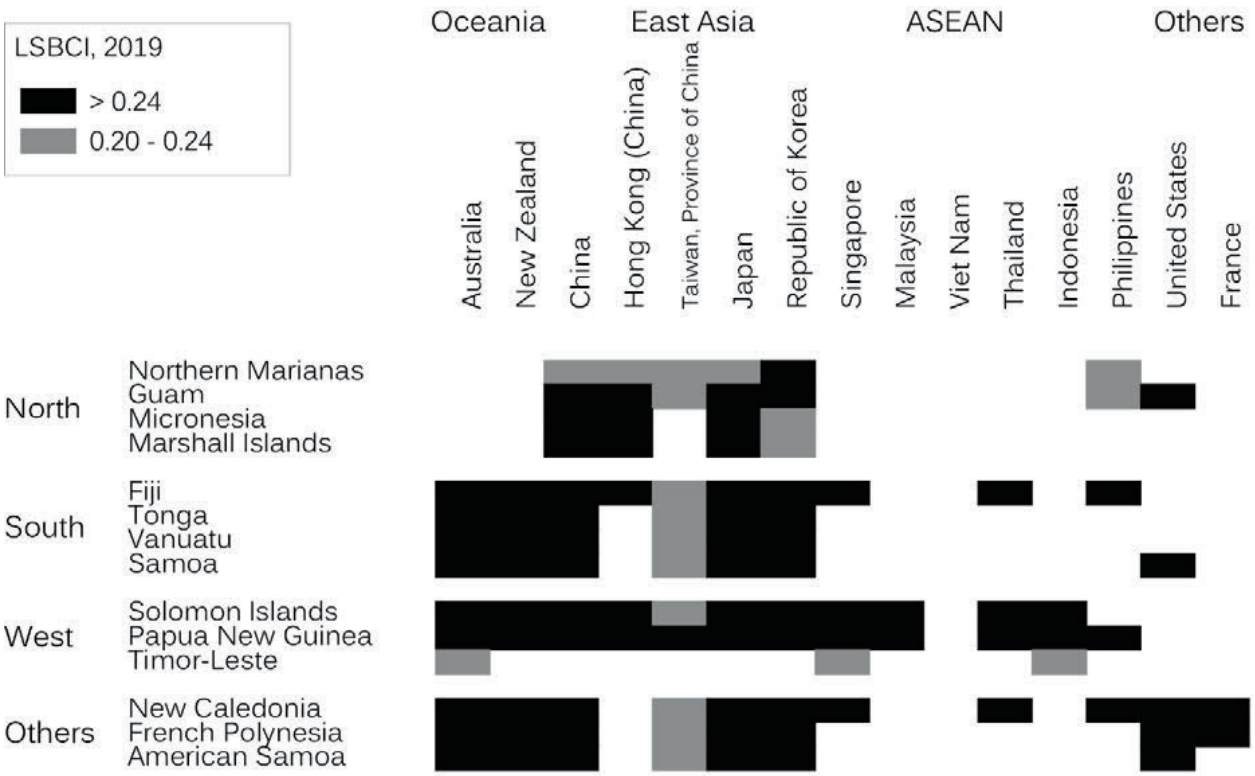
2.2. Pacific SIDS and inter-regional connectivity

More than two thirds of the international trade of SIDS are with partners from other regions. Amongst these partners, Australia, New Zealand, China and Japan are the most important (ADB, 2020).

Figure 31 shows that the only region which is well connected to all the subregions in the Pacific SIDS is East-Asia (2019 data). The North Pacific is poorly connected with all the other regions, including ASEAN and Oceania. Only Guam and the Northern Marianas have good connections with the Philippines. The West Pacific is the subregion having the most diverse connections with the other regions of the world, with relatively strong connections to Australia and New Zealand, East Asia and ASEAN. The South is also well connected to several regions but not with ASEAN.

Amongst the other territories, New Caledonia is the best connected to all the regions, particularly to several ASEAN countries (Singapore, Thailand and Philippines). As expected, connections with mainland United States and France are overall strong, despite the remoteness. Eventually, SIDS countries can benefit from these long-distance links such for example Samoa, which is the only one with strong connections with the United States (see Box 1 for a more in-depth description of these links).

Figure 31: LSBCI of the Pacific SIDS. Inter-regional (2019)



Box 1: Main Shipping lines serving the Pacific Islands [Arslanalp et al., 2021]

*"**Kyowa Shipping** provides three liner services via Guam, Korea (Busan) and Japan connecting European and Asian ports to the Pacific Islands. In particular, the Micronesia Service provides service to Micronesian ports, mainly using three multi-purpose vessels of 12000 DWT. Ports of call are Palau (Koror), Federated States of Micronesia (Yap, Chuuk, Pohnpei, Kosrae) and Marshall Islands (Majuro, Kwajalein, Ebeye). Ports visits take place about every two weeks. The South Pacific Service provides service to the South Pacific with four multi-purpose vessels of DWT 18000 DWT. Ports of call are Kiribati (Tarawa), Solomon Islands (Honiara), Vanuatu (Port Vila, Santo), New Caledonia (Noumea), Fiji (Suva, Lautoka), Tonga (Nuku'alofa), Samoa (Apia), American Samoa (Pago Pago), and Tahiti (Papeete). Finally, the Papua New Guinea/Australia Service provides service with two multi-purpose vessels of 8500 DWT. Ports of call are Papua New Guinea (Lae, Port Moresby, Rabaul) and Australia (Townsville). It has a partnership with the US-based Matson shipping company.*

***Neptune Pacific Direct Line** was formed in 2020, when Neptune Pacific Line acquired Pacific Direct Line (PDL), bringing together two of the South Pacific's leading shipping companies and offers a range of shipping service linking the South Pacific Islands with Australia and New Zealand. It has a cooperation with the government of Samoa and owns a 50 percent controlling interest in Pacific Forum Line (PFL). It has vessels calling in Vanuatu (Vila and Santo), Fiji (Suva and Lautoka), Tonga (Nuku'alofa), Samoa (Apia), Tahiti (Papeete), Tuvalu (Funafuti), Solomon Islands (Honiara), as well as Kiribati, Marshall Islands, and Nauru. It has a partnership with the Mariana Express Lines (MELL), through which it services Palau and Yap out of Guam.*

***Swire Shipping** operates 13 liner services connecting over 400 ports via an extensive network of services in the Asia-Pacific region. Among these services, the Polynesia Line operates a shipping network from*

the U.S. West Coast to the Pacific Islands, offering a fortnightly service from Los Angeles and Oakland in the United States to Tahiti, Tonga, Samoa, American Samoa, and the wider Pacific. The Australia Pacific Islands line provides a multi-purpose liner service accepting all types of containerized, breakbulk and project cargo between East Australia and New Caledonia, Vanuatu, Fiji, Samoa, and Tonga. Similarly, New Zealand Eastern Pacific Islands line provides service between Auckland and Tonga, Fiji, Samoa, Tahiti, the Cook Islands, and Niue. The Pacific North Asia line provides services between North Asia and the Marshall Islands, Kiribati, Vanuatu, Solomon Islands, New Caledonia, Fiji, Tonga, Samoa, and Tahiti."

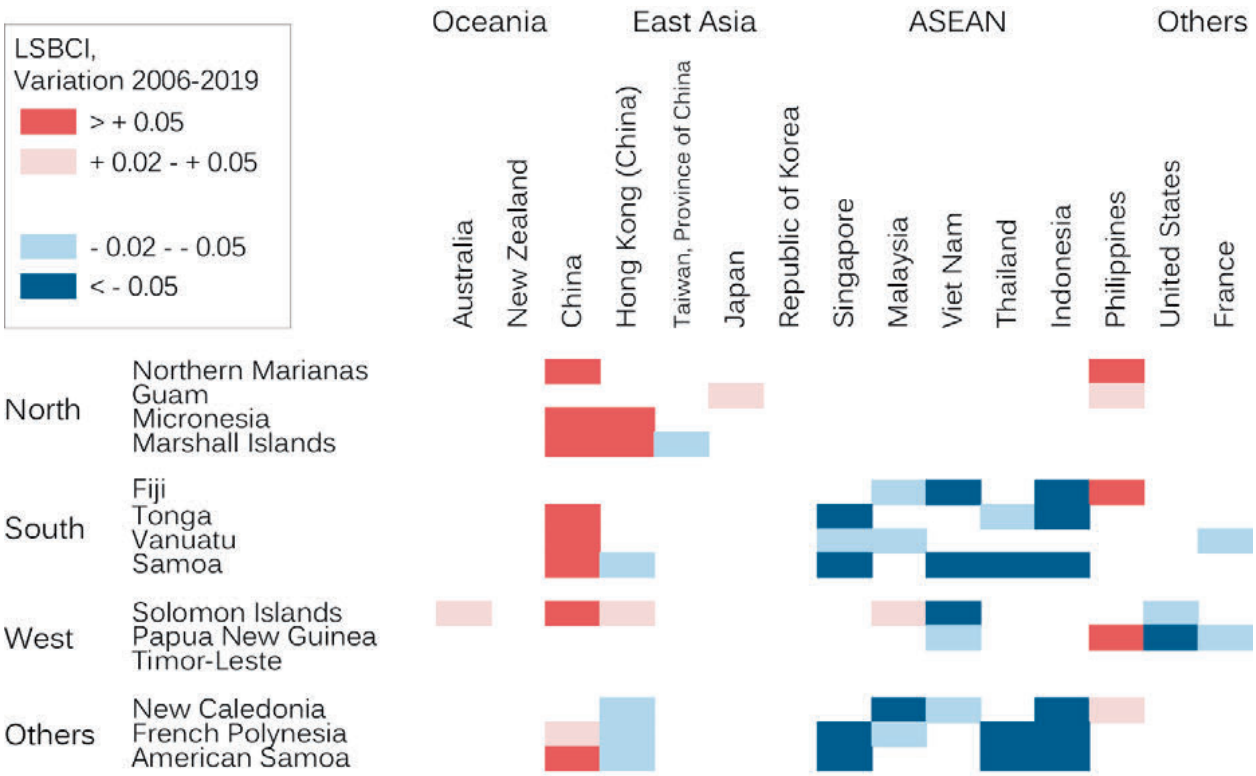
Excerpt from Arslanalp et al., 2021, p.16-17

Figure 32 shows the largest inter-regional connectivity shifts from 2016 to 2019. Main inter-regional connectivity improvements are mainly with China, and with the Philippines to a lesser extent. Few countries have gained connectivity with the Philippines, i.e. Papua New Guinea, Timor-Leste, Guam and New Caledonia.

The connectivity with ASEAN countries decreases for most of the Pacific SIDS in the South and the West and other territories in 2019 compared to 2016. There are little changes in the connectivity with other major partners (Oceania and East Asia). Hong Kong, China, gains connectivity with the north (the Marshall Islands and the Federated States of Micronesia) but loses connectivity with Samoa and other territories. Several countries from the West and the South lose connectivity with the United States and/or France (Papua New Guinea, Solomon Islands and Vanuatu). There is a significant deterioration of Samoa's connectivity with ASEAN countries and Hong-Kong (China). This may relate to limits in port infrastructure (see Box 2) although this hypothesis can only be confirmed after an in-depth analysis.

The stability of links with Australia and New Zealand, on one side, and Japan and Republic of Korea, on the other side, is remarkable, given the importance of these trade partners for the Pacific SIDS (see Figure 32). ASEAN countries (Singapore and Malaysia) only play equivalent roles for the West and Fiji.

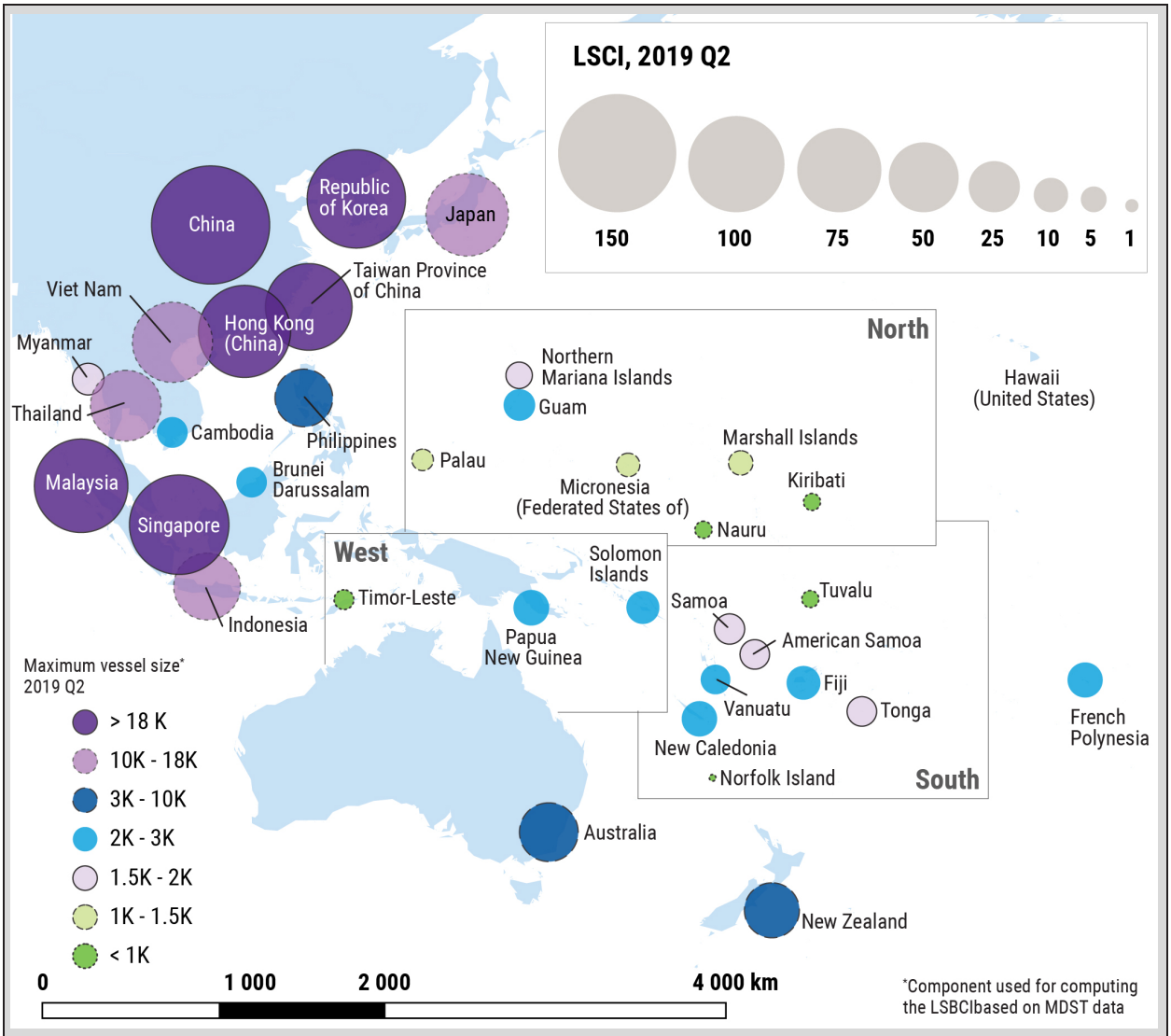
Figure 32: LSBCI of the Pacific SIDS. Inter-regional (Variation 2016-2019)



Box 2: Maximum vessel size as a proxy of port infrastructure limitations

The maximum vessel size is one of the components of the LSCI. It informs about the largest container vessel deployed in a country over a period. It provides a proxy for the port infrastructure limitations in the different countries under scrutiny. Figure 33 maps the ASEAN countries and Pacific SIDS according to their LSCIs (circle size) and maximum vessel sizes (colour). It highlights large disparities between and within both regions.

Figure 33: Maximum vessel size in ASEAN and in Pacific SIDS



Within ASEAN, Singapore and Malaysia, with the highest LSCIs in the region, accommodate the largest category of container vessels (> 18,000 TEUs) which are currently deployed on the routes between China and Northern Europe. Conversely, the largest container vessel deployed in Myanmar has a very limited capacity (less than 2,000 TEUs). Cambodia and Brunei Darussalam are in the category immediately above.
In contrast, the maximum vessel size is below 3,000 TEUs among Pacific SIDS.

As to the Pacific SIDS, there are important differences between Northern and Southern SIDS. In the latter, the largest vessels call at Papua New Guinea, Solomon Islands, Fiji and Vanuatu (in the category 2,000-3,000 TEUs). Samoa and Tonga are in the category immediately below. In the Northern part, countries such as Kiribati, Tuvalu, Nauru are only visited by very small containerships of less than 1,000 TEUs. Palau, Micronesia and Marshall Islands are on the category immediately above.

In some countries the maximum vessel size is small compared to neighbouring countries with similar LSCI scores. This is the case of Myanmar in the ASEAN and some Pacific SIDS (such as Samoa). In these countries, the infrastructure may be limiting improvements in connectivity. In Northern Pacific SIDS, ports rarely have container-handling equipment so the ships should bring their own gear.

2.3. Direct links between countries

The LSBCI reflects the overall quality of maritime links between countries. In general, a country pair with a high LSBCI tends to reflect a situation in which there is a direct connection between both. However, this is not always the case because components others than the number of transshipments, such vessel size, number of companies, services, etc. also play a role.

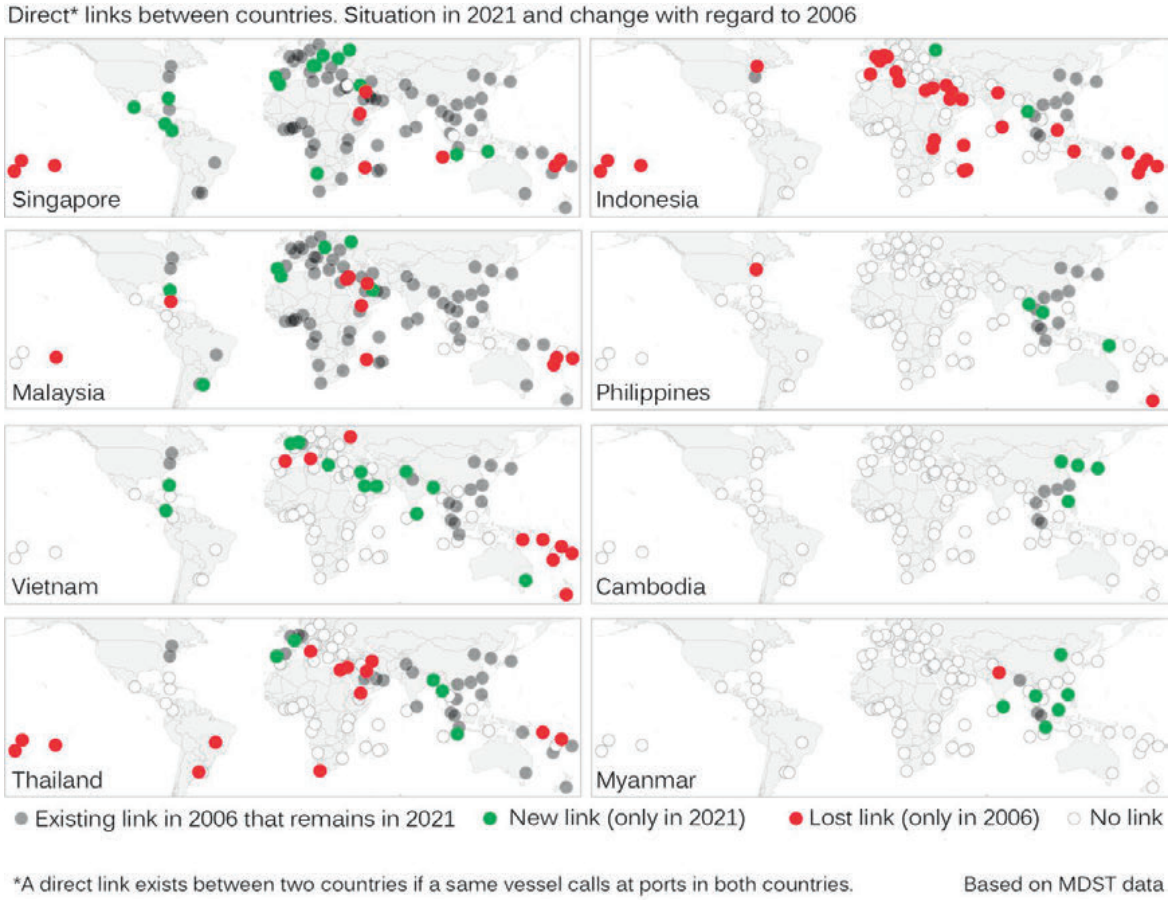
A direct link exists between two countries when a same vessel calls at ports of both countries. Therefore, it is virtually possible to move cargo from one country to another without transshipment. Trade tends to be more intense between countries which are directly connected. On the contrary, the lack of direct connections between a country pair often implies a reduction in trade, equivalent to an increase in the distance between the two countries of 2612 km (Fugazza and Hoffmann, 2017). In the past two decades, the size of container vessels has increased considerably, making more difficult for shipping lines to maintain direct services from/to the ports of small countries. In the latter the local demand does not always meet the minimum level required by maritime companies to operate large vessels efficiently. Therefore, these countries may be increasingly served via transshipment zones.

As such, analysing direct connections of a country and their change over time is particularly relevant to unveil its trade potential, and eventually its dependence over a limited number of partners. Furthermore, direct links also inform how direct is the access of countries to the maritime network.

2.3.1. ASEAN: direct connectivity

Amongst the ASEAN countries, those with higher numbers of direct connections globally are, by far, Singapore and Malaysia. Both are connected with about a hundred countries, located in several regions as shown by Figure 34, which illustrates connectivity links in 2021 and variations in comparison to 2016 levels. New links in 2021 include regions/sub-regions such us Africa and the East Coast of South America. Vietnam, Thailand and Indonesia have lower number of direct links, and are mostly concentrated on Asia-Pacific and Northern Hemisphere countries. In the cases of Philippines, Cambodia and Myanmar, most of their direct links are with countries in Asia.

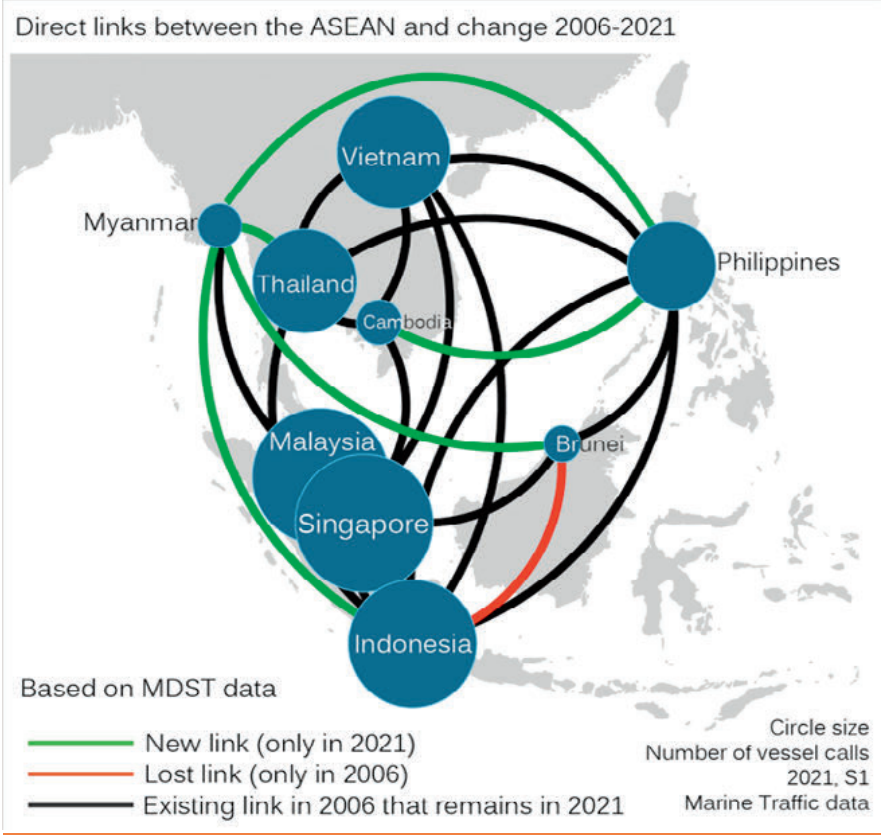
Figure 34: Direct links of selected ASEAN members



Between 2006 and 2021, the number of direct connections remains stable for Singapore and Malaysia. However, there are important changes. On one hand, new direct connections appear in 2021, mainly with European countries. On the other hand, direct connections are lost, particularly with the Pacific SIDS and other surrounding territories. In Vietnam and Thailand trends are similar, although the new connections are less concentrated on the sole European countries. Along the same period, Indonesia loses most of its direct links, not only with the Pacific SIDS but also with all the other partners except those in Asia, Australia and New Zealand. Philippines, Myanmar and Cambodia gain new direct connections within Asia, eventually losing links with other areas (such those with US and New Zealand for Philippines, or Myanmar with India).

Within ASEAN, most of the country pairs are directly connected, as shown by the Figure 35. Between 2006 and 2021 several new links were created mainly involving Myanmar with the Philippines, Thailand, Myanmar and Indonesia. while others disappeared (such as the direct link between Brunei Darussalam and Indonesia).

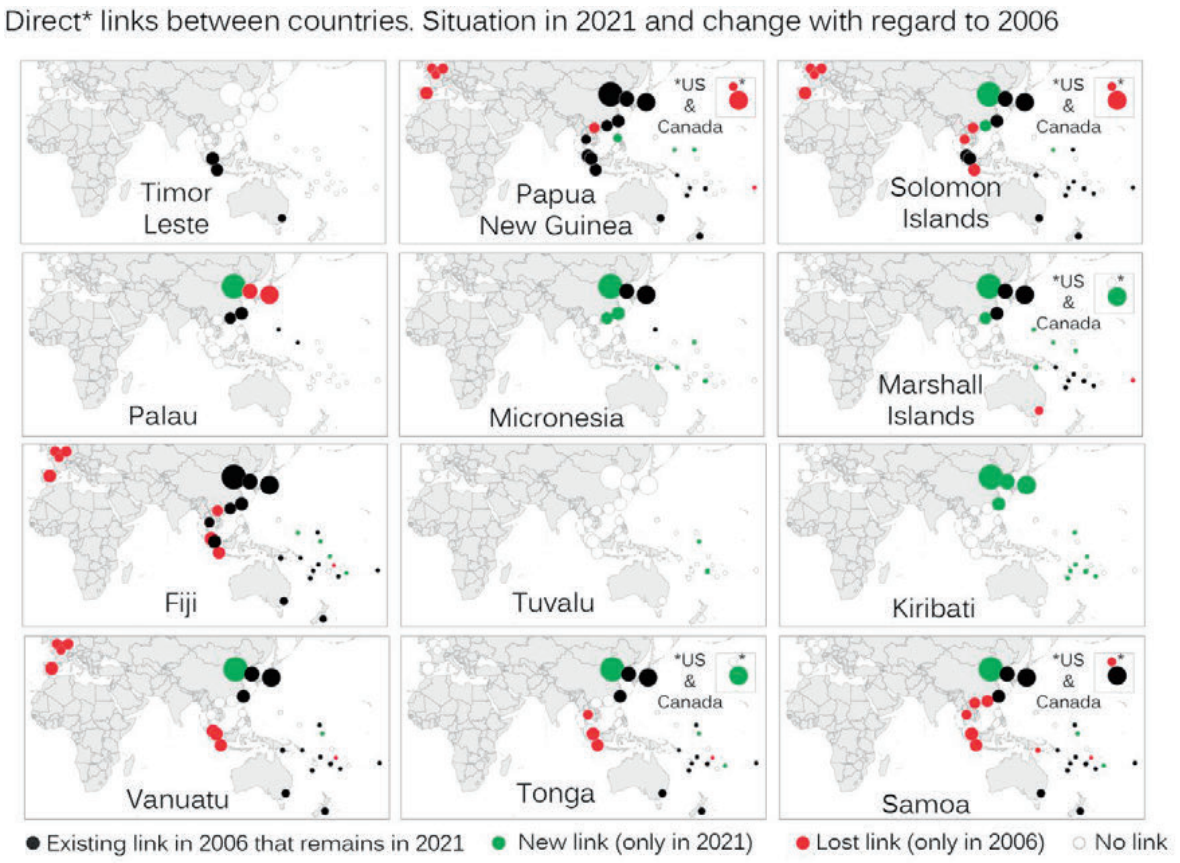
Figure 35: Direct links within ASEAN. Circle size reflects number of calls (2021 S1)



2.3.2. Pacific SIDS direct connectivity

Pacific SIDS only have connections with a limited number of partners, mainly within the Asia-Pacific region (figure 36). In 2021, the country with the largest number of direct connections was Fiji, with 23 direct connections, followed by Solomon Islands (19 connections), the Marshall Islands, Papua New Guinea, Samoa and Tonga (18 connections) and Vanuatu (16 connections). For the other countries, the number of direct connections varies between 2 (Tuvalu) and 12 (Kiribati and the Federated States of Micronesia). These connections are limited to the Asia-Pacific region, and are mostly with other small States and territories. Outside the Pacific, a handful of Asian countries have direct connections with these countries: China, Japan and the Republic of Korea. Comparatively, direct connections with ASEAN are less common in Pacific SIDS.

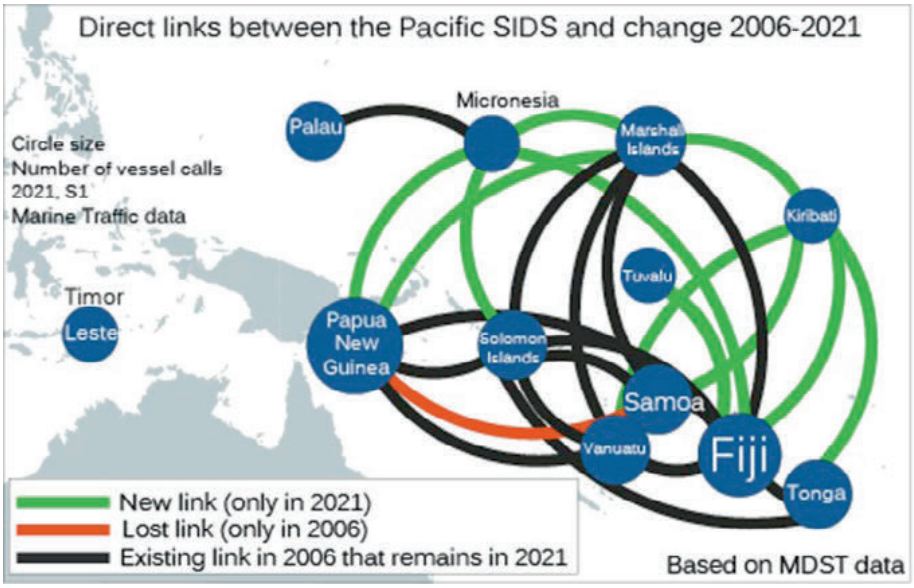
Figure 36: Direct links of selected Pacific SIDS. Circle size reflects number of calls (2021 S1)



Between 2006 and 2021, there have been important changes in the inter-regional connections of the Pacific SIDS. China has recently emerged the best-connected partner outside the region with new direct connections to 8 Pacific SIDS, on the top of the two existing ones (Fiji and Papua New Guinea). Beyond the connections with China, it is worthwhile noting that the countries gaining new direct links are mainly those in the North (Kiribati, Micronesia and the Marshall Islands). At the same time, the Pacific SIDS from the South and the West lost their direct connections with Europe (Fiji, Solomon Islands, Papua New Guinea, Vanuatu) and part of their connections with ASEAN (Samoa, Tonga, Vanuatu).

For many of the Pacific SIDS, most of the direct connections take place within the region. Between 2006 and 2021 the main improvements have taken place between the North, on one side, and the South and the West, on the other side, as illustrated by the green lines (new links in 2021) in Figure 37. Despite losing its direct links with Europe, Fiji seems to consolidate its position as one of the regional transshipment hubs, for the connections of the region with the outside.

Figure 37: Direct links between Pacific SIDS. Circle size reflects number of calls (2021 S1)



3. UNCTAD Port LSCI

The analyses of LSCI and LSBCI developed above provide insights on the evolution of maritime connectivity at countries level. They may hide different trends when a country has several container ports. To appreciate such differences, this section examines connectivity trends using the Port LSCI (PLSCI)[9], which reflects a ports' position in the global liner shipping network.

The Port LSCI is set at 100 for the highest value in the first quarter of 2006 (i.e. Hong Kong, China) and all other indices are in relation to this value. The PLSCI is generated for more than 900 container ports in the world. It is generated from 6 components: (i) the number of scheduled ship calls per week in the port; (ii) deployed annual capacity in TEU offered at the port; (iii) the number or regular liner shipping services from and to the port; (iv) the number of liner shipping companies that provide services from and to the port; (v) the average size in TEU of the ships deployed by the scheduled service with the largest average vessel size and (vi) the number of other ports that are connected to the port through direct[10] liner shipping services. The data on these components is provided by MDSTransmodal.

3.1. ASEAN Port LSCI ranking

The ports in the ASEAN are amongst the best connected in the world. Table 2 shows that three of them rank in the top-15 PLSCI ranking.

Table 2: Positions of ASEAN ports in the global PLSCI ranking, Q2 2020

Rank	Port	Country/territory	Region	Port LSCI
1	Shanghai	China	East Asia	135
2	Singapore	Singapore	ASEAN	124
3	Ningbo	China	East Asia	116
4	Pusan	Republic of Korea	East Asia	115

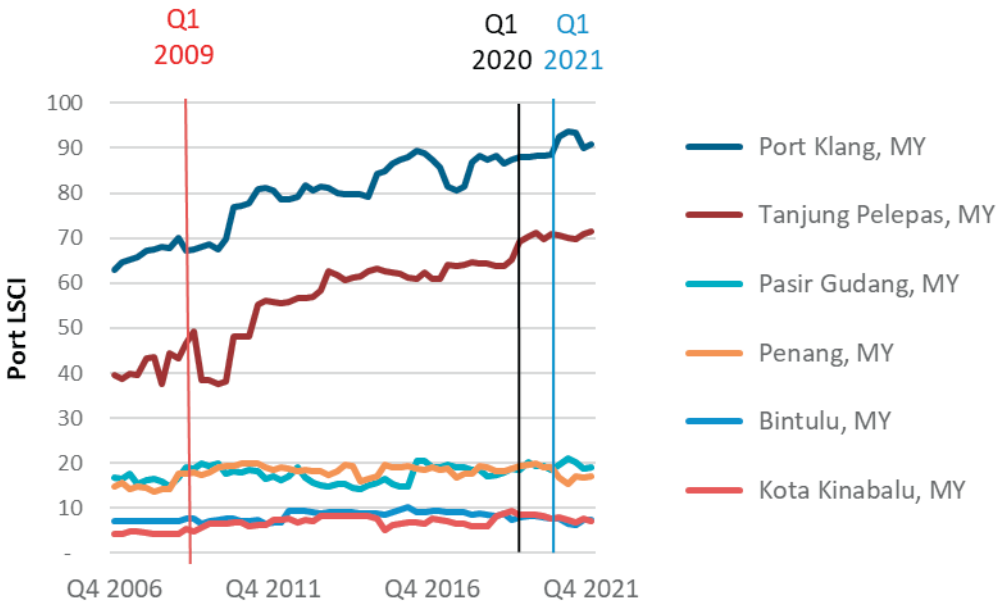
[9] The full dataset is accessible via http://stats.unctad.org/plsci

[10] A direct service is defined as a regular service between two ports; it may include other stops in between, but the transport of a container does not require transshipment.

5	Hong Kong	Hong Kong, China	East Asia	105
6	Qingdao	China	East Asia	92
7	Rotterdam	Netherlands	Europe	92
8	Antwerp	Belgium	Europe	90
9	Port Klang	Malaysia	ASEAN	87
10	Xiamen	China	East Asia	81
11	Shekou	China	East Asia	80
12	Xingang	China	East Asia	76
13	Yantian	China	East Asia	75
14	Nansha	China	East Asia	69
15	Tanjung Pelepas	Malaysia	ASEAN	65

In Malaysia, the hierarchy of ports is very clear with two transshipment[11] ports (Port Klang and Tanjung Pelepas), which have progressed steadily over the 2006-2019 period. (Figure 38). Port connectivity levels have slightly improved since the Covid-19 outbreak. The other top Malaysian ports are stagnating, in line with the slow pace of growth of the Malaysian economy. Since the Covid-19 outbreak, the trends of Penang and Pasir Gudang follow opposite trends.

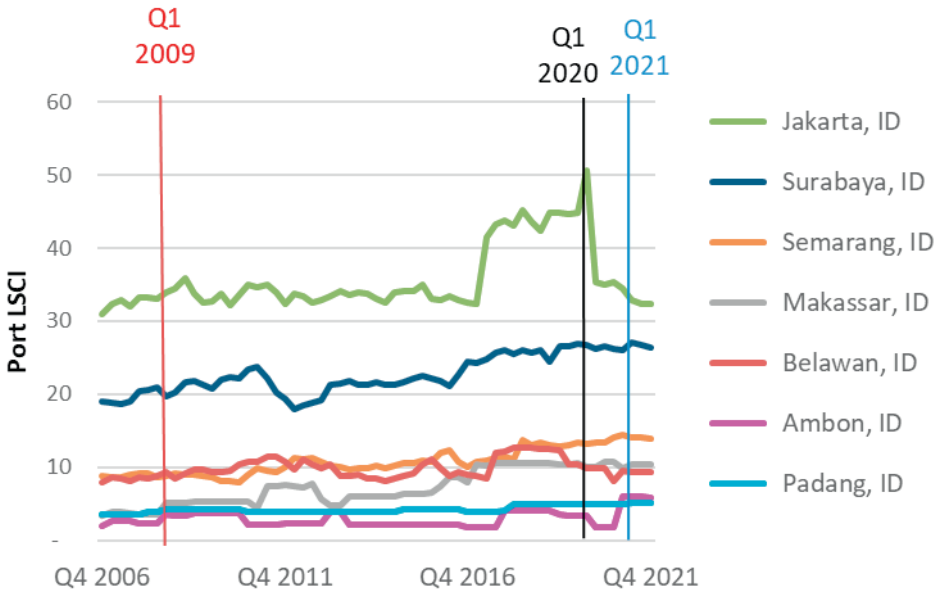
Figure 38: PLSCI of main ports in Malaysia, Q4 2006-Q4 2021



In Indonesia, there has been a considerable improvement of Jakarta port connectivity between 2016 and 2020, but its connectivity collapsed from early 2020 and follows a declining trend since then (Figure 39). At lower levels, the port of Semarang and Makassar also improved their LSCI until 2019, with port Semarang increasing further its connectivity afterwards whereas Makassar's connectivity stagnated.

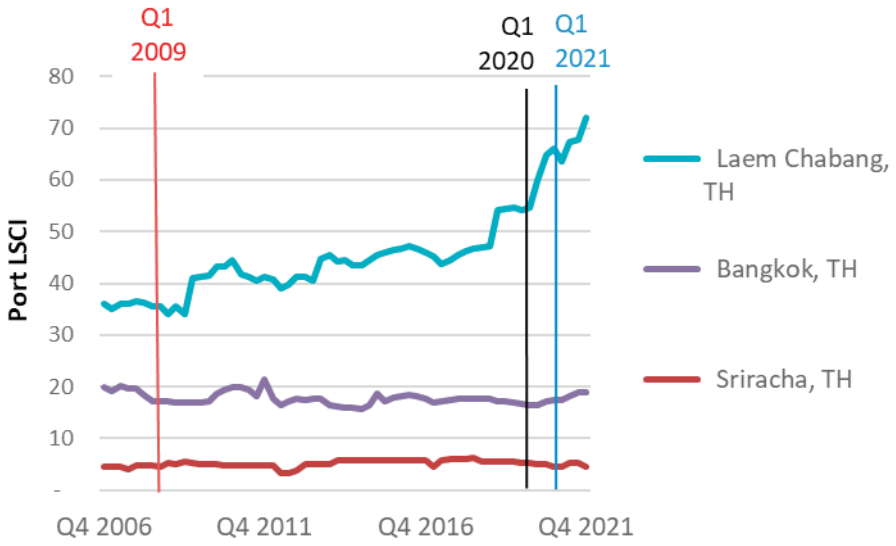
Figure 39: PLSCI of main ports in Indonesia, Q4 2006-Q4 2021

[11] More than two thirds of the throughput of Port Klang is transshipment (Drewry's, 2017)



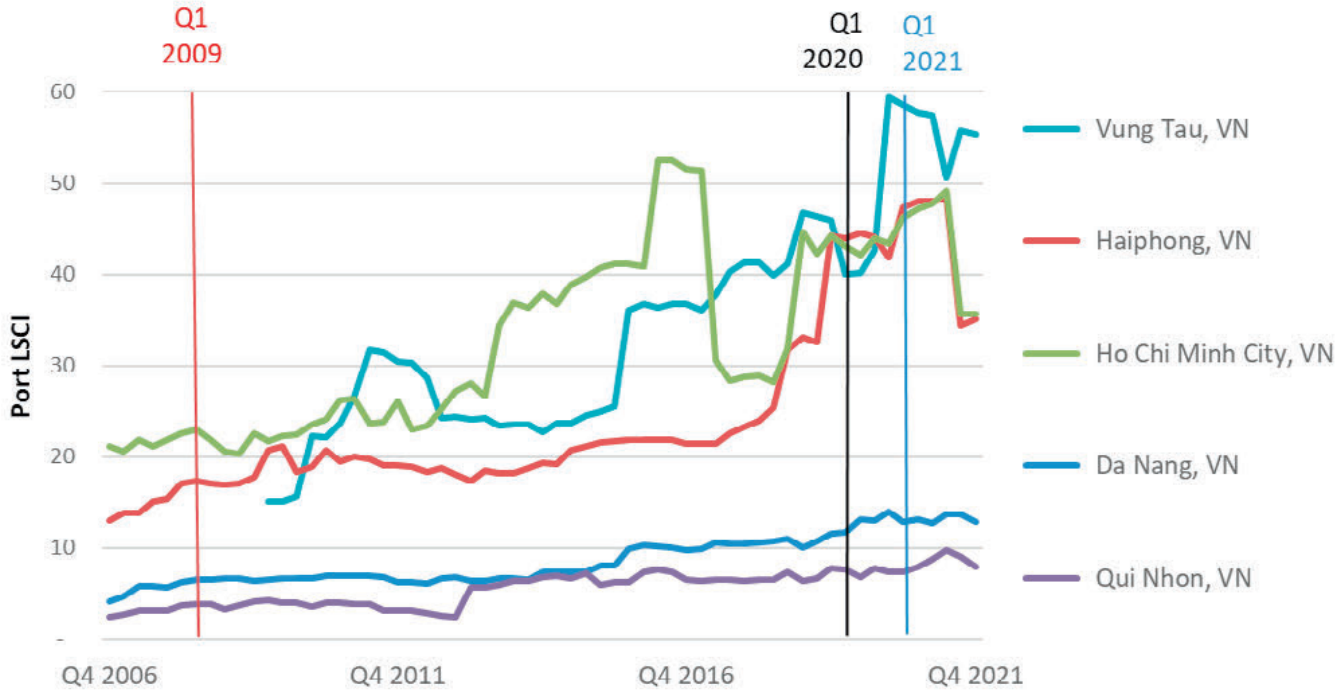
In Thailand, there is a concentration trend, with port of Laem Chabang greatly improving its position, mostly since 2017 (Figure 40). The other major port gateways, Bangkok and Sriracha, which competed with Laem Chabang for a largely common hinterland, stagnate all over the 2006-2021 period.

Figure 40: PLSCI of main ports in Thailand, Q4 2006-Q4 2021



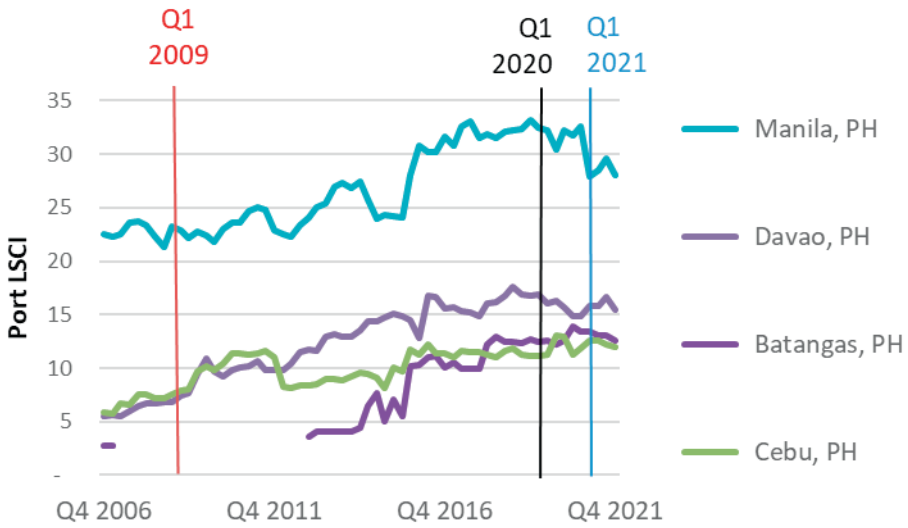
Contrarily to other ASEAN countries, in Vietnam there are three important gateway ports contributing to the high LSCI of the country (Figure 41). The three were at the same level at early 2020 but then diverged, with the progress of Vung Tau and the decline of Haiphong and Ho Chi Min City. Minor ports (Da Nang, Qui Nhnon) have increased steadily all over the period and stagnated since early 2020.

Figure 41: PLSCI of main ports in Vietnam, Q1 2006-Q4 2021



In the Philippines, the port of Manilla level of connectivity stands out. During the 2006-2021 period, the trends of all the major ports have been upward with variations (Figure 42). However, since 2021 the connectivity of Manilla declined, after stagnating for several years (2015-2020).

Figure 42: PLSCI of main ports in Philippines, Q4 2006-Q4 2021



3.2. Pacific SIDS Port LSCI ranking

Papua New Guinea, Fiji, Samoa, Solomon Islands and Samoa were home to the best 10 connected Pacific ports, in Q2 2022 and in Q1 2022 (Table 3), with port LSCIs ranging from 11.6 to 6.7. On the other hand, Tuvalu, Papua New Guinea, Micronesia, Palau and the Marshall Islands were home to the less 10 connected Pacific ports, in Q2 2022 and in Q1 2022. The following sections explore the evolution of

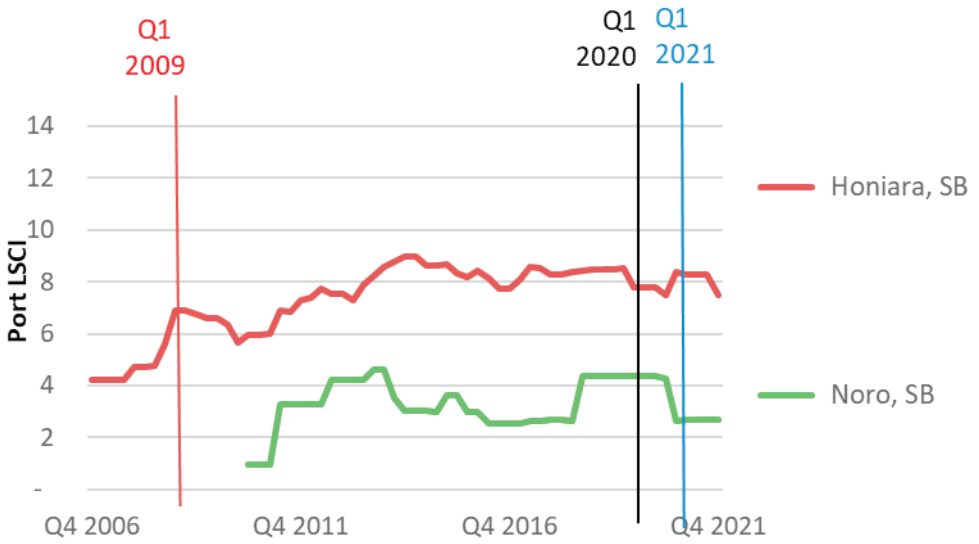
connectivity within selected Pacific countries to assess whether they follow a national trend or evolve differently within countries.

Table 3: Pacific SIDS best and less connected ports, Q2 2020 and Q1 2022

Pacific SIDS best-connected ports		Pacific SIDS less connected ports	
2020 Q2	2022 Q1	2020 Q2	2022 Q1
i. **Papua New Guinea, Lae** (11)	1. **Papua New Guinea, Lae** (11.6)	i. Papua New Guinea, Wewak (3.3)	1. Solomon Islands, Noro (2.7)
ii. **Fiji, Suva** (8.9)	2. **Fiji, Suva** (9.4)	ii. Timor-Leste, Dili (2.6)	2. **Marshall Islands, Kwajalein** (2)
iii. **Fiji, Lautoka** (8.8)	3. **Fiji, Lautoka** (9.3)	iii. **Marshall Islands, Kwajalein** (2.5)	3. **Micronesia (Federated States of), Truk** (2)
iv. **Solomon Islands, Honiara** (7.5)	4. **Papua New Guinea, Port Moresby** (9.1)	iv. **Micronesia (Federated States of), Yap** (2.1)	4. **Micronesia (Federated States of), Yap** (2)
v. Papua New Guinea, Port Moresby (7.5)	5. **Samoa, Apia** (7.6)	v. **Palau, Koror** (2.1))	5. **Palau, Koror** (2)
vi. **Samoa, Apia** (6.9)	6. **Solomon Islands, Honiara** (7.5)	vi. **Micronesia (Federated States of), Truk** (2)	6. Tonga, Vavau (1.8)
vii. Vanuatu, Port Vila (7)	7. American Samoa, Pago Pago (7.1)	vii. **Papua New Guinea, Alotau** (1.6)	7. **Papua New Guinea, Alotau** (1.6)
viii. Papua New Guinea, Lihir Is (6.7)	8. Tonga, Nukualofa (6.9)	viii. **Papua New Guinea, Buka** (1.6)	8. **Papua New Guinea, Buka** (1.6)
ix. **Papua New Guinea, Madang** (6.7)	9. **Papua New Guinea, Madang** (6.9)	ix. **Tuvalu, Port Funafuti** (1.6)	9. **Tuvalu, Port Funafuti** (1.4)
x. American Samoa, Pago Pago (6.7)	10. **Papua New Guinea, Rabaul** (6.7)	x. Nauru, Nauru (1.6)	10. Papua New Guinea, Oro Bay (1.1)

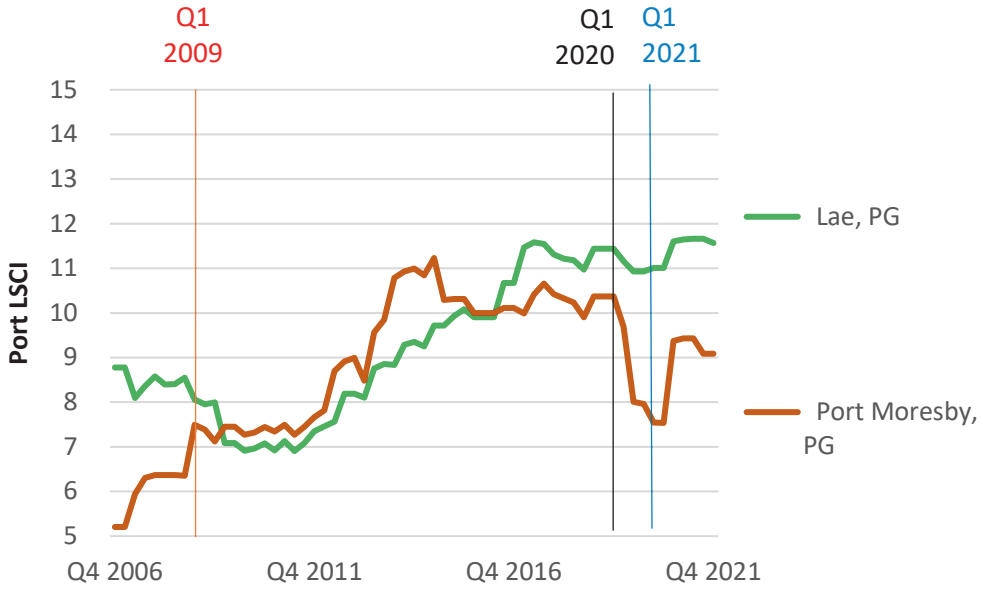
In the Solomon Islands (Figure 43), the port of Honiara is, by far, the most important, with a PLSCI around 8. It has almost doubled since 2006. The other container port of the country, Noro is more recent, and cannot achieve PLSCI beyond 5.

Figure 43: PLSCI of main ports in the Solomon Islands, Q4 2006-Q4 2021



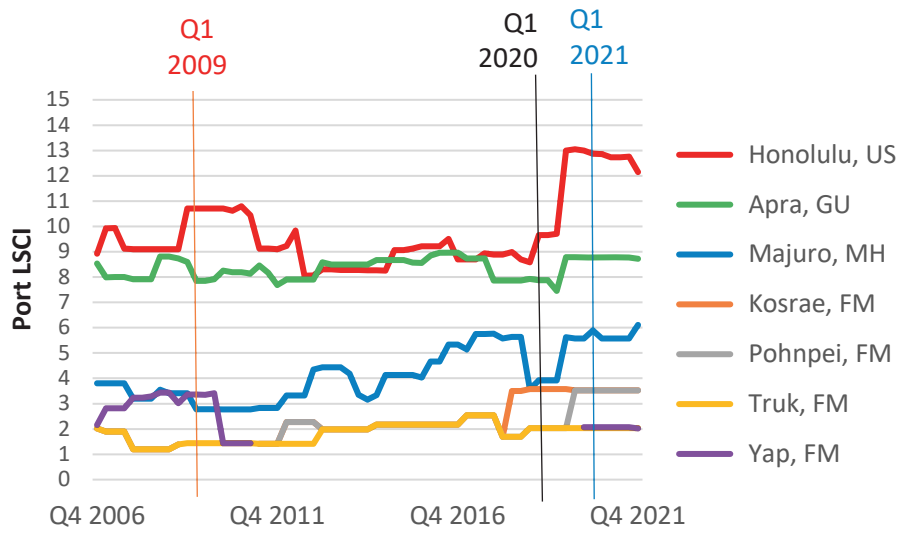
In Papua New Guinea, the ports of Lae and Port Moresby have considerably improved their connectivity levels during the 2006-2019 period although with ups and downs (Figure 44). The divergence of trends of both ports seems to have been accentuated since the Covid-19 outbreak. Since 2020, Lae scores around 12 while Port Moresby around 8.

Figure 44: PLSCI of main ports in Papua New Guinea, Q4 2006-Q4 2021



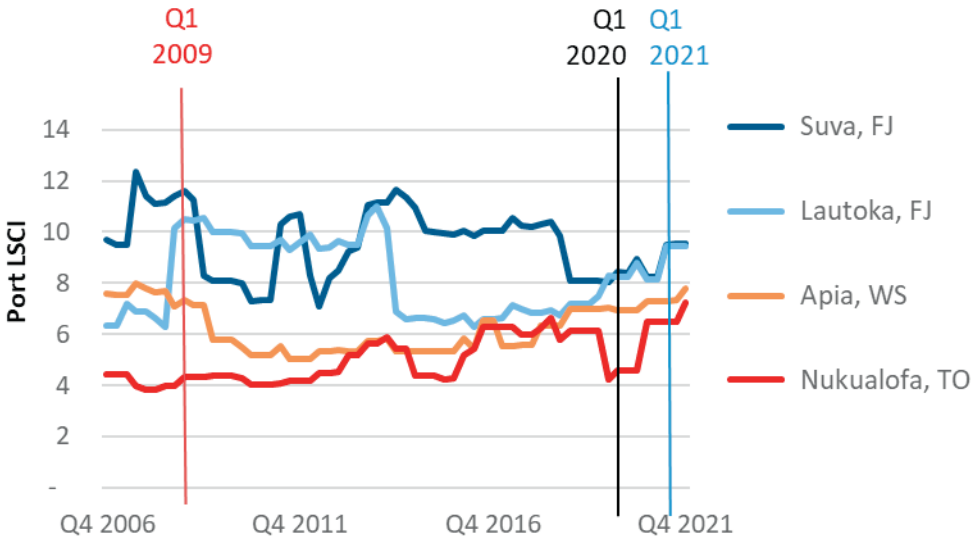
The ports in the Northern Pacific (Figure 45) score relatively low. Within the SIDS, the best performer is Majuro, with 6 in Q4 2021. The Micronesian ports, Kosrae, Pohnpei, Truk and Yap, score between 2 and 3.5. Yap has declined considerably during the 2006-2021 period. Apra and Honolulu play the role of transshipment hubs for ports of the subregion. The latter has outperformed since the Covid-19 outbreak in 2020.

Figure 45: PLSCI of main ports in the Northern Pacific, Q4 2006-Q4 2021



Ports in the South Pacific (Figure 46) have connectivity levels higher than the North Pacific but slightly lower than Lae (West). In Fiji, Suva (decline) and Lautoka (progress) converge to similar connectivity levels during the 2006-2019 period. Apia and Nukuoalofa stagnate.

Figure 46: PLSCI of main ports in Fiji, Samoa and Tonga, Q4 2006-Q4 2021



4. UNCTAD port call statistics

Port connectivity has been analysed through a synthetic indicator (the port LSCI), which does not inform on the respective contributions of different components used to compute it. To supplement this analysis at the port level, this section investigates how port calls and time spent by vessels at ports have evolved in the last four years using the UNCTAD port call and performance statistics. The UNCTAD port call

statistics[12] provide an overview of ships' characteristics and the time they spent in the country's ports during a certain period (either by semester or annually) and are based on data provided by MarineTraffic.

To benchmark container ship port call performance against other regional actors that are relevant from the perspective of connectivity dynamics, ASEAN figures are compared with those of selected East Asian countries and territories and Pacific SIDS are compared with those of other Pacific countries and territories.

4.1. ASEAN: port calls, turnaround time and vessels size deployment

In ASEAN, Singapore, Malaysia and Indonesia are the countries attracting the highest number of container ships port calls. During the first semester (S1) of 2019 they received respectively 8 255, 8 060 and 6 903 vessel calls (Table 4, column 3). Just below them Vietnam, Thailand and the Philippines, handled 4 986, 4 034 and 2 592 of such port calls. The progress of ASEAN countries is even more marked when compared with trends observed in East Asian countries and territories, as many of them stagnated or declined during the 2018–2021 period.

The trend between 2018 and 2021 for ASEAN is overall positive (Table 4, arrows in column 8). Only Singapore and Malaysia slightly decline or stagnate. When looking at year-to-year changes (Table 4, arrows in columns 2, 4 and 6), countries have not followed stable trends. Most of them have lost calls during the first semester 2020 (red arrows in column 4), eventually catching up in the first semester 2021 (green arrows in column 6). The smallest maritime nations, Myanmar and Brunei Darussalam show the opposite trend, increasing their calls during the first period of Covid-19, i.e. 2020 S1 (see green arrows in column 4) and losing part of them afterwards in 2021 S1 (see red arrows in column 6). The progress of ASEAN countries is even more marked when compared to trends observed in East Asian economies, as many of them stagnated or declined during the 2018-2021 period.

Table 4: Number of container ship port calls in ASEAN and in selected East Asian countries and territories, annual change and evolution (S1, 2018–2021)

[12] Four port call datasets are accessible via the following links:

- Number of port calls, annual: http://stats.unctad.org/portcalls_number_a
- Number of port calls, semi-annual: http://stats.unctad.org/portcalls_number_sa
- Port call performance (Time spent in ports, vessel age & size), annual: http://stats.unctad.org/portcalls_detail_a
- Port call performance (Time spent in ports, vessel age & size), semi-annual: http://stats.unctad.org/portcalls_detail_sa

	2018 S1	Δ	2019 S1	Δ	2020 S1	Δ	2021 S1	Δ* 2018-2021
ASEAN								
Singapore	8 679	↓	8 255	↓	7 494	↓	7 021	↓
Malaysia	7 347	↑	8 060	↓	7 800	↓	7 552	→
Indonesia	6 608	↑	6 903	↑	7 303	↑	7 705	↑
Viet Nam	1 926	↑	4 986	↓	4 462	↑	5 843	↑
Thailand	4 005	→	4 034	→	4 063	↑	4 356	↑
Philippines	1 791	↑	2 592	↓	2 332	↑	2 906	↑
Cambodia	193	↑	260	↓	239	↑	305	↑
Myanmar	174	↑	225	↑	527	↓	276	↑
Brunei Darussalam	101	↓	85	↑	126	↓	107	↑
East Asia								
China	36 339	↓	34 063	↑	35 750	→	36 398	→
Hong Kong, China	6 386	→	6 210	↓	5 913	→	5 756	↓
Taiwan Province of China	7 689	↑	8 195	→	8 273	↓	7 798	→
Korea, Republic of	10 618	↑	11 874	↓	10 943	↓	10 486	→
Japan	18 858	→	18 810	→	19 174	↓	18 108	↓

Port call performance statistics also provide other interesting insights. For instance, the median vessel turnaround time at ports can be considered a proxy of port performance[13]. Table 5 (column 3) shows that within ASEAN, the median time of containerships at ports (first semester of 2019 data) is overall short for most countries, about one day or less. Notwithstanding, median turnaround times were exceptionally high in in Myanmar during 2019 S1 (2.21 days). Singapore, Malaysia and Brunei Darussalam were the only ASEAN members where this indicator increased between in 2021, compared to 2018 (Table 5, last column).

To benchmark these figures against other regional actors that are relevant from the trade and port dynamics perspectives, in other East Asian countries, the turnaround times remain moderate, around 1 day or less, but have increased between 2018 and 2021. Only Japan maintained its performance. It is worthwhile noting that turnaround times have worsened in many of ASEAN and East Asian countries between 2020 and 2021, as shown in Table 5. This deterioration in performance may have resulted from the congestion suffered by many large ports in the recent period.

Table 5: Evolution of container ships' median time in port (days) in ASEAN and selected East Asian countries and territories (S1, 2018–2021)

[13] It provides an estimation of the overall time in port, measuring the difference between the time a vessel enters a port's limits and the time it leaves those limits. However, it does not distinguish between waiting time, berth time and working and idle time

	2018 S1	Δ	2019 S1	Δ	2020 S1	Δ	2021 S1	Δ* 18-21
ASEAN								
Singapore	0.75	→	0.75	→	0.76	↑	1.00	↑
Malaysia	0.76	→	0.76	→	0.73	↑	0.95	↑
Indonesia	1.06	→	1.06	↓	0.98	↑	1.05	→
Viet Nam	0.84	↑	1.03	↓	0.92	↓	0.84	→
Thailand	0.81	↓	0.68	↑	0.80	↓	0.72	↓
Philippines	0.79	↑	0.92	↑	0.95	→	0.93	↑
Cambodia	1.29	↓	0.96	↓	0.68	↓	0.64	↓
Myanmar	2.75	↓	2.21	↓	1.98	→	2.01	↓
Brunei Darussalam	0.49	↑	0.63	↓	0.55	↓	0.53	↑
East Asia								
China	0.60	→	0.61	→	0.60	↑	0.68	↑
Hong Kong, China	0.53	→	0.54	↓	0.51	↑	0.58	↑
Taiwan Province of China	0.47	↓	0.44	→	0.43	↑	0.53	↑
Korea, Republic of	0.57	→	0.57	↑	0.62	↑	0.90	↑
Japan	0.35	→	0.35	↓	0.34	↑	0.36	→

To understand how containerships' deployment patterns may change from one country to another, it is useful to examine the characteristics of the vessels calling at these countries, such as the average container carrying capacity and the maximum carrying capacity.

Average vessel sizes vary significantly across ASEAN countries. Singapore and Malaysia handle the largest vessels, with an average vessel size of 4,917 and 3,823 TEUs, respectively (table 6). In the other countries, the average size is at least two times smaller, ranging from 1,311 TEUs, in Myanmar, to 2,115 TEUs, in Thailand. Between 2018 and 2021, the average vessel size only decreased in Cambodia and Indonesia. In East Asian countries, the average vessel size decreased in China and Japan.

In terms of maximum vessel capacity, the differences between ASEAN countries are even wider. Table 6 shows that at one end of the spectrum, Singapore and Malaysia attract the vessels of 21 413 TEUs. At the other end, the three smallest maritime economies (Myanmar, Cambodia and Brunei Darussalam) accommodate much smaller vessels, whose maximum capacity is between 2 034 and 2 806 TEUs. Between both extremes, largest vessels calling at the Philippines, Indonesia, Thailand and Viet Nam have capacities between 6 800 and 16 000 TEUs. Between 2018 and 2021, the maximum carrying capacity increased in most of the ASEAN countries and all East Asian ones. It only decreased in Indonesia and Philippines.

It is worth noting that two of the three countries (Singapore and Malaysia) in which the median turnaround time has increased between 2018 and 2021 are also those handling the largest container vessels. Accommodating those vessels require important resources such cranes, workforce and yard surface. The increase of maximum vessel size in these two countries is therefore particularly challenging. Furthermore, given the high proportion of transshipment in the throughput of these two countries, they

seem particularly vulnerable to deterioration in port performance, as lines can easily switch to ports in other countries.

Table 6: Container ship port calls in ASEAN and in selected East Asian countries and territories: Characteristics (S1, 2019) and change (S1, 2018–2021)[14]

	Average container carrying capacity, TEU per container ship (2019 S1)	Δ 18 21	Maximum container carrying capacity of container ships, TEU (2019 S1)	Δ 18 21
ASEAN				
Singapore	4 917	↑	21 413	↑
Malaysia	3 823	→	21 413	↑
Indonesia	1 485	↓	11 356	↓
Viet Nam	1 755	↑	16 000	↑
Thailand	2 115	→	14 220	↑
Philippines	1 773	→	6 800	↓
Cambodia	1 444	↓	2 339	→
Myanmar	1 311	↑	2 034	↑
Brunei Darussalam	1 553	↑	2 806	↑
East Asia				
China	4 681	↓	21 413	↑
Hong Kong, China	3 737	↓	20 776	↑
Taiwan Province of China	2 765	→	20 388	↑
Korea, Republic of	2 840	↑	23 000	↑
Japan	1 695	↓	20 150	↑

4.2. Pacific SIDS: port calls, turnaround time and vessels size deployment

One of the main challenges for ensuring maritime connectivity in the Pacific SIDS is to maintain frequent vessel connections. Vessel calls can be considered as a proxy of the frequency of vessels serving these countries. As compared to ASEAN countries, the Pacific SIDS attract very few container ships port calls (see Table 7).

However, there are important intra-regional differences. Papua New Guinea and Fiji are the only countries reaching levels of vessel calls of 392 and 165 (average for S1 during the 2018-2021 period). At the other end, Kiribati only received 21 containership port calls during the first six months of 2019, which means less than a vessel per week over this period. The other Pacific SIDS have similar numbers of calls, ranging between 38 and 48 for the same semester.

In the 2018-2021 period the number of calls has decreased in most Pacific SIDS, and has only improved in Papua New Guinea, Solomon Islands and the Marshall Islands. In the other Pacific territories, the numbers

[14] The horizontal yellow arrows represent values between -3% and +3%.

of calls are also generally low and have declined during the 2018-2021 period. Only Australia and New Zealand attract large numbers of calls, reaching similar levels to those of the Philippines in the ASEAN.

Table 7: Number of container ship port calls in Pacific SIDS and in other Pacific countries and territories, annual change and evolution (S1, 2018–2021)

	2018 S1	Δ	2019 S1	Δ	2020 S1	Δ	2021 S1	Δ* 18-21
Pacific SIDS								
Papua New Guinea	323	↑	366	↑	440	→	439	↑
Fiji	193	↓	169	↓	152	→	152	↓
Solomon Islands	36	↑	38	↑	49	↓	43	↑
Samoa	47	↓	45	↓	39	→	40	↓
Vanuatu	44	↓	42	↓	37	↓	31	↓
Tonga	32	↑	39	↓	27	↑	30	↓
Marshall Islands	19	↑	48	↓	24	↓	22	↑
Kiribati	20	↑	21	↓	14	→	14	↓
Other Pacific countries and territories								
American Samoa	44	↓	41	↓	34	↑	39	↓
French Polynesia	52	→	51	↓	47	↓	38	↓
New Caledonia	152	↓	136	↑	150	↓	109	↓
Guam	65	↑	75	↓	67	↓	56	↓
Australia	2 169	↑	2 267	↓	1 884	→	1 836	↓
New Zealand	1 594	→	1 582	↓	1 394	↓	1 092	↓

The vessel turnaround time is overall low, with most of countries scoring median values around 1 day (Table 8, col. 3). The shortest average median time in ports is recorded in the ports of Micronesia (0.41 days, in S1 2018) and Tonga (0.55 in S1 2019, 0.54 in S1 2020 and 0.56 in S1 2021). This is due to the low number of calls, given that countries that have very few port calls only receive ships with a few containers to be loaded and unloaded, so there is little congestion (UNCTAD 2021). The longest in Kiribati (2.44 days in S1 2021).

Between 2018 and 2021 the vessel turnaround times have increased in most of the Pacific SIDS. Amongst the countries with large numbers of vessel calls, Papua New Guinea improved its performance whereas Fiji declined. In a regional context where most countries have decreased performance, Papua New Guinea Tonga and the Marshall Islands are exceptions. However, given the few services on which the measure is based, values can change considerably from one period to another, as shown in Table 8.

Table 8: Evolution of container ships' median time in port (days) in Pacific SIDS and in other Pacific countries and territories (S1, 2018–2021)

	2018 S1	Δ	2019 S1	Δ	2020 S1	Δ	2021 S1	Δ* 18-21
Pacific SIDS								
Papua New Guinea	1.55	↓	1.35	↓	1.21	→	1.21	↓
Fiji	0.93	↑	1.02	↓	0.98	↑	1.09	↑
Solomon Islands	1.02	↑	1.06	↑	1.14	↓	1.07	↑
Samoa	0.63	↑	0.75	↑	0.86	↑	1.08	↑
Vanuatu	0.89	→	0.91	↑	1.02	↓	0.97	↑
Tonga	0.64	↓	0.55	↓	0.54	↑	0.56	↓
Marshall Islands	1.13	↓	0.98	→	0.98	↑	1.07	↓
Kiribati	1.07	↑	1.58	↓	1.28	↑	2.44	↑
Other Pacific countries and territories								
American Samoa	0.99	↓	0.96	↑	0.99	↑	1.12	↑
French Polynesia	0.62	↑	0.66	→	0.66	↑	0.69	↑
New Caledonia	0.75	↓	0.54	↑	0.61	↓	0.58	↓
Guam	0.95	→	0.96	↓	0.91	↑	1.00	↑
Australia	1.19	↓	1.12	↑	1.31	↑	1.46	↑
New Zealand	0.75	↓	0.54	↑	0.61	↓	0.58	↓

The average size of containerships deployed vary significantly across Pacific SIDS (Table 9), with values ranging between 1 510 in the Solomon Islands (S1 2019), and 1 019 in Kiribati (S1 2020). Between 2018 and 2021 the average container carrying capacity increased in Papua New Guinea, Samoa and the Marshall Islands. It decreased in Fiji and Vanuatu.

The maximum vessel size deployed shows similar trends to those observed for the average size (Table 9). It is worthwhile noting that Papua New Guinea accommodates substantially larger vessels (2 732 TEUs) compared to other Pacific SIDS (such as between 1 170 TEUs, in the case of Micronesia and 1 617 TEUs in the case of Kiribati). Another interesting point is that between 2018 and 2021 the maximum vessel size only increased in Papua Guinea and the Solomon Islands, as it did also in most of the other, non-SIDS, Pacific territories.

Table 9: Container ship port calls in Pacific SIDS and in other Pacific countries and territories: Characteristics (S1, 2019) and change (S1, 2018–2021)

	Average container carrying capacity, TEU per container ship (2019 S1)	Δ 18 21	Maximum container carrying capacity of container ships, TEU (2019 S1)	Δ 18 21
Pacific SIDS				
Papua New Guinea	1 349		2 732	
Fiji	1 366		2 082	
Solomon Islands	1 510		2 082	
Samoa	1 244		1 740	
Vanuatu	1 240		1 740	
Tonga	1 236		1 740	
Marshall Islands	1 036		1 740	
Kiribati	1 386		1 617	
Other Pacific countries and territories				
American Samoa	1 227		1 740	
French Polynesia	2 163		4 253	
New Caledonia	1 630		2 824	
Guam	1 782		3 027	
Australia	4 465		8 500	
New Zealand	3 329		9 971	

5. Conclusions and next steps

ASEAN and Pacific SIDS are at the opposite ends of the connectivity spectrum in terms of maritime connectivity. Given their central position along key major trade routes ASEAN countries are better connected. Within this subregion, there is a clear three-level hierarchy of countries, with Singapore and Malaysia among the top 10 best connected countries, leveraging their strategic position along the Malacca strait and as important transhipment hubs connecting South Asia and East Asia. An intermediate category of countries among the global top 50 (Vietnam, Thailand, Philippines and Indonesia) have seen significant changes in their connectivity levels since 2006. Brunei Darussalam, Cambodia and Myanmar feature among ASEAN least connected countries.

In contrast, connectivity levels are low among Pacific SIDS. Papua, Fiji and Solomon Islands are the best connected within this group, due to their larger market size, which makes them more attractive to for maritime companies, which eventually use them as transhipment bases. Only some Pacific SIDS are served by North-South routes linking Australia and New Zealand with East Asia and North America, with two regional hubs: Guam in the Northern part and Fiji in the Southern part. Although, connectivity appears to have slightly increased (comparing 2021 and 2006 levels), it has stagnated or declined since the 2013-2014 period.

A look on the evolution of underlying components underpinning the LSCI since 2006 shows the increased importance of deployment of larger vessels (and derived increase of quarterly scheduled capacity) as a

driving factor behind connectivity improvements in most ASEAN countries. In parallel, most countries have seen a decline in number of operators and a reconfiguration of countries directly connected.

In the case of Pacific countries, trends are less clear. During the 2006-2021 period, some Pacific SIDS have not been served directly by shipping lines, others witnessed significant fluctuations in different components. Some countries have seen marginal increases in connectivity associated with deployment of larger vessel and increased scheduled capacity. Others have seen a contraction in scheduled capacity and fewer services.

The analysis of the bilateral LSCI during 2006-2021 for Pacific SIDS shows that links between the same subregion (i.e. within the North, within South and within West Pacific SIDS) are better than those between these subregions. Fiji is emerging as transhipment basis for the South Pacific. More than two thirds of the trade of Pacific SIDS take place with partners from other regions, notably with Australia, New Zealand, China and Korea, which are key partners and displaying stable connectivity links. China has emerged as the best-connected partner outside the region. Only North Pacific SIDS show an improvement in connectivity links with ASEAN. In the case of ASEAN countries, some countries display new connections in 2021 with European countries, while others have new direct connections with East Asia.

The analysis of the Port LSCI suggest that different ports within a country do not follow a national connectivity trend but often evolve differently. Three of the ASEAN ports feature prominently in the top PLSCI ranking. For many ports in the ASEAN and in Pacific SIDS, the COVID-19 pandemic entailed changes in connectivity trends. Ports such as Port Klang and Tanjung Pelepas (Malaysia) or Laem Chabang (Thailand) saw improvements in connectivity levels. In other cases, such as Jakarta (Indonesia) has seen declining connectivity since early 2020 whereas COVID-19 has accentuated divergent trends between ports in one country (like in the case of three main ports in Vietnam or between port Lae and Moresby in Papua New Guinea).

Port call performance statistics also provide interesting insights regarding containership deployment patterns. For instance, the different connectivity indexes inform about scheduled calls whereas the port calls statistics inform about effective port calls. The median time at ports can provide an indication of port performance, which is a dimension that can be leveraged, through policy interventions, to enhance attractiveness as a port of call, and therefore may contribute to improve connectivity. Finally, the average container capacity and maximum container carrying capacity have important linkages with the deployment of larger vessels (and derived increase of quarterly scheduled capacity), an important driver of connectivity improvements.

Although ASEAN port calls increased in 2021 compared to levels recorded in 2018, the period 2018-2021 conceals differences in year-to-year changes among ASEAN countries. Most countries lost calls during the first semester of 2020, catching up in the first semester of 2021 whereas the smallest maritime nations followed the opposite trend.

Median time in ports is overall short in ASEAN, although Myanmar and Indonesia show higher turnaround times for the 2018-2021 period. The median turnaround time has increased between 2018 and 2021 for Singapore, Malaysia, the Philippines and Brunei Darussalam. In the case of Singapore and Malaysia this coincides with the fact that these countries handle large container vessels. During the 2018-2021 period, turnaround time has remained stable for Indonesia and Vietnam and decreased for Cambodia, Myanmar and Thailand.

Average vessel sizes vary significantly across ASEAN countries ranging between 4 917 TEU (Singapore) and 1 311 TEU (Myanmar). Differences across ASEAN countries are even wider in terms of maximum vessel capacity with, at the two extremes, Singapore and Malaysia accommodating 21 413 TEU vessels and Myanmar, 2 034 TEU vessels. Between 2018 and 2021, the maximum carrying capacity has increased in most of the ASEAN countries (except for Indonesia and the Philippines).

Maintaining frequent vessel connections is an important challenge for Pacific SIDS. Low levels of cargo and trade imbalances lead to inability to capitalize on economies and scale, with consequent impacts on high transport costs. Pacific SIDS attracting the highest number of port calls include Papua New Guinea and Fiji. At the other end, Micronesia and Kiribati witnessed the lowest number of container ships port calls in 2018-2021. During this period, the number of containership port calls decrease for most Pacific SIDS, except for Papua New Guinea, Solomon Islands and the Marshall Islands.

Between 2018 and 2021, the median time of containerships in most Pacific SIDS ports increased. The average size of ships and maximum vessel size vary significantly across Pacific SIDS. During this period the average carrying capacity increased in Papua New Guinea, Samoa and the Marshall Islands, it decreased in Fiji and Vanuatu and the maximum vessel size increased in Papua New Guinea and the Solomon Islands.

In this study, we have analysed several connectivity indexes and port call data to understand regional and subregional rankings and dynamics. However, to have a more complete understanding of the reason(s) why a given country (or port) is well or less connected, and more importantly how its connectivity can be improved compared to the connectivity of neighbouring (and competitive) countries (or ports) it is important to look at a range of issues at the country level.

Factors influencing maritime connectivity, or in other words the decision of shipping companies to deploy containership in certain routes, are manyfold. These include, for instance, volumes of cargo and trade imbalances; the structure and level of competition within the maritime industry (including vertical integration between terminals and shipping lines, which affects the choices made by the shipping lines in serving or not a given country/port); port productivity and competitiveness (i.e. port fees and infrastructure); transport facilitation (ease to conduct processes and operations underpinning cargo movements) and remoteness (UNCTAD 2015 and UNCTAD 2017).

This more detailed and in-depth analysis will be conducted in the second stage of this project, which foresees data gathering and analysis, at the national level in 3 countries, coupled with related discussions, in the format of workshops, with local stakeholders. This second stage could analyse aspects such as the quality of the infrastructure (both at the port as well as at the inland level), shipping lines' operation of port terminals and investments (or intentions to invest) in port facilities, as well as port efficiency and hinterland connections. In this analysis, due consideration will be given to the fact that some of these aspects may be more relevant for the ASEAN countries than for the Pacific SIDs countries as they generally account for a greater proportion of global trade, and therefore, are generally strategically more attractive for shipping lines.

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