International Transport Forum

The Impact of Mega-Ships

The Case of Jakarta

Case-Specific Policy Analysis

OECD

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The International Transport Forum

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Case-Specific Policy Analysis Reports

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Executive summary

What we did

This study assesses the conditions for the port of Jakarta in Indonsesia to attract very large containerships. It was carried out as part of a programme on the impact of mega-ships at the International Transport Forum (ITF) at the Organisation for Economic Co-operation and Development (OECD). This report benefits from a study visit to Jakarta and a series of interviews conducted with stakeholders.

What we found

Jakarta's port, Tanjung Priok, is the uncontested gateway to Indonesia. It serves the mega-city of Jakarta with more than 10 million inhabitants, but is also a regional hub for all of Indonesia. With a volume of 5.5 million TEUs handled in 2016, Tanjung Priok is the world's 27th-largest container port. The volume of containerised cargo volume grew 130% overall between 2000 and 2017 but declined in 2013, 2014 and 2015, rebounding 6% in 2016.

The performance of Tanjung Priok has been mixed. Its ship turnaround time is longer than those of its competitors in Southeast Asia, even if individual terminals achieve good berth productivity, for instance Jakarta International Container Terminals. Maritime connectivity of Jakarta is poor and hinterland connectivity is problematic. Significant progress has been made in reducing container dwell time, which can no longer be considered a major bottleneck.

The port of Tanjung Priok has undergone structural change during the past 15 years. In the early 2000s, the port was on the schedule of numerous Far East-Europe services and served as a transhipment hub for the region. As draught was restricted to 14 metres, it became more and more difficult for the port to keep its position on the major trades as container ship sizes increased rapidly. In early 2015, Tanjung Priok was neither connected directly to Europe, nor to the Americas. In 2017, the shipping group CMA CGM started a direct service from Jakarta to the United States.

The New Priok Port, the first phase of which came into operation in August 2016, has increased the Jakarta's attractiveness for large vessels. But that is no guarantee that these ships will actually come to the port: much depends on the decisions of the large liner companies and alliances to integrate the port into their long-distance networks.

Government subsidies have fostered new port development in Indonesia and stimulated short sea shipping. Yet restrictive cabotage laws most likely constrain the attractiveness of Jakarta and other Indonesian ports as a direct port of call for global shipping companies. These would probably like to include several ports in Indonesia in their routes, for instance those linking Chinese Taipei and Australia. The economic viability of routes including Indonesian ports could depend on the possibility to deliver domestic cargo between ports in Indonesia. In effect, those ocean-going vessels would in this case be engaging in coastal shipping alongside the transport of international cargo. However, this is currently not possible, as cabotage laws do not allow foreign lines to be active in coastal shipping.

What we recommend

Smart phasing in of next phases of the New Priok port project

Aligning port capacity to demand is always challenging, as new port infrastructure is by definition delivered in large chunks at once. In Jakarta, container volumes declined for most of the recent past, which increases the risk that new terminal capacity will cannibalise existing terminals. Careful phasing in of additional terminal capacity would be necessary.

Stimulate port investment in other parts of Indonesia

Jakarta's attractiveness as a port depends partly on the attractiveness of other Indonesian ports for large container ships. This is because shipping lines are likely to want to establish routes with several calls in Indonesia. It will thus be important to coordinate with port investment projects elsewhere in Indonesia, so that other major ports in Indonesia can also accommodate very large container ships. This might be a necessary condition for attracting container mega-ships to Jakarta.

Open up domestic coastal freight transport to international shipping lines

For an island nation like Indonesia, maritime connectivity is of great importance for domestic commerce as well as external trade, but also for domestic trade. Maritime cabotage regulations most likely constrain the development potential of coastal shipping. Although reforming maritime cabotage regulations have proved challenging in many countries, some have nevertheless opened up cabotage. A way to do this is to gradually introduce exemptions for certain categories of ships; considering the desire to attract direct calls from large container ships to Jakarta – and other Indonesian ports – it would be advisable to formulate an exemption from cabotage laws for such types of ships.

Resolve bottlenecks elsewhere in the supply chain to increase efficiency

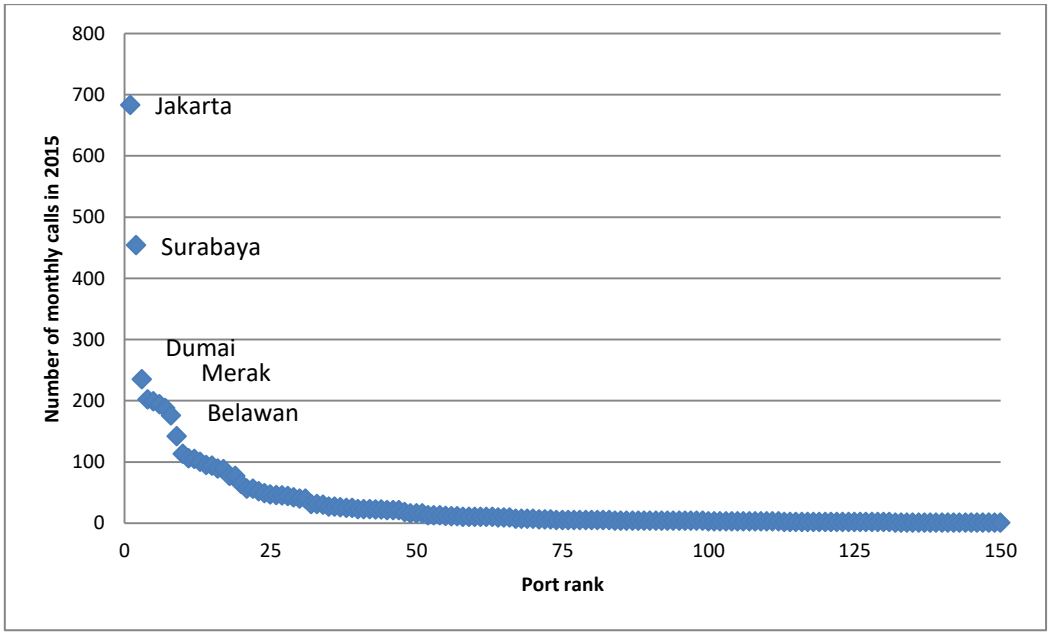
Considerable political attention has focused on container dwell time and resolving bottlenecks in the port of Jakarta. While commendable, it could be broadened to bottlenecks elsewhere in the supply chain. For instance, dry port capacity could be developed in different areas of metropolitan Jakarta to help manage port-related truck movements.

Jakarta's port performance

The Port of Jakarta, also known as Tanjung Priok, is the uncontested gateway to Indonesia. It is by far the busiest port and handles the largest cargo volumes, servicing the Jakarta metropolitan region, home to approximately 30 million people. In addition, Jakarta also serves as the regional hub through which most of the domestic cargo is feedered. Monthly port calls in Jakarta amounted to around 700 in 2015; far more than the second busiest port, Surabaya –known as Tanjung Perak – that had on average around 450 ports calls per month. This fits into a picture of relatively high port concentration in Indonesia; the first ten Indonesian ports represented 53% of the monthly port calls in 2015.

Tanjung Priok handled 51 million tonnes of cargo in 2014; making it the 82nd largest port in the world as regards to tonnage. It handled 5.5 million TEUs[1] of containerised cargo in 2016, which makes it the 27th largest container port in the world. The next largest Indonesian port in terms of tonnes, Kota Baru, handled 44 million tonnes in 2014, whereas the second Indonesian container port, Surabaya, handled 3.1 million TEUs in 2014.

Figure 1. **Number of monthly port calls in Indonesian ports, 2015**

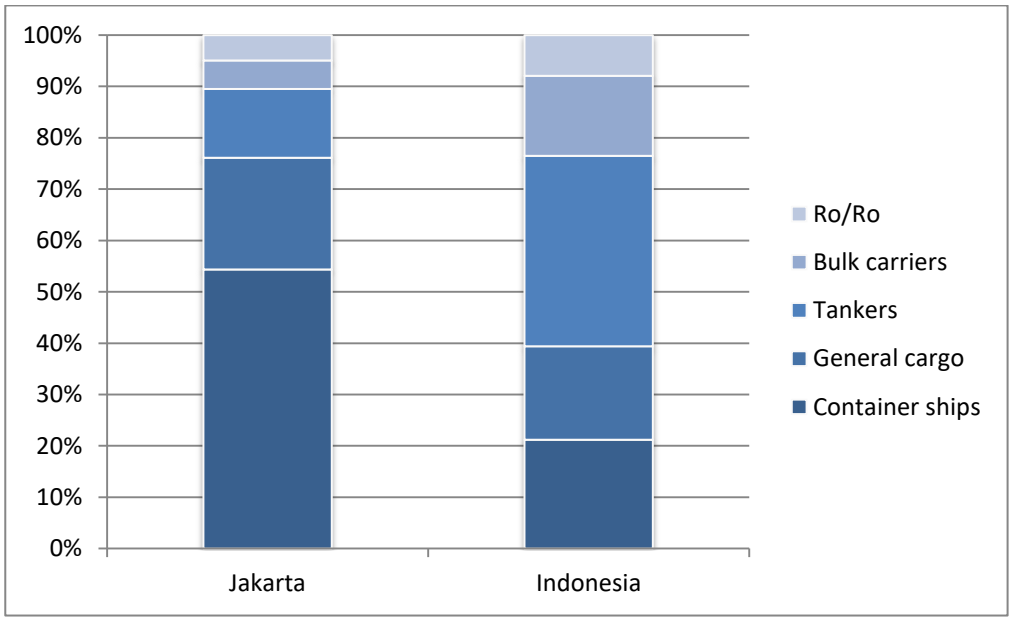


Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

Tanjung Priok has a different cargo profile than most Indonesian ports: it is more specialised in containerised cargo, but has relatively less calls from liquid bulk tankers and dry bulk carriers. Container ship calls represented more than half of the total port calls in 2015, which generally represents a fifth of ship calls in Indonesian ports overall. The share of non-containerised general cargo in Jakarta is around a fifth of total port calls, which is comparable to the average share in Indonesian ports. Whereas liquid bulk represents almost 40% of port calls for Indonesian ports as whole, this share is only 13% in Tanjung

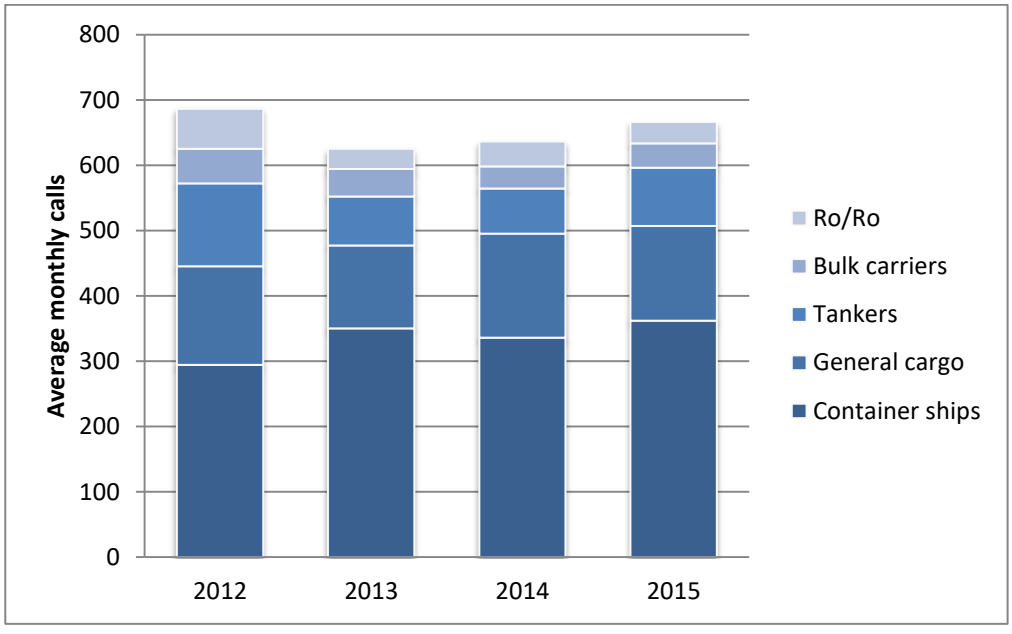
Priok. Also dry bulk and Ro/Ro traffic are relatively less important for Tanjung Priok than for other Indonesian ports. In recent years, the share of containership calls has increased, from 43% in 2012 to 54% in 2015. At the same time the number of calls from other ship categories declined slightly.

Figure 2. **Share of cargo ship types in port calls in Jakarta and Indonesia as a whole, 2015**



Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

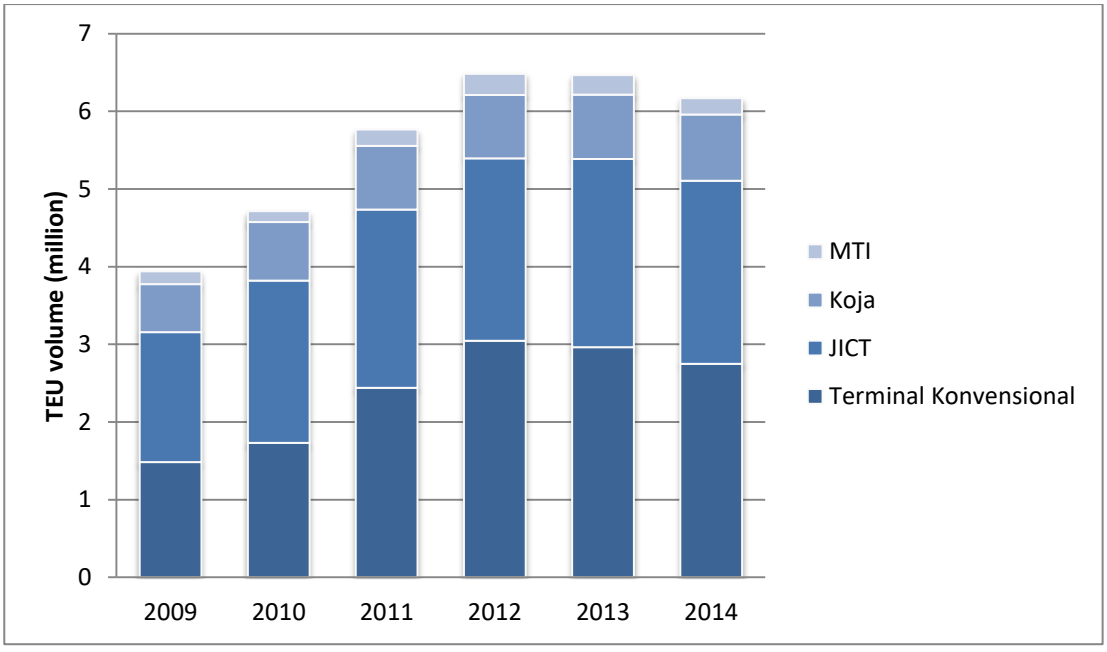
Figure 3. **Share of cargo ship types in port calls in Jakarta, 2012-15**



Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

Tanjung Priok has a variety of container terminals. The most important of these include Terminal Konvensional, Jakarta International Container Terminal (JICT), KOJA and PT Multi Terminal Indonesia (MTI). JICT and KOJA are joint ventures between Hutchison Ports Holding and IPC, the state-owned Indonesian company in charge of the ports in central and eastern Java, also known by its previous name Pelindo 2. The international cargo, coming in bigger ships, is mostly handled by JICT and KOJA, whereas most of the domestic cargo and smaller ships are handled by the other terminals. Since 2009, the market share of JICT and KOJA declined from 58% to 52% in 2014, driven by stronger growth rates of domestic cargo.

Figure 4. **Market share of container terminals in Tanjung Priok, 2009-14**

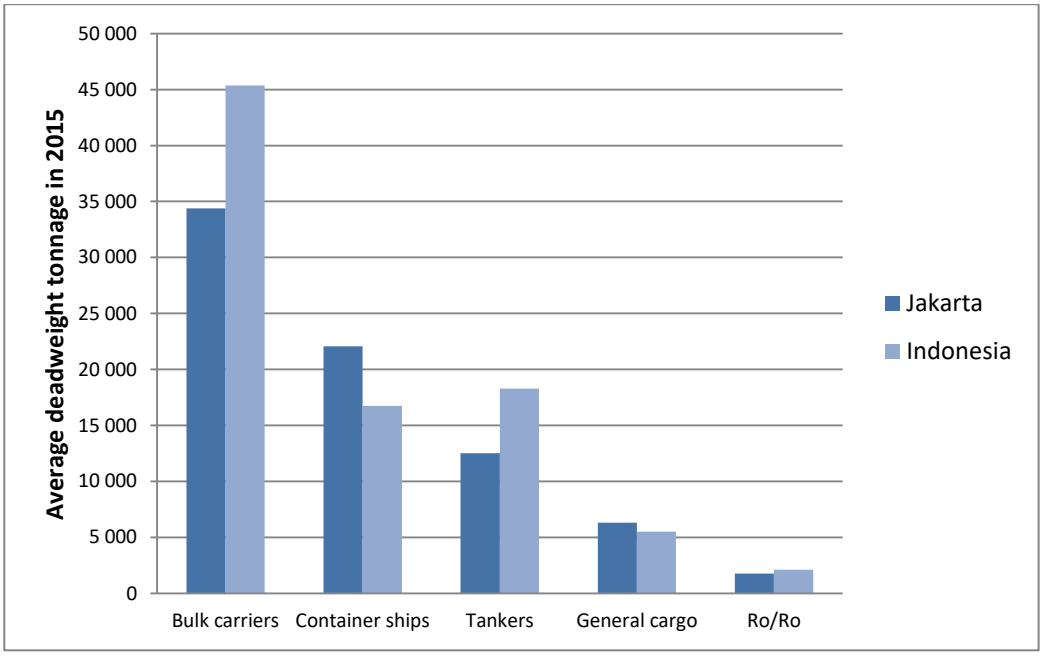


Source: ITF elaborations based on data provided by IPC.

Jakarta's container terminals have extensive facilities and equipment. The Jakarta International Container Terminal for example has 19 quay cranes, a berth length of 2 153 m, a terminal area of 100 hectares with 74 rubber-tyred gantry cranes (RTGs), 142 container tractors and 25 other pieces of mobile lifting equipment.

The largest ships calling Indonesian ports are bulk carriers, with average deadweight tonnage of 45 000 dwt. Compared to these ships, liquid bulk tankers and containerships calling Indonesian ports are considerably smaller, between 15-20 000 dwt. The smallest ships are general cargo ships and Ro/Ro ships. Not surprisingly – considering the specialisation of Tanjung Priok in containerised cargo – the average containership calling Jakarta is larger than those calling Indonesian ports on average: approximately 22 000 dwt compared to 17 000 for all Indonesian ports. The inverse is the case for bulk carriers and liquid bulk tankers, both larger for Indonesian ports as a whole than those calling the port of Jakarta.

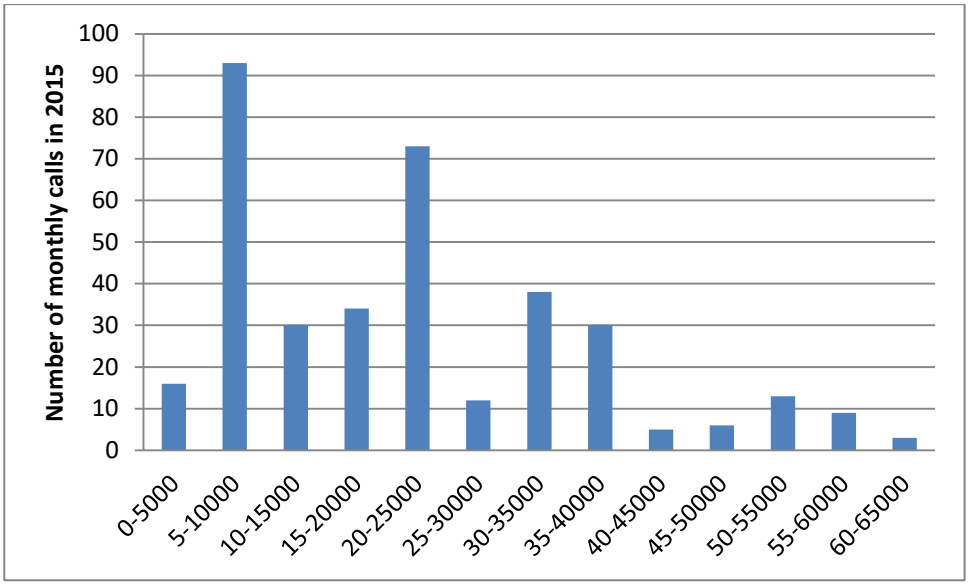
Figure 5. **Average ship size in Jakarta and Indonesia, 2015**



Note: Average ship size measured in dead weight tonnage.
Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

Around 64% of the container ships calling Tanjung Priok fall into the category of 5 000 to 25 000 dwt. Only a handful of ship calls (10%) surpasses 40 000 dwt. The largest containerships that have called Jakarta had a maximum capacity of 5 000 TEUs. Approximately 30% of the containerships calling Jakarta International Container Terminal had a ship length of over 200 m.

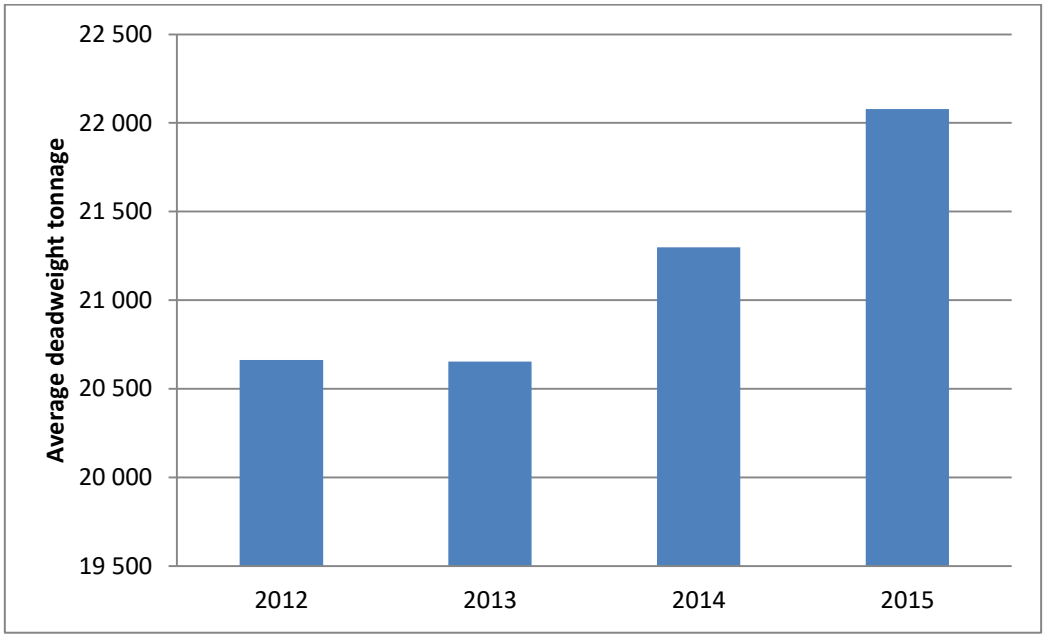
Figure 6. **Number of calls of container ships in different size categories, 2015**



Note: Size categories measured in dead weight tonnage.
Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

The average container ship size increased over 2012-15 with approximately 10%, from around 20 500 dwt in 2012 to a bit more than 22 000 dwt in 2015. Considering the pace of container ship upsizing over the last decade, this increase in Jakarta is fairly limited.

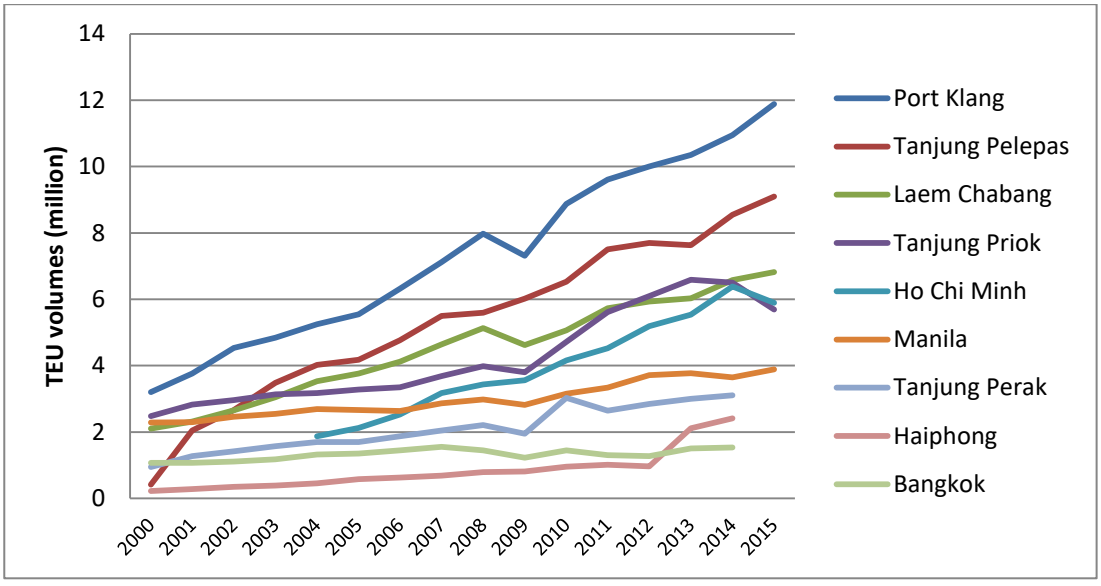
Figure 7. **Average ship size of container ships (dwt) in Jakarta, 2012-15**



Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

Container volumes at the Port of Jakarta have more than doubled since 2000, but growth rates are fairly moderate when compared to its peers in Southeast Asia. The growth rate over 2000-2015 was 130% in Tanjung Priok, well below the rates achieved in the Malaysian ports of Port Klang (270%) and Tanjung Pelepas (2070%), or the Thai port of Laem Chabang (224%). At the same time, growth rates were higher than those achieved in other major urban ports such as Manila (70%) and Bangkok (43%). Unlike most other Southeast Asian container ports, growth rates in Jakarta have declined since 2013.

Figure 8. **Growth rates of main Southeast Asian container ports, 2000-15**



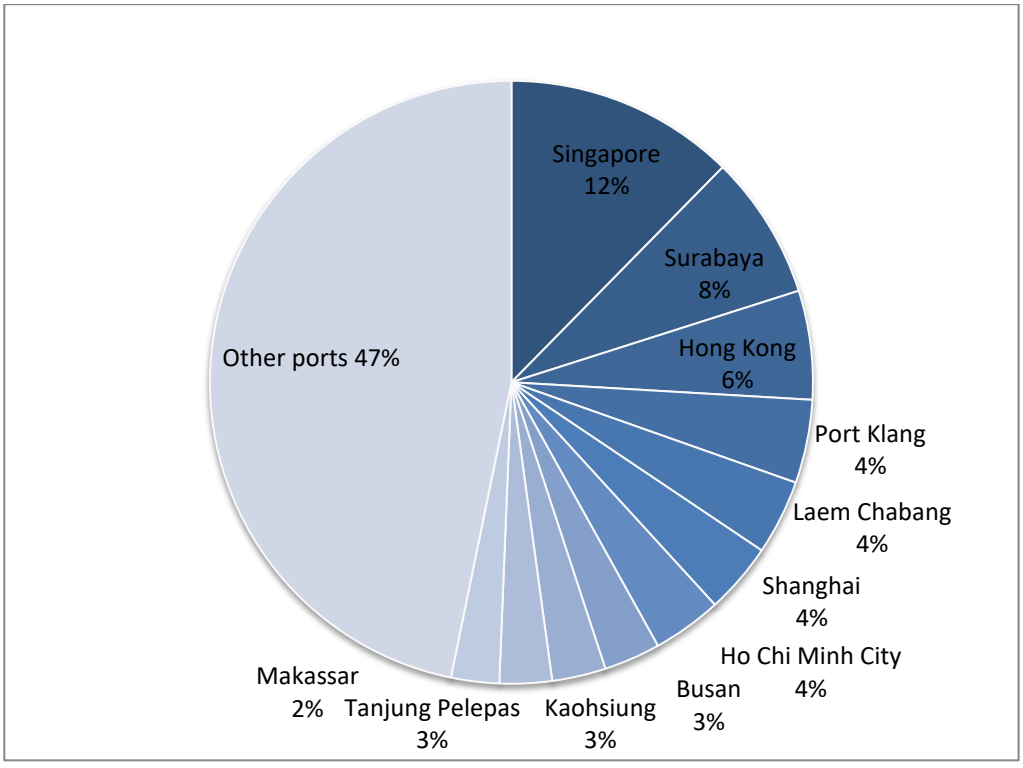
Note: For reasons of visibility, the port of Singapore is left out of this figure.
Source: ITF

Maritime access

The maritime connectivity of the Port of Jakarta is currently fairly limited. It is linked, directly or indirectly to approximately 18 countries. This is based on an analysis of ship voyages of ships that called the Port of Jakarta in May 2015. The most important maritime connection is with Singapore (12%), followed by Surabaya (8%) and Hong Kong (6%), three ports that together represent a quarter of the links. A large share of the maritime connections is with other Indonesian ports, representing a quarter of the calls of the ships that called Jakarta in May 2015.

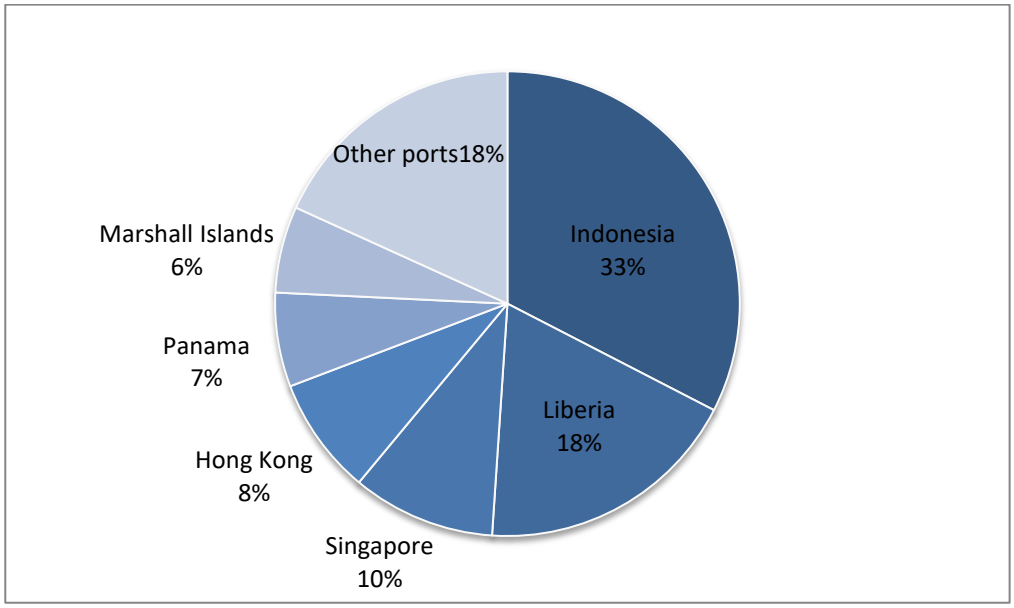
The limited maritime connectivity is mirrored by the limited diversity of flags calling the Port of Jakarta. A third of the calls come from ships with the Indonesian flag, followed by the Liberian and Singaporean flag. There is a clear division between foreign and Indonesian flagged vessels. The Indonesian flagged vessels calling the Port of Jakarta almost exclusively service the Indonesian market; their number of calls at foreign ports is negligible. The calls at foreign ports are by foreign-flagged vessels, which also call at two other Indonesian ports: Surabaya and Semarang. The average ship size of the foreign-flagged vessels (approximately 34 000 dwt) is more than three times larger than the Indonesian flagged container ships (11 600 dwt). The largest ships (over 50 000 dwt) are used to connect Jakarta to Japanese and Australian ports.

Figure 9. **Destinations of containerships calling at Port of Jakarta, 2015**



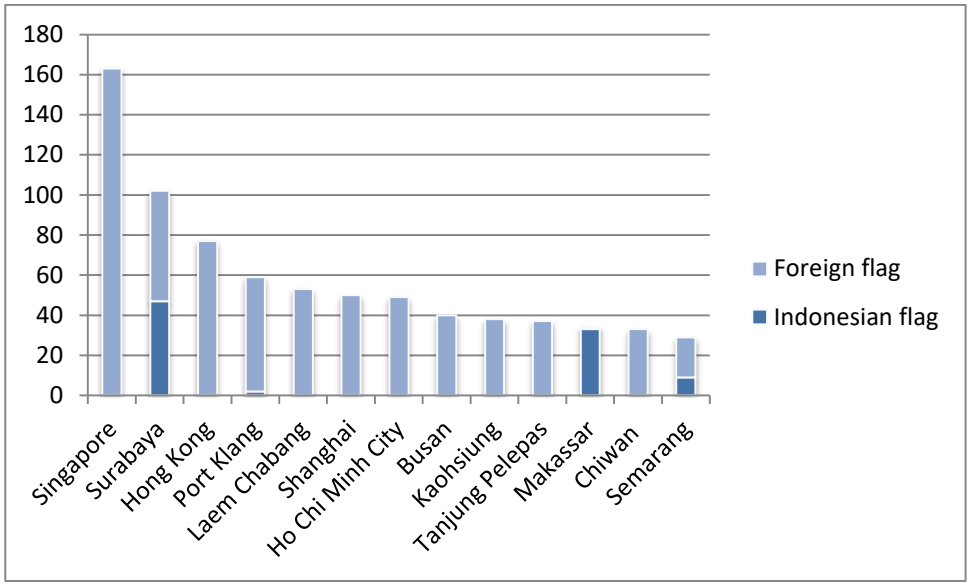
Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

Figure 10. **Flags of containerships calling at port of Jakarta, 2015**



Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

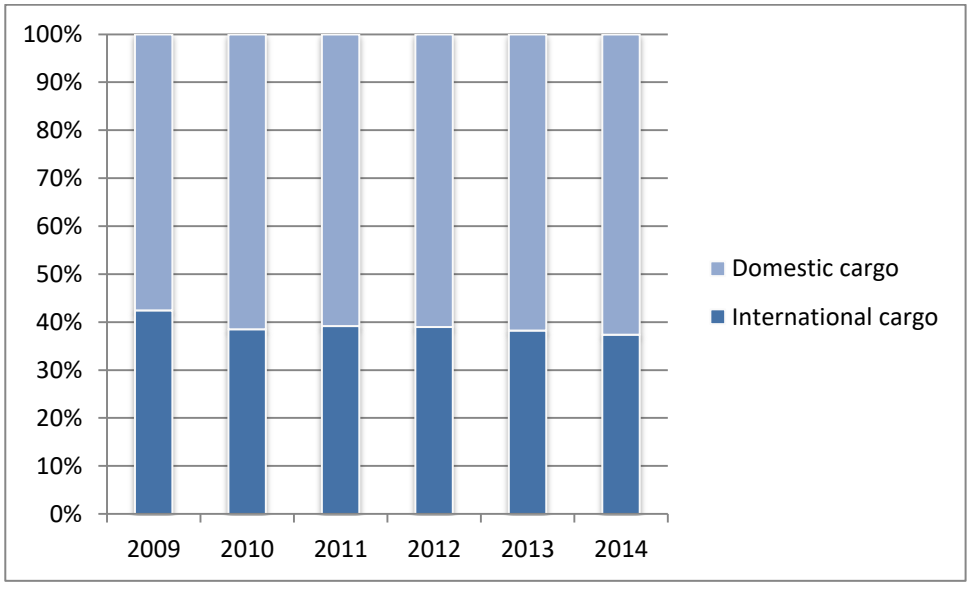
Figure 11. **Direct and indirect port links with Jakarta, related to Indonesian and foreign-flagged containerships**



Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

Significant in this respect is the increase of local cargo over recent years in Jakarta, whereas the share of international cargo is gradually declining, from 42% in 2009 to 37% in 2014 (Figure 12).

Figure 12. **Local and international cargo of port of Jakarta, 2009-14**

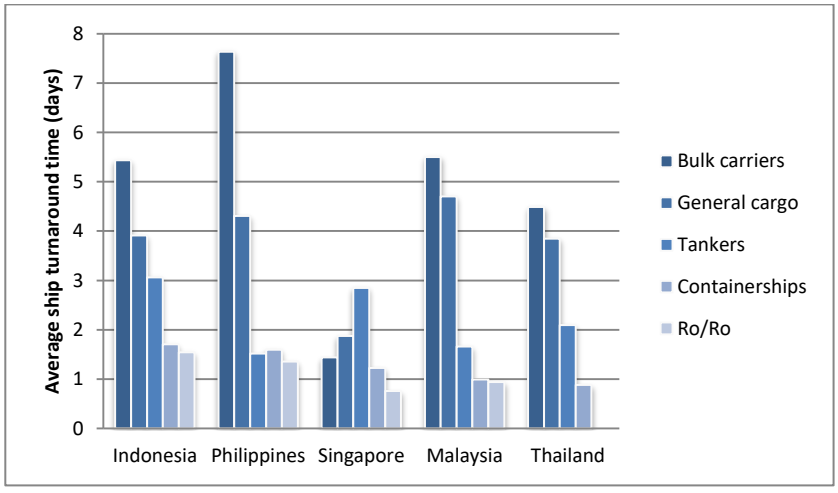


Source: ITF/OECD elaborations based on data provided by IPC.

Port operations: Average turnaround times

Average ship turnaround time in Indonesia in 2015 differed by ship type, but was above the average scores in other Southeast Asian countries for tankers, container ships and Ro/Ro ships. Tankers stayed on average three days in Indonesian ports in 2015; in the Philippines, Malaysia and Thailand this was between one and two days, but the score in Singapore is close to that of Indonesia. Differences between Southeast Asian countries are smaller with respect to container ships and Ro/Ro ships, but for ship types the average turnaround time in Indonesia is around twice the time of Thailand. With regards to bulk cargo and general cargo ships, the position of Indonesian ports is less disadvantageous; if the turnaround times are large for these ship types, this is also the case for most other Southeast Asian countries (with the exception of Singapore that has much lower turnaround times): between four to eight days for bulk carriers, around four days for general cargo ships.

Figure 13. **Average ship turnaround time per ship type for Southeast Asian countries**

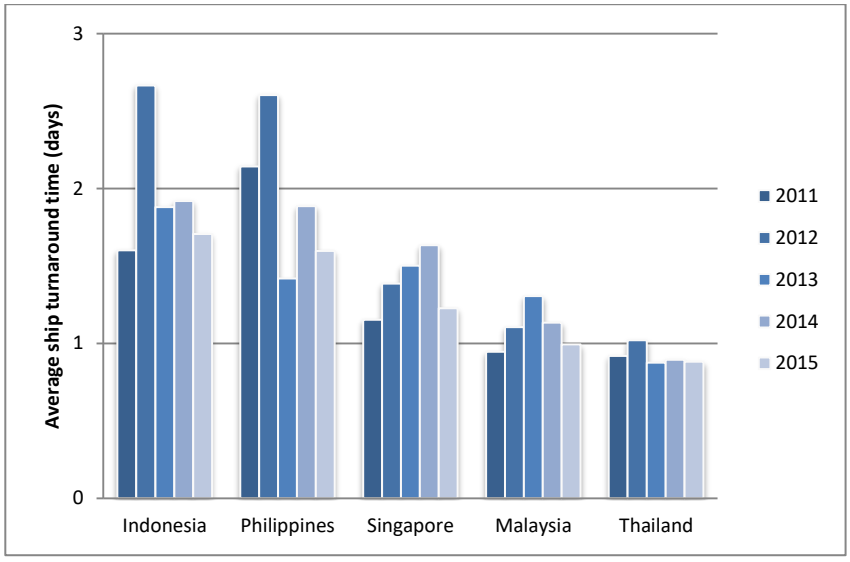


Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

The average turnaround time for container ships in Indonesian ports is between 1.5 and 2 days, which is consistently longer than the turnaround times in ports in other Southeast Asian countries over the last five years. The best scores are achieved in Thailand where the average containership turnaround time is less than one day. Malaysia is not far behind, whereas turnaround time in Singapore is on average around 1.3 days over 2011-15. The scores of the Philippines are close to the ones for Indonesia, albeit slightly lower. There is no clear trend with regards to the development of ship turnaround times in Southeast Asian ports. Turnaround times in Indonesia appear to be going down since 2012, in line with developments in Philippines and Thailand, but the scores in Singapore and Malaysia do not follow a clear diminishing trend.

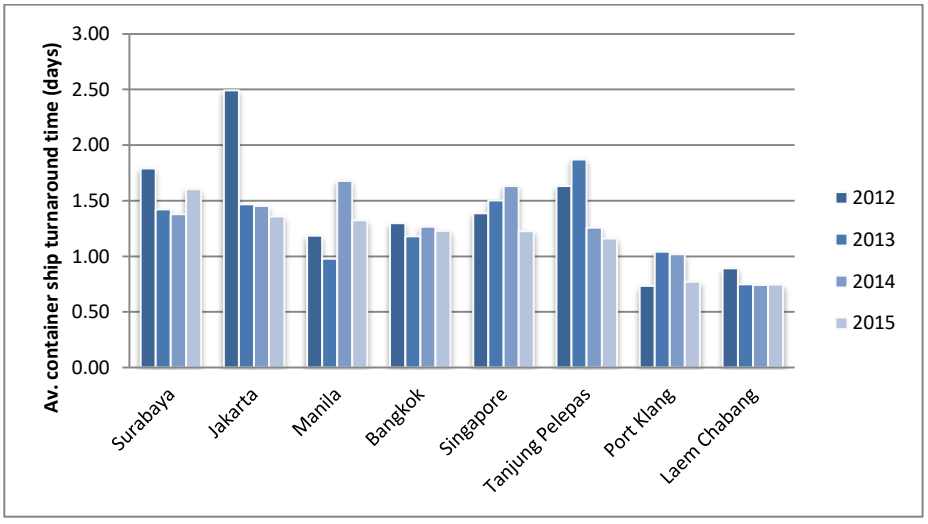
The average ship turnaround time for container ships in Tanjung Priok was around 1.3 days in 2015. This is slower most of its competitor ports in the region: slightly slower than ports like Manila, Bangkok and Singapore, and well behind ports like Port Klang and Laem Chabang, that manage to achieve turnaround times twice as fast as in Tanjung Priok. Ship turnaround times in Tanjung Priok have decreased in recent years, similar to in most other large Southeast Asian ports (Figure 15).

Figure 14. **Average container ship turnaround time in Southeast Asian countries, 2011-15**



Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

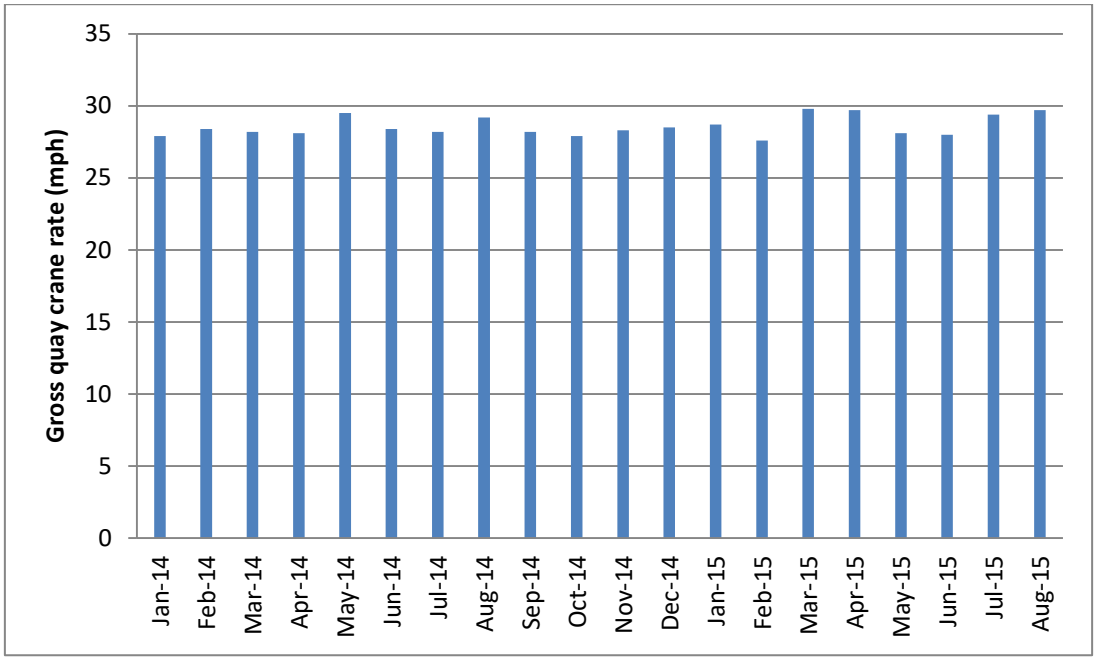
Figure 15. **Average container ship turnaround time in main Southeast Asian container ports, 2011-15**



Source: ITF elaborations based on vessel movement database from Lloyds Intelligence Unit.

The performance at the container terminals for international cargo is well above the port average: JICT managed to achieve an average ship turnaround time of around 0.7 days in 2015. This was achieved via very decent crane productivity rates of approximately 29 moves per hour; these crane rates are very stable over time (Figure 16), which can guarantee reliability of handling. On average a little over two quay cranes are deployed per vessel; as a result, the ship handling rate is over 60 moves per hour. The average call size in JICT in 2015 was around 1 300 TEUs.

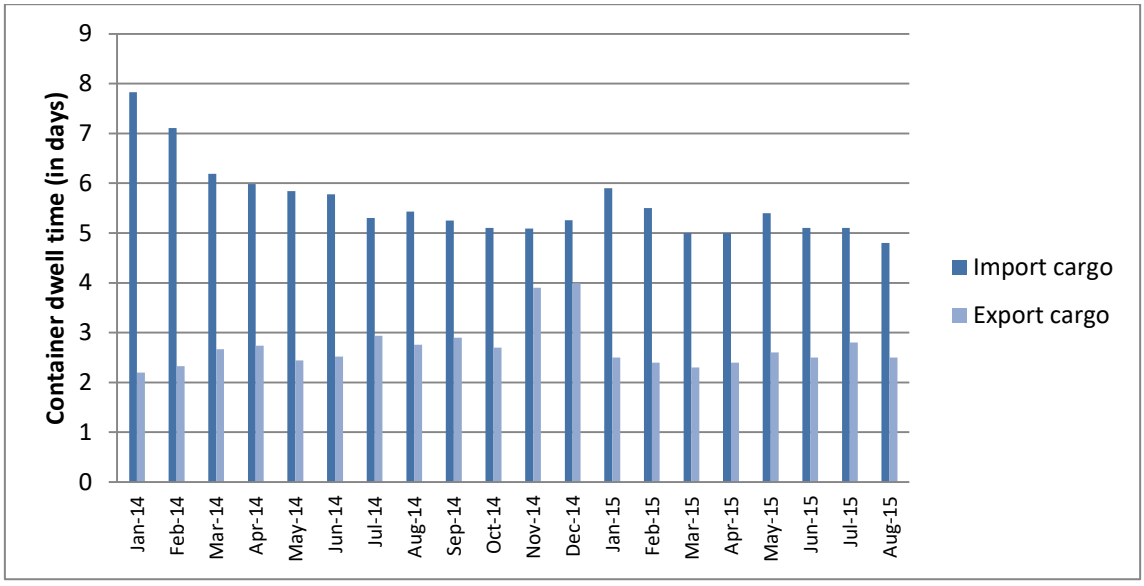
Figure 16. **Gross quay crane rate at the Jakarta International Container Terminal, 2014-15**



Note: Gross quay crane rate measured in moves per hour.
Source: ITF elaborations based on data provided by JICT.

The dwell time of containers in the yard does not seem disproportionally high. Furthermore it is decreasing and is not problematic in the light of existing yard capacity. Again, the most relevant figures here relate to JICT, the main terminal for international containerised cargo. The overall container dwell time in 2015 was approximately four days, a bit more than five days for import cargo and 2.5 days for export cargo. The dwell times for import cargo have come down substantially since the beginning of 2014, from almost eight days to less than five days in August 2015 (Figure 17). Long dwell times in container yards generally become problematic if the occupancy rate of the yard is very high, as this contributes to port congestion and possibly gridlock. Considering the moderate levels of yard occupancy at JICT (approximately 55% in 2015), there is no reason to be worried about current dwell times from the perspective of port operational efficiency.

Figure 17. **Container dwell times in yard at the Jakarta International Container Terminal, 2014-15**



Source: ITF elaborations based on data provided by JICT.

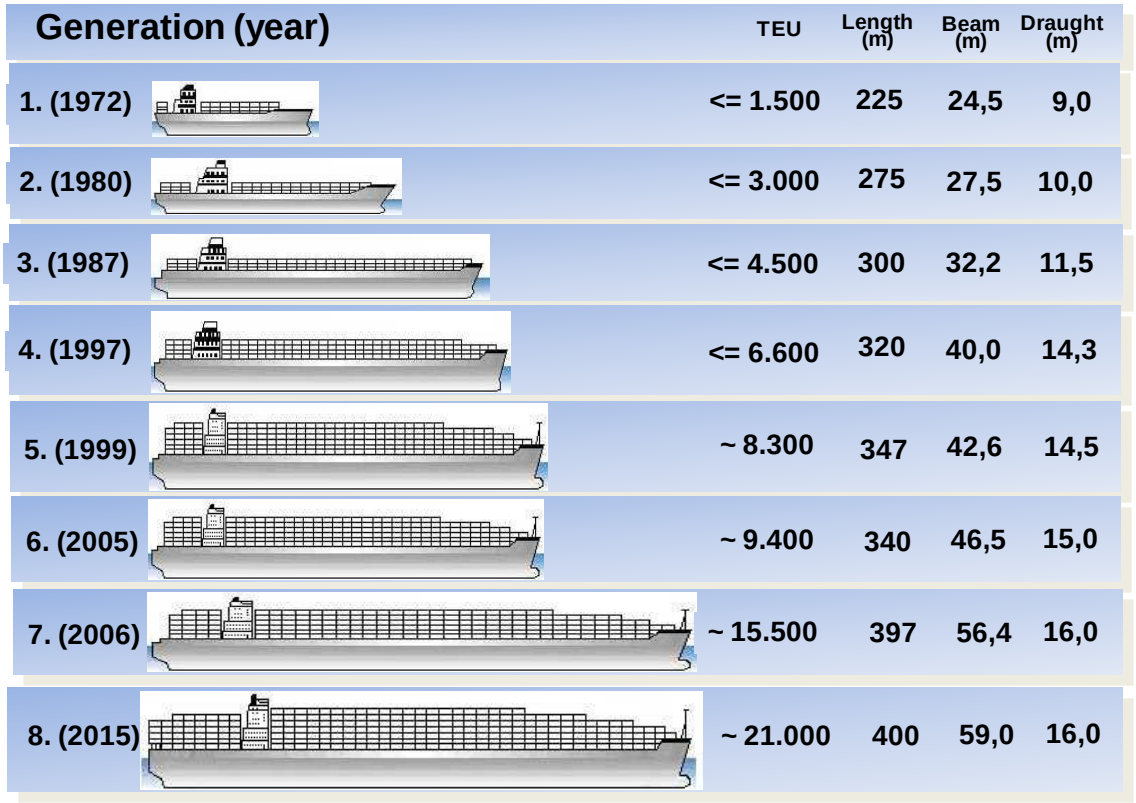
Hinterland connectivity

One of the key challenges of Tanjung Priok is its connectivity to the hinterland. This takes different forms. Within the port the truck turnaround time is relatively long: in 2015 it took more than an hour for a truck to go between the in-gate and out-gate. Trucks often have to wait in front of the port gate before entering the port, which blocks the urban roads around the ports. Moreover, the trucking costs from and to the port are relatively expensive. Within Indonesia, Jakarta has one of the highest trucking costs between port and warehouse, namely 96 154 Rp per TEU/km. This is due to high congestion in the industrial area close to the port (Nestra, 2015). Although Tanjung Priok is connected to railways, the container volumes transported to and from the port by rail are negligible.

Will bigger ships come to Jakarta?

Despite being one of the world's largest container ports, Tanjung Priok is no longer integrated in the world's major intercontinental trade routes. The introduction of new container ship generations and the cascade effect triggered by their introduction led to a sharp increase of container ship sizes on the major intercontinental East-West routes. With a maximum ship draught of 14 m, Tanjung Priok is hence no longer able to handle the ultra-large container vessels serving the Europe-Far East and the Transpacific trades.

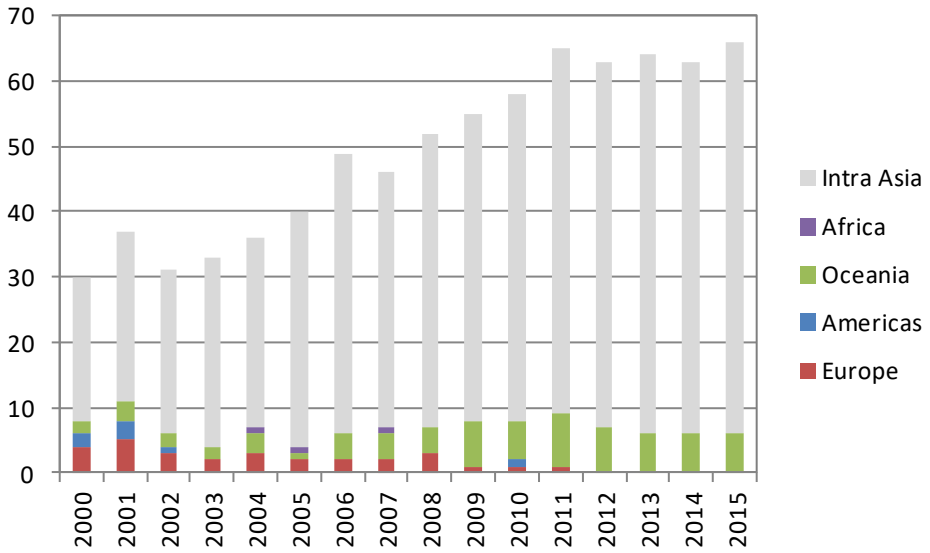
Figure 18. **Evolution of containership dimensions (1972-2015)**



In order to forecast the development of ship sizes in the port of Tanjung Priok, assumptions have been made about its future integration in intercontinental trade lanes. A look at current and past liner services having regularly called in the port has served as a basis for these assumptions. A forecast of the ships likely to call in Tanjung Priok has been developed based on a forecast of the container vessel fleet by size classes and a model of the cascade effect.

The port of Tanjung Priok used to be on the schedules of up to five Europe-Asia services in the early 2000s, but has slowly dropped out of the major East-West trade lanes. Since 2012, not a single major service is left and the regular lines calling in the port are restricted to Asia and Oceania.

Figure 19. **Number of liner services calling in the port of Tanjung Priok, 2000-15**



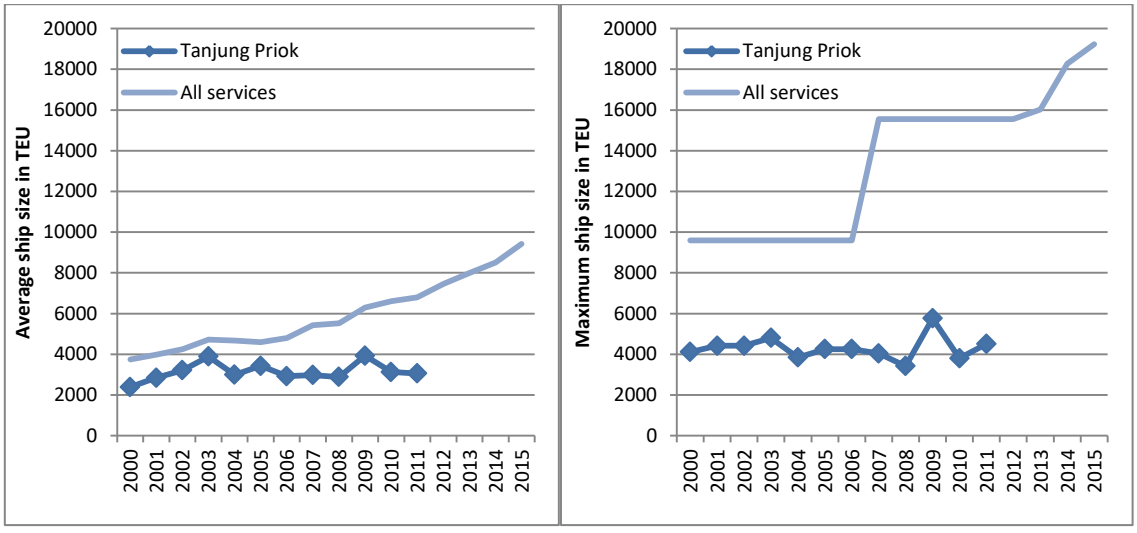
Note: Double counting in case of, e.g., Europe-Asia-America services.
Source: ITF/OECD elaboration based on ISL and MDS Transmodal (2015).

An analysis of the ship size development on the major East-West trade routes passing through Southeast Asia – namely Europe-Far East and Transpacific – reveals how Tanjung Priok was downgraded to a mere regional port over time.

Traditionally, the largest ships are sailing on Europe-Far East trades. While in 2000, the average ship size on this trade was below 4 000 TEUs and hence within the Panamax range, it increased to more than 5 000 TEUs in 2007, more than 6 000 TEUs in 2009 and then climbed to almost 9 000 TEUs in early 2015. Up until 2003, the average ship size on European trades was increasing and reached 3 900 TEUs, 83% of the average. However, while ships sizes continued to grow on Europe-Far East trades, the services calling in Tanjung Priok continued to average around 3 000 to 4 000 TEUs. Finally, in 2011 – the last year with a regular Europe service – the average size in Tanjung Priok was only 45% of the trade's average. A similar trend can be observed regarding maximum ship size: while it roughly doubled between 2000 and 2015 on the Europe-Far East trade, it remained more or less unchanged around 4 000 TEUs until Europe services stopped calling in Tanjung Priok in 2011.

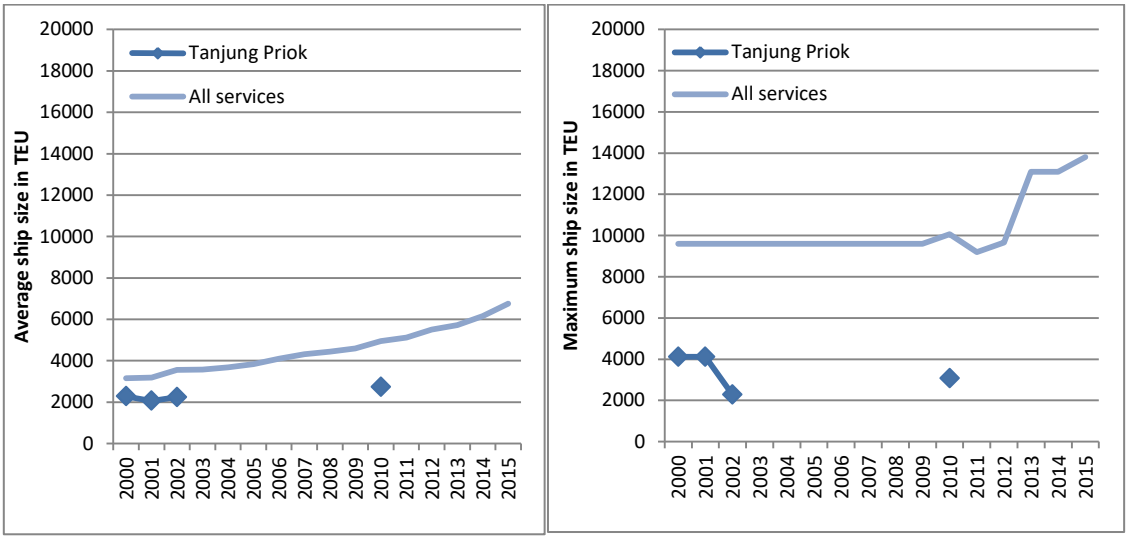
A similar development – though at a different scale – could be observed in the US trades. The average ship size grew steadily from 3 150 TEUs in the year 2000 to 6 750 TEUs in early 2015. While in 2000, the average ship size on American trades observed in Tanjung Priok was 72% of the market average, it was only 55% of the average in 2010, the latest year with a regular Americas service. The maximum ship size was around 10 000 TEUs between 2000 and 2012, but then jumped up to reach almost 14 000 TEUs in 2015 (see Figure 21).

Figure 20. **Far East-Europe services calling in the Port of Tanjung Priok, 2000-15**



Source: ITF elaboration based on ISL based on MDS Transmodal (2015).

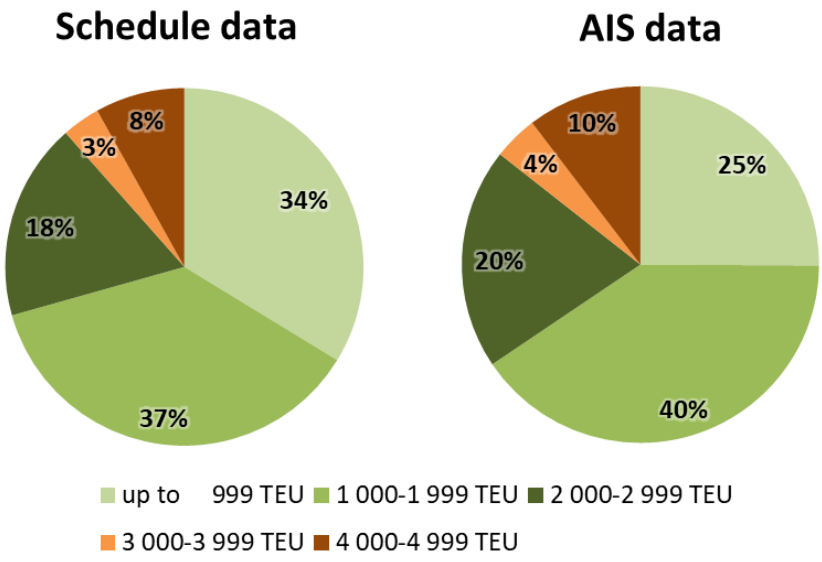
Figure 21. **Transpacific services calling in the Port of Tanjung Priok, 2000-15**



Source: ITF elaboration based on ISL and MDS Transmodal (2015).

Given the absence of intercontinental East-West services in Tanjung Priok in 2015, one could expect that larger Panamax-sized vessels have stopped calling in the port. The schedule dater of liner operators reveals that this is not the case: such ships are used on services to and from China, Japan and Australia. However, smaller ships of up to 2 000 TEUs make up roughly two-thirds of the calls in Tanjung Priok.[2]

Figure 22. **Ship calls in Tanjung Priok by size class during the first half of 2015**



Source: ITF elaboration based on ISL Container Fleet Forecast, December 2015.

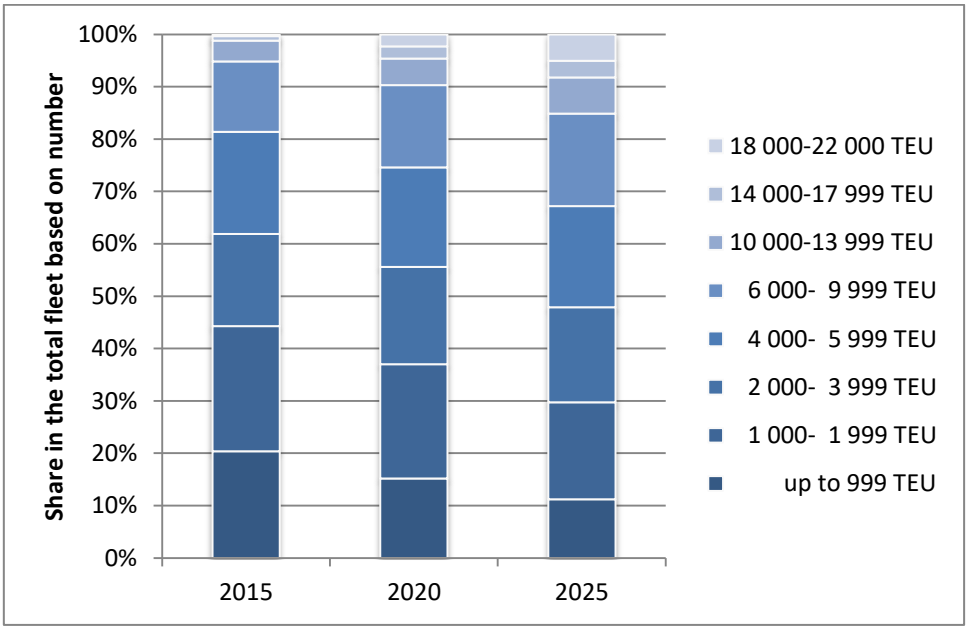
The average ship size of regular services calling in Tanjung Priok was actually smaller in 2001 despite the port's strong position in the major East-West trades. This is, of course, due to the fact that the average ship size in the world fleet has increased sharply during the past decades so that ships used on Europe-Far East trades 15 years ago can now be found on shorter and smaller trades like Southeast Asia-Australia. To illustrate the impact of Tanjung Priok's new service structure, a look at the relative position of the largest ships having called in the port is more helpful. In 2001, only 20% of the world's container ships were larger than the largest vessel calling in Tanjung Priok. In 2015, almost 60% were larger.

The increase of ship sizes and the cascade effect will continue to play an important role during the coming years. According ISL's Container Fleet Forecast, the share of ships with more than 18 000 TEU will increase from 0.3% in 2015 to 5.1% in 2025, their number will increase from 17 to around 270.

The large number of new orders particularly for ships 400 metres long with 59-metre beams will fuel the crowding-out of smaller units from the Europe-Far East trades. Within a short time, ships of 18 000 TEUs will be standard on the major North Europe-Far East routes, while operators will continue to use smaller ships on the minor Europe-Far East routes such as Mediterranean-Southeast Asia. According to the cascade model, which estimates how ships will move from one trade area to another based on scale economies, the pressure to use much larger ships on the Transpacific trade (i.e. the "smaller" 18 000 TEUs units crowded out of Europe-Far East) is imminent and ships of 18 000 TEUs may soon be crossing the Pacific on a regular basis – even if the current 21 000 TEUs ship design remains the largest until 2025.

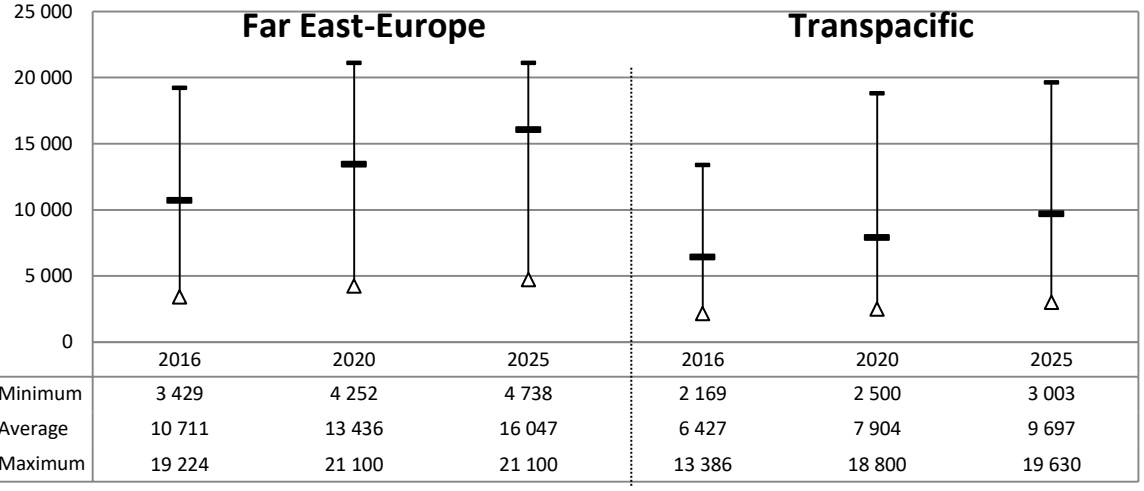
Though there may be some shifting inside of the Europe-Far East trades that will help absorb the 18 000 TEUs units until 2020, it is obvious that the average ship size will sharply increase on both major trade routes. It is estimated to increase from 10 700 TEUs in 2015 to 16 000 TEUs in 2025 for Europe-Far East routes, and from 6 400 TEUs to 9 700 TEUs for Transpacific trades.

Figure 23. **Container fleet forecast 2015-2025 by size classes**



Source: ITF elaboration based on ISL Container Fleet Forecast, December 2015.

Figure 24. **Forecast of ships deployed on major East-West trade routes up to 2025**



	Far East-Europe			Transpacific		
	2016	2020	2025	2016	2020	2025
Δ Minimum	3 429	4 252	4 738	2 169	2 500	3 003
– Average	10 711	13 436	16 047	6 427	7 904	9 697
– Maximum	19 224	21 100	21 100	13 386	18 800	19 630

Source: ITF elaboration based on ISL Container Fleet Deployment Forecast, December 2015.

Ship size forecast for the Port of Tanjung Priok in 2020 and 2025

The opening of the planned terminal in Tanjung Priok will make the port more attractive for the large carriers as the maximum allowed ship draught is increased from 14 16 m. Therefore, it is likely that the port will be integrated again in major East-West trade routes. This section calculates two scenarios. In scenario 1 (status quo 2015), the new terminal will not significantly alter the service structure of liner operators and the port will continue to be mostly of regional importance. In scenario 2 (major hub as in

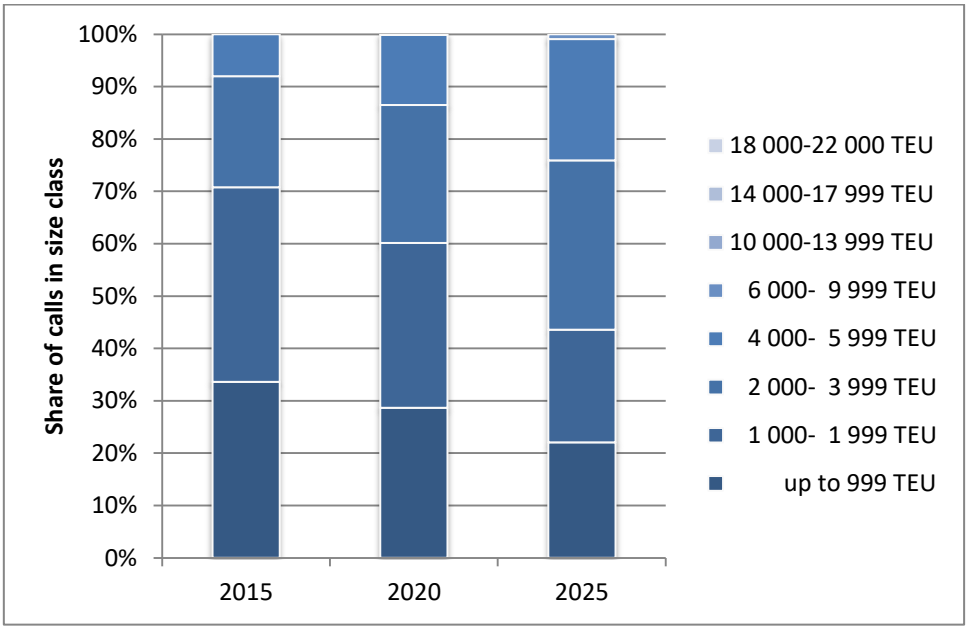
2001), within a short period of time (i.e. before 2020), the terminal will be once again integrated in major East-West trade routes as it used to be in 2001.

For both scenarios, the distribution of ship calls by size class is estimated by combining the container fleet deployment forecast with the relative position of the Port of Tanjung Priok on each trade. The relative position of Tanjung Priok as observed in the past is relevant because even with the new terminal, the port will most likely not be integrated, e.g. on the major China-North Europe services normally sailing directly from China to the Malacca Strait and vice versa. The results obtained from the two scenarios can be seen as high and low cases regarding the ship size distribution.

Scenario 1: Status quo 2015

In the scenario "Status quo 2015", 95% of the ship calls in Tanjung Priok are related to intra-Asia services, the remainder connects Asia to Oceania. In the base year 2015, one-third of the calls relate to ships with less than 1 000 TEUs and another 37% to ships between 1 000 TEUs and 1 999 TEUs. However, Panamax ships are also used on both trades. In total, 8% of the ships have more than 4 000 TEUs.

Figure 25. **Forecast of ship calls in Tanjung Priok port 2020 and 2025 (status quo scenario)**



Source: ITF/OECD elaboration based on ISL, December 2015.

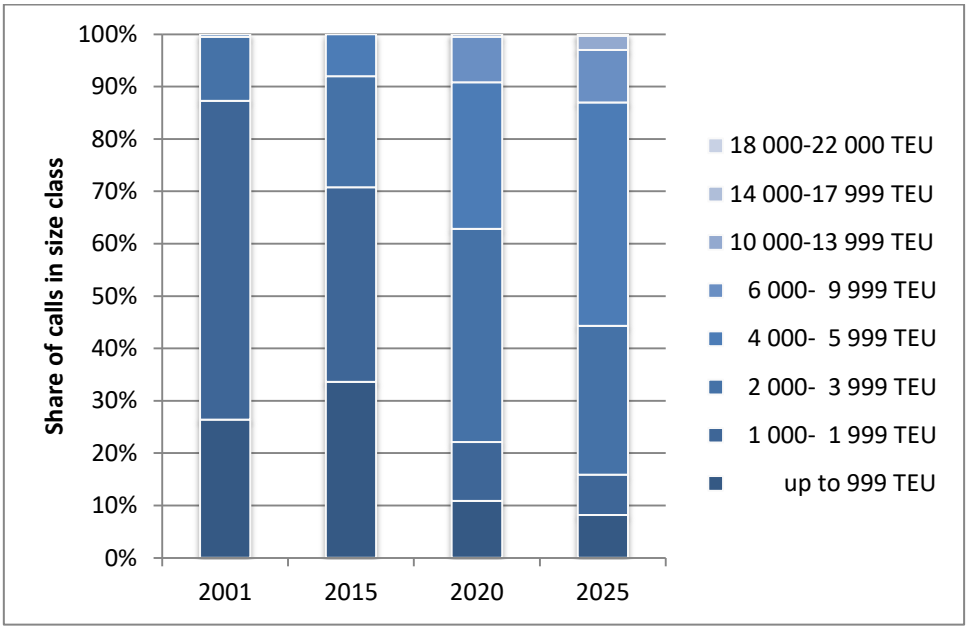
Assuming that the cascade effect can fully play on the related trades after the opening of the new terminal, there will be an increasing share of vessels with a capacity beyond the 4 000 TEUs threshold. There will also be first Post-Panamax vessels with more than 5 000 TEUs by 2020 (two services). By 2025, the number of Post-Panamax services will have increased to four, including regular calls of 8 000 TEU vessels (e.g. around 330 m long and 43 m wide). The share of vessels with less than 2 000 TEUs will decrease to around 44% as Panamax vessels will be increasingly used for intra-Asian services.

Scenario 2: Major hub as in 2001

In the "Major hub" scenario, which is based on Tanjung Priok's position in intercontinental container shipping in 2001, the share of ship calls related to intercontinental services is more than three times as high as in the status quo scenario: 18% of the ship calls fall into this category. Two-thirds of these services connect Tanjung Priok with Europe. Even though, the share of ships with more than 2 000 TEUs was only 12% as the other intercontinental services (Oceania, Americas) were still served with smaller ships.

As described above, the share of ships with more than 2 000 TEUs dropped to around 70% despite the fact that around 95% were related to intra-Asian services. Assuming that Europe-Far East and Transpacific services will be back by 2020, we should expect regular calls of vessels with around 9 000 TEUs (e.g. around 330 m long and around 46 m wide) in that same year. Note that this is less than half of the capacity of the largest ships trading on the major China-North Europe routes. The share of calls with less than 2 000 TEUs will drop sharply to around 22% as ship sizes on intra-Asian routes increase and as the relative importance of intra-Indonesian island services decreases.

Figure 26. **Forecast of ship calls in Tanjung Priok port 2020 and 2025 (major hub scenario)**



Source: ITF elaboration based on ISL (2015).

The share of larger vessels will continue to grow in the following years with 10% of the vessels exceeding 8 000 TEUs. Regular calls with container ships of about 11 000 TEUs may be expected (e.g. 360 m long and 48 m wide), but single units may reach around 14 000 TEUs already.

Conclusions: The prospects of mega-ships in Jakarta

The port of Tanjung Priok has undergone a structural change during the past 15 years. In the early 2000s, the port was on the schedule of numerous Far East-Europe services and served as a transhipment hub for the region. As draught was restricted to 14 m, it was more and more difficult for the port to keep its position on the major trades as container ship sizes increased rapidly to ever-new heights. In early 2015, the port was neither connected directly to Europe nor to the Americas.

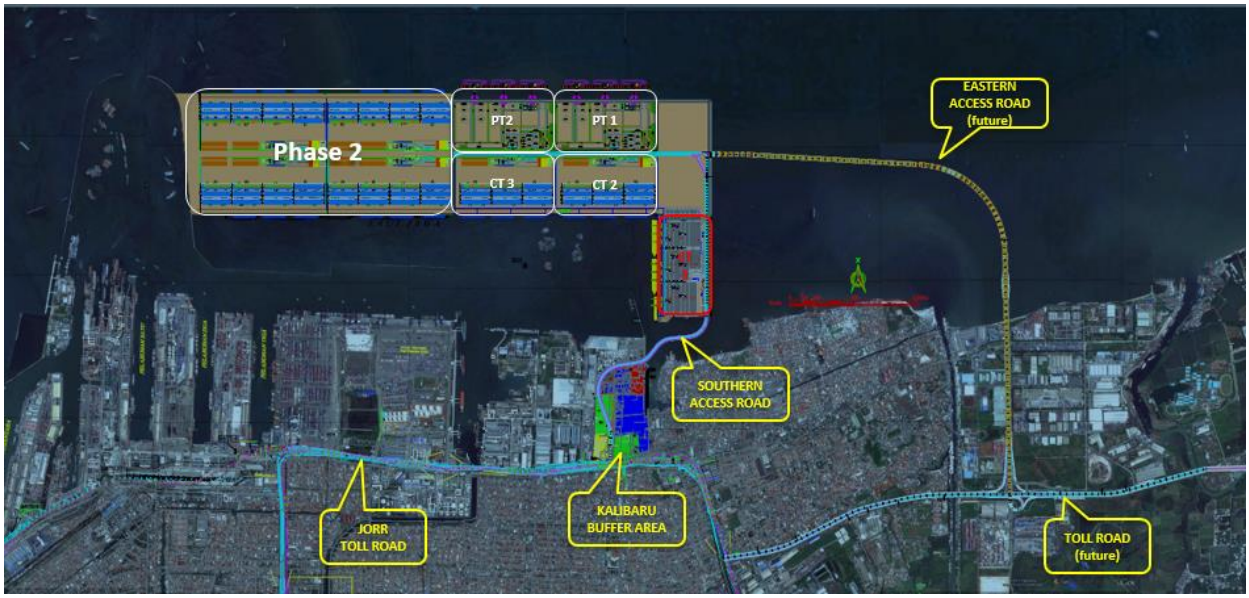
The New Priok Port has made the port more attractive again for large intercontinental liner services. Under these circumstances, the development of ship sizes will depend on the decisions of the large liner companies and alliances to (re-)integrate the port into their long-distance networks. If this is the case, deepening the berth depth to 16 m will soon be justified due to the large liner services calling in the port. But even if the port would continue to only be of regional importance for East Asia and Oceania, ships of around 8 000 TEUs may be very regularly calling in 2025 due to the cascade effect crowding out these ships from other trade routes.

Policies to make Jakarta big-ship ready

The overall strategy of IPC is to attract ever-larger ships to Jakarta. This is not because the port wants to handle larger ships as such, but because the port wants to attract direct calls rather than continue to be a regional feeder port. The requirements to service mega ships are included in the Ports Master Plan and are driving current investment plans.

Jakarta has aimed to attract bigger ships via a massive port expansion, dubbed "New Priok", also known as Kalibaru Port. This expansion of the port will take place in two phases and create new terminals via land reclamation. In the first phase three new container terminals will be created (indicated as CT1, CT2 and CT3 on Figure 27), as well as two liquid bulk terminals. A second phase will add more container handling capacity. CT1 will be connected with Tanjung Priok via a southern access road that will also lead to a buffer area. Subsequent stages of the new port envisage a dedicated access road – the eastern access road – via the sea to link directly to a toll road outside the port. As part of the project the access channel to the port will be widened and deepened; the new berths will have a draft of 16 m, which will also be the case for the berths alongside the JICT terminal. The new port, when finalised, will have a total design capacity of 12.5 million TEUs a year. The final completion of the entire project is currently expected to be completed in 2023.

Figure 27. **Schematic overview of the New Priok Port**



Source: http://www.portdevco.com/?portfolio=newpriok

The first terminal of New Priok was granted to a consortium, consisting of the conglomerate Mitsui, the global terminal operator PSA International and the shipping line NYK Line, in a joint venture with PT Pelabuhan Indonesia II (IPC). The new terminal will be developed and operated by a newly

established project company, PT New Priok Container Terminal One (NPCT1). The new terminal will have a design capacity of 1.5 million TEUs, an overall berth length of 850 m and a 16-metre draft upon completion, which would make it ready to accommodate the largest container vessels. NPCT1 became operational in August 2016.

In the first years of operation, management of expectations would be essential. Container volumes at Tanjung Priok have declined since 2013, the share of international cargo has decreased and the incumbent operators are not at full capacity, so the conditions for a new terminal are not necessarily very favourable from the outset. Unless the supply of new port infrastructure – adapted to very large containerships – manages to immediately recapture some of the lost transshipment cargo, it is difficult to see how NPCT1 could grow in the coming years without affecting the cargo volumes of JICT. Depending on the development of demand for containerised cargo in Indonesia in the coming years, the phasing-in of the next stages of the project could be reconsidered, in order to avoid the creation of container terminal oversupply in Jakarta.

A maritime policy to attract direct calls

Maritime policy is recognised by the government as one of the key tools to foster Indonesia's development. Since election in 2014, Indonesia's president, Joko Widodo pushed forward a "Global Maritime Axis" vision for the country. As part of a larger ambition to develop infrastructure extensively throughout Indonesia, he strongly believes in strengthening maritime infrastructure as a way to propel the country's economy. Upgrading the port network is considered as the fundamental pillar to achieve this goal. This ambition is translated into Indonesia's Port Development Master Plan, which aims at reducing logistics costs from 23.5% of gross domestic product (GDP) in 2015 to 19.2% in 2019. The policy approach to reduce logistics costs is formed by a push for public and private infrastructure investments in an extended port network, the creation of new maritime freight service routes designed for better economic integration of the country and a vessel building plan to support the programme.

As part of the Port Development Master Plan, the government identified a network of 24 ports to be developed within five years from 2014, for which the government would have to invest close USD 6 billion, in addition to which around USD 7 billion worth of investments from the private sector would need to be raised. The Indonesian president intends to find public resources through improved tax collection and reducing the country's fuel subsidies. On the private side, Indonesia relies on the interest of investors from China, Japan, the United States and Europe. The project separates ports in different categories. Some will be granted to local or foreign port operators through concession contracts, some will be operated on the basis of 10-year contracts, some will be operated by the Indonesian Port Corporation (IPC), and others will be run directly by the local governments. Part of the projects are related to infrastructure upgrades at 11 existing feeder ports dedicated to facilitating passengers movements and some funds will be directed to creating the design of 13 new cargo ports.

In 2015, the Indonesian Transportation Ministry asked the state-owned port operators (Pelindo 1, 2, 3 and 4) to start developing 15 commercial ports. The Ministry itself will focus on developing the non-commercial ports in more remote areas. As part of this, PT Pelabuhan Indonesia (Pelindo 1) launched five port expansion projects in 2015 (Malahayati Port, Belawan Port, Kuala Tanjung Port, Dumai Port and Batam Port). Considering Indonesia's geography, it is likely that international routes of shipping companies that would include Jakarta would also include a few other Indonesian ports. In this respect, it is not sufficient that Jakarta is mega-ship ready; it would be in Jakarta's interest if a few other Indonesian ports could also accommodate such ships.

Indonesia is also a strategic node for China within the context of the maritime part of its Belt and Road-Initiative. The port of Jakarta figures on the map that outlines this vision (Figure 28). Chinese investors are looking at strategic infrastructure to develop in Indonesia because of its location on two straits, between two oceans and two continents. Chinese Merchants Group has largely invested in the Port of Batam, in conjunction with Pelindo 2, to develop a new container terminal allowing transshipment in the Malacca Straits, bypassing Singapore. Chinese investments keep increasing towards Indonesia and the tendency will likely continue, as it is being solicited by the Jokowi administration. According to local stakeholders, there would be an interest from the China Merchants group in operating CT2 or CT3 of the New Priok Port.

Figure 28. **China's One Belt One Road vision**

Source: Council on Foreign Relations. (2015).

The other component of the policy is the "Sea Toll Road" programme, which is dedicated to improving connectivity throughout the country and to capture traffic currently heading to other regional ports at which cargo is transshipped and then sent to Indonesia (such as Singapore or Port Klang). Such a policy is not new and it remains fairly similar to the past administration's "East-West Pendulum" programme. The project aims toconnect six major ports, by making them local "hubs", to a large number of smaller ones in an integrated system. The six ports are Belawan (Sumatra), Batam (bordering Singapore), Tanjung Priok (Jakarta), Tanjung Perak (East Java), Makassar (South Sulawesi) and Sorong (Papua), most of which are already the busiest ports in the country. The government wants to boost the creation of service routes between ports in the country through temporary subsidised shipping programmes. This allows a decrease in shipment costs and sets incentives for shippers to gradually

increae their use of these new routes. The first three routes operated by the state-owned public company Pelni were launched in November 2015; the government aims to launch 22 in total, dropping the subsidies as traffic grows. With this programme, Indonesia hopes to lower price disparity between regions by 30% according to the Minister of Trade, in charge of coordinating the project. In support of the programme the government also announced a plan to build 188 ships between 2015 and 2017, which is the largest ship development initiative ever conducted in the country.

Figure 29. **Main maritime routes in the Indonesian "Sea Toll Road" programme**

Source: HKTDC (2017).

Some skepticism has been expressed with regards to the Sea Toll Road programme. For many commentators, the cost of operating these routes will remain too high in large part because if there are volumes to be sent to more remote areas, they often come back empty, which is not sustainable. This would also mean that landside transportation improvements would be needed to better connect production centres with the ports to be developed.

Coastal shipping constrained by cabotage laws

After a set of important deregulation measures in the 1990s, which significantly increased the amount of domestic cargo carried by foreign flag vessels, the Indonesian Government took contrasting steps in 2005 and later 2008, adopting the cabotage principle in Indonesian waters. This means that domestic shipping is in the hands of the state, which is entitled to restrict and sanction access to domestic waters for international vessels and international crews. Cabotage protects the national maritime industries, supports national security and defence objectives, provides economic opportunities for local businesses and prevents the dependency of the country on foreign companies (Simbolon and Partners, 2011). But it reduces overall coastal shipping activity.

In 2005, Presidential Instruction No. 5 focused on empowering the shipping industries, establishing that "Sea activities in the country shall be convened by the national sea transport companies, organizers of the special marine transportation and shipping companies using the Indonesian flagged ship and by Indonesian crews." The Maritime Law No.17/2008 further pushed in that direction, imposing two important notions in Article 8: first, “Domestic sea freight must be carried by national sea transport companies using Indonesian flagged vessels manned by crews of Indonesian nationality.” Furthermore, "Foreign vessels are prohibited from transporting passengers and/or goods between islands or between ports in Indonesian waters." In that regime, companies are required to license themselves as "Indonesian Sea Carriage Companies", and to be owned by foreign companies at no more than 49% currently allowed by law (Clyde & Co, 2014). The interdictions and sanctions imposed with Maritime Law 17/2008 fully came into force in 2011, allowing international shippers three years to replace vessels or to re-register under the Indonesian flag.

The Indonesian National Shipowners Association (INSA) welcomed these new laws, which have led to an important increase in cargo volumes traded on Indonesian ships in the country. Asrofi (2010) notes that between 2005 and 2010 the freight transported on Indonesian ships almost doubled while the number of Indonesian flagged ships has increased by close to 63% over the same period. However, it remained hard to obtain information on company ownership in Indonesia, which meant that part of the benefits generated by the cabotage regulation could have fled outside of the country (OECD, 2012).

In the meantime it was acknowledged that the imposed cabotage requirements were too restrictive for some shipping sectors, in particular the ones for which there was no local fleet available to respond to market demand. A series of other provisions were introduced to exempt some of the ships and activities from the regulation, allowing some flexibility and giving them some extra time to adapt to this new regime. Exempted vessels are typically those for which there is little substitution with local ships available in the medium term because the industry is not sufficiently developed. Government Regulation No. 22/2011 and Ministry of Transportation (MOT) Regulation No. 48/2011 established the guidelines for the exemptions for offshore vessels, as well as the expiry dates by which these vessels will have to abide by the cabotage principle. Depending on the type of ships and activity different extra times were allowed (Global Business Guide, 2014).

Indonesia's cabotage regulation had rather limited impact on the country's shipbuilding industry so far. According to data from the Ministry of Transportation, the number of vessels types that can be produced in Indonesia went from nine to 19 between 2005 and 2014, which represents an encouraging diversification. The number of Indonesian vessels increased sharply as well, going from 5 750 to 14 175 with only 295 foreign flagged vessels still operating in Indonesian waters in 2014. Still these figures do not tell where the ships were built and it is likely that most were built elsewhere. The ship building industry represented only IDR 10 trillion (Indonesian rupiahs) a year (USD 757 million), and employed only 26 000 persons in around 250 shipyards in 2013, while the vessels operating in Indonesian waters the same year had a total investment values of IDR 227.5 trillion (USD 17.2 billion) (Nusantara Maritime News, 2015).

The policy also led to an explosion of the number of joint ventures, which could be seen as way to go around the rule. Regulation and compliance also remain issues, since clarity is still lacking concerning investment protection for foreign investors, standards for Indonesian flagged vessels and compliance terms (Yee, 2015). As the exemptions have now expired, there is still concern that Indonesian shipping companies will not be able to meet market demand in the offshore oil and gas sectors, which is sustained by the fact that there remains a lack of local assets and expertise in these fields (Yee, 2015).

Restrictive cabotage laws most likely constrain the attractiveness of Jakarta and other Indonesian ports as a direct port of call for global shipping companies. It is likely that these companies, when designing their maritime route configurations, e.g. between Chinese Taipei and Australia, would want to include multiple ports in Indonesia. The business model of such a route could be dependent on the possibility to include domestic cargo; the ocean going vessel would in this case be doing coastal shipping alongside transport of international cargo. This might well be in the interest of Indonesian shippers and consumers as the economies of scale of ocean going vessels would translate into lower rates than the ones that national coastal shipping might achieve.

However, this is currently not possible, as cabotage laws do not allow foreign lines to be active in coastal shipping. Reforming cabotage is not an easy undertaking, yet various OECD member countries have managed to implement reforms in this area (Box 1). A feasible way to open up cabotage is to gradually introduce exemptions for certain categories of ships; considering the desire to attract direct calls from large container ships to Jakarta - and other Indonesian ports – it could be recommendable to formulate an exemption from cabotage laws for such types of ships.

Box 1. Reforming cabotage in OECD member countries

Short-sea shipping from one coastal location to another in the same country is often subject to restrictive cabotage laws, excluding this kind of cargo transport to foreign-flagged ships, vessels with foreign staff, vessels that were not constructed in the country, or a combination of these restrictions. Such laws have had a very discouraging impact on short-sea shipping.

Generally, the range of maritime cabotage regimes is wide, from very restrictive in the US and Japan to very liberal in New Zealand and Australia (Brooks, 2009). The regime in the US, regulated by the Jones Act, requires not only US-flagged vessels and US crews, but also that the vessel was built in the US. Many countries are less restrictive and do not include the "built in" requirement. The regimes of Australia and New Zealand are very liberal and aim at creating a level playing field between international and coastal shipping. Although cabotage legislation is sensitive and difficult to reform, various countries have liberalised their legislation over the last decades; one of the more recent liberalisations was conducted in China.

In practice, many countries have exemptions to cabotage rules. For example, coastal shipping in Mexican waters is, as a general rule, reserved to Mexican shipowners with Mexican vessels, but if there are no Mexican-flagged vessels available, foreign flagged vessels may engage in cabotage trade under temporary cabotage permits granted by the Ministry of Communications and Transportation (SCT). These cabotage permits are granted for three-month periods and can be renewed seven times, with a maximum total of two years. After this period, the vessel would have to be flagged Mexican in order to continue operating in Mexican waters. Many countries have such exemptions, sometimes to the extent that the cabotage rules practically no longer apply.

Source: Merk and Notteboom (2015).

Removing bottlenecks

Much political attention has focused on reducing dwell times in Indonesian ports. The issue received special attention by the Indonesian president Joko Widodo. He formulated a target of two-three days waiting time in the yard and created a task force to reduce the time cargo spends in the port. One of the measures to reduce dwell time was a container storage penalty scheme introduced at the Jakarta International Container Terminal in September 2015. Under this scheme three days of storage were permitted, but a daily fee begins on the fourth day, as well as a penalty of 500% of the daily fee from day

four to day 10, and an additional penalty from day 11 onwards. This measure was made more stringent in March 2016, when a penalty of 900% of the daily fee was introduced for containers that remain in storage for more than a day after unloading from vessels. This measure led to opposition from local shippers and a complaint from the Indonesian Chamber of Commerce and Industry, after which the scheme was revised into a payment per hour, rather than per day.

Some new measures were announced that would reduce the time cargo would be retained for inspection. According to some of the stakeholders, the time needed for pre-customs clearance was responsible for half of the average dwell time of containers in 2015. This procedure involves a permit that requires verification by various administrative bodies. In March 2016 the Indonesian government announced measures to help cut the time needed for imports to be processed by customs at local ports. As part of the Economic Policy Package XI, the Ministry of Economic Affairs now requires all customs permits to be processed through the Indonesia National Single Window web portal, instead of going through the different government agencies in charge of ports. The government hopes that this measure will reduce by one day the customs clearance time for pharmaceutical raw materials, food and beverages, and other products that require a licence from Indonesia's National Agency of Drug and Food Control.

One possible way to reduce bottlenecks in the supply chain could be the wider use of dry ports. There is currently one dry port connected to the port of Jakarta, namely Cikarang. This dry port acts as an extended gate of the port of Jakarta, as it hosts customs and sanitary inspection services, and has bonded shuttle truck and train services between the area and the JICT and KOJA terminals in the Jakarta port. The information systems of the dry port are integrated with the ones from shipping lines, which makes it possible to do detailed truck arrival planning to the port. The total volumes passing through Cikarang are limited – they do not exceed 50 000 TEU per year – but the model is promising and would deserve to be roll-outed in other parts of the metropolitan region, since it would allow more planned truck arrivals at the port gate and less congestion in the yard.

One of the measures that will likely smoothen the truck traffic to and from the port is the section N of the Jakarta Outer Ring Road (JORR), finalised in 2017. This section makes it possible for port trucks to avoid intermingling with local passenger traffic on congested urban roads. The JORR project suffered from flaws in building materials, an experienced signs of cracking in the columns supporting the elevated toll way. These columns have subsequently been replaced.

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Notes

[1] TEU stands for twenty-foot equivalent unit, the standard for a small container.

[2] 70% according to schedule data, 65% according to AIS data; actual ship movement data was not available.

International Transport Forum

The Impact of Mega-Ships

The Case of Jakarta

The port of Jakarta is the incontestable gateway to Indonesia. As an archipelago state, Indonesia has much to gain from improving its maritime connectivity and attracting more direct liner services. These services rely on ever larger ships. What is needed to attract them, and how could Jakarta best handle them? This report brings more clarity to these issues by assessing the impacts of very large container ships for Jakarta. It analyses current policies and offers recommendations on how Indonesia's largest port could effectively prepare for the arrival of ships.

This report is part of the International Transport Forum's Case-Specific Policy Analysis series. These are topical studies on specific issues carried out by the ITF in agreement with local institutions.

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