Ever-larger container vessels and much bigger liner alliances have brought a sharp focus on the nature of terminal capacity in each port. In the ‘old days’ of smaller ships and smaller ‘customers’, each customer could be accommodated in a single terminal and it did not matter whether a port had one large terminal or a number of smaller ones. However, the large scale and ‘lumpiness’ of customer volumes in the mega-alliances has markedly changed the nature of demand for terminals. Fewer, larger terminals are needed in each port and this has led Drewry to analyse the degree to which terminal capacity in the world’s ports is either concentrated in a small number of terminals in each port, or fragmented across numerous terminals.

**Mapping Out Desirable Options**
Figure 1 illustrates the various scenarios. On the vertical axis, the degree to which a port’s capacity is fragmented into numerous terminals is measured using the HHI Index, where 1.0 means no fragmentation at all (i.e. the port only has one terminal) and zero means it is highly fragmented (i.e. the port has numerous terminals within it). However, the question of fragmentation also must be seen in the context of the size of the port and so the horizontal axis plots this, ranging from an annual throughput of 1.0 million teu to 20 million teu. As can be seen, there are two quadrants that are undesirable and two that are more desirable. Smaller ports are better off with low fragmentation, but larger ports can function with a degree of fragmentation. A very large port with a single terminal might appear to be an attractive operational option on the face of it, but this may result in inefficiency due to very long internal moves of containers between the yard and the quay. It is possible therefore to show an operational ‘sweet spot’ across the matrix, as illustrated in Figure 2.

**Operational Benefits vs Internal Competition**
It is important to note that these ‘desirable’ options are purely assessed in terms of what is best for a port operationally, in order to cope with bigger ships and alliances. They do not consider the question of the need or desire for competition between terminals within a port. In general, port authorities and governments like to see multiple terminals (with different operators) in each port, in order for there to be internal competition – albeit that in most cases the result is a duopoly or oligopoly. In operational terms though, fewer terminals (or a single one) is often a better solution. There is a dilemma here therefore and a need for suitable balance in each port between operational advantages and perceived and actual regulatory concerns over competition. On the question of competition though, in many locations it is often the case that there is sufficient competition from neighbouring ports, so internal competition within individual ports is not necessarily imperative.

**Data-Driven Results**
Drewry has analysed the structure of around 120 ports worldwide with throughputs in the range of 1-20 million teu per annum, assessing the size and number of specialised container terminals in each port, and calculating an HHI index figure. The results of this bespoke Drewry analysis are plotted in Figure 3 and show a cluster of ports at
the smaller end of the throughput range, but having a wide variation in the HHI Index, including a number of ports with no fragmentation of terminal capacity at all but also many at the more fragmented end of the scale. The overall results show that the position of ports in the sample varies widely, a consequence of historical accident, gradual evolution and changing circumstances in each port.

**MOST FRAGMENTED PORTS**

Figure 4 plots a selection of ports in the sample having the highest degrees of fragmentation of terminal capacity, with the operational ‘sweet spot’ range also shown for context. In our sample, several Japanese ports (Tokyo, Osaka and Kobe) and several major US ports also feature (Los Angeles, Long Beach and New York). The Japanese ports have medium-sized throughputs (in the range of 2.5 to 5 million teu per annum), but a high number of terminals (29 in total across the three ports). The US ports are larger than the Japanese ports (5.0 to 9.0 million teu per annum) but still have six terminals in each port on average. Buenos Aires is a port with one of the smallest throughputs in the sample (around 1.5 million teu) but has four terminals. Very large ports such as Ningbo and Busan with throughputs in excess of 17 million teu per annum also have significant fragmentation of capacity with eight and nine terminals respectively. This places them outside the operational ‘sweet spot’ and, for example, has a high level of inter-terminal transfers.

**LEAST FRAGMENTED PORTS**

Figure 5 plots a selection of the ports with the lowest levels of fragmentation of their terminal capacity. The majority of these are clustered in the ‘sweet spot’ zone in the top left of the matrix and are small to medium sized ports with just one specialised container terminal. Showing greater fragmentation, but still within the ‘sweet spot’, are ports such as Piraeus and Dubai (Jebel Ali). It is interesting to note here though that while there are several terminals in each of these ports, following the acquisition of Piraeus Port Company by Cosco Pacific, both ports now have a single operator each. This naturally makes it easier to achieve operational coordination of the terminals within each port.

Hong Kong port has a moderate level of fragmentation but lies outside the ‘sweet spot’. The high level of inter-terminal transfers at this port (in common with many other ports) is evidence of the consequences of a large degree of terminal fragmentation. On the basis of this analysis, Tanjung Pelepas also lies outside the ‘sweet spot’, but it is an interesting case because it is a single, very large terminal. While this may result in long internal travel distances in the yard as mentioned earlier, this is actually more preferable than a similar sized port with multiple terminals requiring inter-terminal transfers. The results of the analysis are nuanced and the size and shape of the ‘sweet spot’ may therefore need refinement.

**WHAT CAN BE DONE?**

The issue is clear but what can be done to address it? For a port to reduce the fragmentation of its capacity it has to consider not only the likely high cost of civil works but also the practicality in terms of land availability and ownership, existing leases and concessions and environmental impacts as well as the question of terminal ownership. The fact remains though that less fragmentation is what the market wants and needs.

**TERMINAL ALLIANCES AND VIRTUAL TERMINALS?**

Greater cooperation and closer working between the terminals within a port is one suggested approach, with the ideal of creating a single, virtual terminal. For example, vessels could be allocated centrally to the first available berth at any terminal in the port and yard equipment could be shared, depending on how contiguous the terminals are and whether they have the...
same equipment types (a common mode of operation).

However, this has numerous challenges if there are a number of different terminal operators with varying aims and interests. It might well be hard to find win-win terminal alliances with one terminal operator more likely to be happy and another not. Shipping lines have been operating in alliances for many years and have the advantage of homogenous assets. Terminal operators face the problem that every terminal is different, not homogenous, and there would not necessarily be like-for-like sharing of assets.

More importantly, regulatory controls limiting cooperation and communication between competing terminal operators have a strong bearing in many locations. Any workable solution would vary greatly from place to place depending on the circumstances.

**TERMINAL CONSOLIDATION: THE ONLY LONG-TERM SOLUTION**

Increased cooperation between terminal operators in a port and efforts to facilitate inter-terminal transfers will help, but in a way this is simply avoiding the real issue. Consolidation is the only real long-term solution and this has two aspects:

- Physically bringing together terminal capacity by capital investment and civil works
- Consolidating the ownership of terminals where there are numerous players in the same port

Perhaps the more practical and deliverable approach, short of physically relocating and combining terminal capacity in a port, is the latter - to align the interests and operational control by encouraging mergers of terminal operators. Indeed it could be argued that physical consolidation of terminal capacity has to be preceded by ownership consolidation in order to be a feasible proposition.

This article draws upon an analysis contained in a pre-launch edition of Drewry’s new report covering the ports and terminals industry (Ports & Terminals Insight: https://www.drewry.co.uk/maritime-research-products/ports-and-terminals-insight-annual-subscription). Ports & Terminals Insight is designed to complement Drewry’s highly regarded annual report on container terminal operators. The new report focuses on timely issues such as the ramifications of changes to liner services and port call patterns, the current financial performance of listed port companies, the implications of new port projects and the reasons behind the latest port throughput trends. In addition, each quarter features a detailed thought leadership analysis, picking out a key industry issue or trend and unravelling its complexities.

**ABOUT THE AUTHOR**

Neil Davidson has over 25 years experience in the port sector. He joined Drewry in 1997 and founded the company’s ports practice. His current role is focused on Drewry’s publications and new products in the ports and terminals sector. He has been closely involved as both contributor and editor of all of Drewry’s annual and one-off port sector publications, and spoken at over 75 industry conferences and seminars worldwide. His previous consultancy experience included participation in port projects in global locations including Europe, Asia, the Americas and the Middle East. The work included buy and sell-side due diligence, privatisations, strategic advice, working for lenders as well as commercial and market analyses. Prior to joining Drewry he spent eight years with the Port of Tilbury, London, specialising in business planning. He was closely involved in the successful management buy-out of the port in 1992, and its subsequent trade sale to Forth Ports plc in 1995. He also gained Freeport status for the port, acting as Freeport Manager for two years.

A graduate of the Department of Maritime Studies, Cardiff University, his industry experience also includes working for Lloyd’s of London and the Medway Ports Authority, Sheerness, UK.

**ABOUT THE ORGANISATION**

Drewry is one of the world’s leading international maritime consultancy and publishing organisations. Founded in 1970, the company has over 40 years’ experience within the maritime sector, employing over 90 specialists across offices in London, India, Singapore and Shanghai. The company provides research reports and consultancy services with a brand renowned for its quality. Drewry reports are sold in more than 90 countries and consultancy services commissioned by clients from over 70 countries.

**ENQUIRIES**

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