
UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

REVIEW OF MARITIME TRANSPORT 2013

Report by the UNCTAD secretariat

Chapter 4



UNITED NATIONS
New York and Geneva, 2013

4

PORT DEVELOPMENTS

This chapter covers container port throughput, port finance, selected global port development projects and efforts aimed at assessing port performance. World container port throughput increased by an estimated 3.8 per cent to 601.8 million TEUs in 2012. This increase was lower than the estimated 7.3 per cent increase of 2011. The share of Chinese mainland ports in total world container port throughput remains at an estimated 25 per cent. The financing of port infrastructure remains strong as investors continue to seek long-term stable returns. Recent efforts by port customers to assess port performance are leading towards an era of increased transparency in port operations that could spur greater interport competition, increased port performance and reduced transport costs.

A. PORT THROUGHPUT

Port throughput is the amount of cargo that passes through a port and is measured in volume or units and categorized by cargo type. Ports are broadly categorized into dedicated terminals (that is, usually reserved for a single or small number of private cargo owners) or common user terminals (open to any cargo owner to use). This chapter deals with containerized cargo, which accounts for 15.6 per cent by volume, but also more than half in value, of international seaborne trade.

1. Container ports

Container port throughput is usually measured in the number of TEUs moved. The latest figures available for world container port traffic are given in table 4.1. Seventy-six developing countries and economies in transition with an annual national throughput of over 100,000 TEUs are listed. (Annex IV shows port throughput figures for 127 countries/territories). In 2011, the container throughput for developing economies grew by an estimated 8 per cent to 406.9 million TEUs. This growth is lower than the 15.8 per cent seen in the previous year, when businesses restocked inventories depleted because of uncertainties surrounding the global economic crisis. The growth rate for container throughput in developing economies for 2012 is still weak, estimated at 4.8 per cent.

Developing economies' share of world throughput continues to remain virtually unchanged at approximately 70 per cent. Out of the developing economies and countries with economies in transition listed in table 4.1, only four experienced negative growth in port throughput in 2011, whereas in the previous year 10 countries experienced negative growth. Of the top 10 developing countries and countries with economies in transition, only one, Brazil, is not located in Asia. Fifteen of the top 20 developing countries and countries with economies in transition are also in Asia, while three are in Central and South America (Brazil, Mexico and Panama) and two are in Africa (Egypt and South Africa). The dominance of Asia in container port throughput signifies the importance of the region in international trade. The countries registering the highest growth in 2012 were the Congo (44.6 per cent), Ghana (30.0 per cent), Kenya (22.7 per cent), Mauritius (19.1 per cent) Saudi Arabia (15.2 per cent), the Russian Federation (14.3 per cent), South Africa (10.9 per cent), the Philippines (8.7 per cent) and China (7.7 per cent). The country with the largest share of container throughput continues to be China, with nine of its ports, including Hong Kong (China) among the top 20. Chinese ports, excluding Hong Kong (China),

experienced a positive growth of 9.2 per cent in 2011 to reach 143.8 million TEUs. Preliminary figures for 2011 show a reduced growth for Chinese port throughput to around 6.9 per cent, at 155 million TEUs. Chinese ports, with the exception of Hong Kong (China) and those of Taiwan Province of China, accounted for around 25.3 per cent of world container throughput in 2012, down slightly from 25.8 per cent in the previous year (a more detailed account of international trade demand and supply is given in chapter 1).

Table 4.2 shows the world's 20 leading container ports for the period 2010–2012. The top 20 container ports accounted for approximately 47 per cent of world container port throughput in 2012. Combined, these ports showed a 3.2 per cent increase in throughput in 2012, down from an 8.2 per cent increase in 2011. The list includes 16 ports from developing economies, all of which are in Asia; the remaining four ports are from developed countries, three of which are located in Europe and one in North America.

The overall picture that emerges is that while Asia continues to lead the global demand for container port services, growth is slowing. However, compared with shipping, which is affected by an oversupply of vessels and declining freight rates, the container port business is growing.

B. FINANCING PORT INVESTMENTS

Financing new port development projects is capital intensive. A recent study of the scale of future infrastructure demand examined nine economies (Brazil, China, France, Germany, India, Japan, Mexico, the United Kingdom, and the United States), collectively accounting for 60 per cent of world GDP, and found that their annual spending on long-term investment totalled \$11.7 trillion for the year 2010. Extrapolating a range of growth forecasts and investment projections from external sources, the study estimated that developing countries will need annual investment of \$18.8 trillion in real terms by 2020 to achieve even moderate levels of economic growth (Group of 30, 2013).

While financing infrastructure from the public purse may provide control of what infrastructure is created, in reality money could be saved by transferring the majority of projects to the private sector as sustainable businesses. This is not always the case where the infrastructure project may be more social than economic, for example, building roads or bridges to remote communities with small populations. However, on the whole, private funding sources for infrastructure development seem

Table 4.1. Container port throughput for 76 developing countries/territories and economies in transition for years 2010, 2011 and 2012 (Twenty-foot equivalent units)

Country/territory	2010	2011	Preliminary figures for 2012	Percentage change 2011–2010	Percentage change 2012–2011
China	130 290 443	143 896 697	155 017 351	10.44	7.73
Singapore ^a	29 178 500	30 727 702	32 421 602	5.31	5.51
Hong Kong, China	23 699 242	24 384 000	23 100 000	2.89	-5.27
Republic of Korea	18 542 804	20 833 508	21 453 964	12.35	2.98
Malaysia	18 267 475	20 139 382	20 866 875	10.25	3.61
United Arab Emirates	15 176 524	16 780 386	17 211 602	10.57	2.57
Taiwan Province of China	12 736 855	13 473 418	13 977 453	5.78	3.74
India	9 752 908	9 979 224	9 826 249	2.32	-1.53
Indonesia	8 482 636	8 966 146	9 324 792	5.70	4.00
Brazil	8 138 608	8 536 262	8 864 368	4.89	3.84
Egypt	6 709 053	7 737 183	8 046 670	15.32	4.00
Thailand	6 648 532	7 171 394	7 372 298	7.86	2.80
Panama	6 003 298	6 911 325	7 187 778	15.13	4.00
Viet Nam	5 983 583	6 335 437	6 588 855	5.88	4.00
Saudi Arabia	5 313 141	5 694 538	6 557 448	7.18	15.15
Turkey	5 574 018	5 990 103	6 229 707	7.46	4.00
Philippines	4 947 039	5 264 086	5 720 749	6.41	8.68
Sri Lanka	4 000 000	4 262 887	4 433 402	6.57	4.00
South Africa	3 806 427	3 990 193	4 424 254	4.83	10.88
Mexico	3 693 956	4 080 434	4 243 651	10.46	4.00
Russian Federation	3 199 980	3 448 947	3 942 628	7.78	14.31
Chile	3 171 959	3 450 401	3 588 417	8.78	4.00
Oman	3 893 198	3 632 940	3 292 707	-6.68	-9.37
Islamic Republic of Iran	2 592 522	2 740 296	2 849 908	5.70	4.00
Colombia	2 443 786	2 402 742	2 498 852	-1.68	4.00
Pakistan	2 149 000	2 193 403	2 281 139	2.07	4.00
Argentina	2 021 676	2 159 110	2 245 474	6.80	4.00
Jamaica	1 891 770	1 999 601	2 079 585	5.70	4.00
Peru	1 534 056	1 814 743	1 887 332	18.30	4.00
Morocco	2 058 430	2 083 000	1 800 000	1.19	-13.59
Dominican Republic	1 382 680	1 461 492	1 519 952	5.70	4.00
Bangladesh	1 356 099	1 431 851	1 489 125	5.59	4.00
Bahamas	1 125 000	1 189 125	1 236 690	5.70	4.00
Bolivarian Republic of Venezuela	1 226 508	1 162 326	1 208 819	-5.23	4.00
Ecuador	1 221 849	1 081 169	1 124 415	-11.51	4.00
Guatemala	1 012 360	1 070 065	1 112 867	5.70	4.00
Costa Rica	1 013 483	1 065 468	1 108 087	5.13	4.00
Kuwait	991 545	1 048 063	1 089 986	5.70	4.00
Kenya	696 000	735 672	903 000	5.70	22.74
Uruguay	671 952	861 164	895 611	28.16	4.00
Ghana	647 052	683 934	889 129	5.70	30.00
Lebanon	949 155	1 034 249	882 922	8.97	-14.63
Yemen	669 021	707 155	735 441	5.70	4.00
Ukraine	659 541	696 641	724 506	5.63	4.00

Table 4.1. Container port throughput for 76 developing countries/territories and economies in transition for years 2010, 2011 and 2012 (Twenty-foot equivalent units) (continued)

Country/territory	2010	2011	Preliminary figures for 2012	Percentage change 2011–2010	Percentage change 2012–2011
Syrian Arab Republic	649 005	685 998	713 438	5.70	4.00
Honduras	619 867	655 199	681 407	5.70	4.00
Jordan	619 000	654 283	680 454	5.70	4.00
Côte d'Ivoire	607 730	642 371	668 065	5.70	4.00
Djibouti	600 000	634 200	659 568	5.70	4.00
Trinidad and Tobago	573 217	605 890	630 126	5.70	4.00
Congo	338 916	358 234	518 000	5.70	44.60
Tunisia	466 398	492 983	512 702	5.70	4.00
Sudan	439 100	464 129	482 694	5.70	4.00
United Republic of Tanzania	429 285	453 754	471 904	5.70	4.00
Mauritius	332 662	350 624	417 467	5.40	19.06
Senegal	349 231	369 137	383 903	5.70	4.00
Qatar	346 000	365 722	380 351	5.70	4.00
Benin	316 744	334 798	348 190	5.70	4.00
Papua New Guinea	295 286	313 598	326 142	6.20	4.00
Bahrain	289 956	306 483	318 743	5.70	4.00
Cameroon	285 070	301 319	313 371	5.70	4.00
Algeria	279 785	295 733	307 562	5.70	4.00
Mozambique	254 701	269 219	279 988	5.70	4.00
Cuba	228 346	246 773	256 644	8.07	4.00
Georgia	226 115	239 004	248 564	5.70	4.00
Cambodia	224 206	236 986	246 465	5.70	4.00
Myanmar	190 046	200 879	208 914	5.70	4.00
Libya	184 585	195 106	202 910	5.70	4.00
Guam	183 214	193 657	201 403	5.70	4.00
Gabon	153 657	162 415	168 912	5.70	4.00
El Salvador	145 774	154 083	160 246	5.70	4.00
Madagascar	141 093	149 135	155 101	5.70	4.00
Croatia	137 048	144 860	150 654	5.70	4.00
Aruba	130 000	137 410	142 906	5.70	4.00
Nigeria	101 007	106 764	111 035	5.70	4.00
Brunei Darussalam	99 355	105 018	109 219	5.70	4.00
Sub total	375 760 063	406 133 627	425 712 710	8.08	4.82
Other reported ^b	796 607	746 145	772 903	-6.33	3.59
Total reported	376 556 670	406 879 772	426 485 613	8.05	4.82
World total	540 816 751	580 022 280	601 772 123	7.25	3.75

Sources: UNCTAD secretariat, derived from information contained in *Lloyd's List Intelligence* (July 2013), from various Dynamar B.V. publications, and information obtained by the UNCTAD secretariat directly from terminal and port authorities.

^a In this list, Singapore includes the port of Jurong.

^b The term "other reported" refers to countries for which fewer than 100,000 TEUs per year were reported.

Note: Many figures, especially for 2012, are estimates (*these figures are indicated in italics*). Port throughput figures tend not to be disclosed by ports until a considerable time after the end of the calendar year. Country totals may conceal the fact that minor ports may not be included; therefore, in some cases, the actual figures may be higher than those given.

Table 4.2. Top 20 container terminals and their throughput for 2010, 2011 and 2012 (Twenty-foot equivalent units and percentage change)

Port name	2010	2011	Preliminary figures for 2012	Percentage change 2011–2010	Percentage change 2012–2011
Shanghai	29 069 000	31 700 000	32 500 000	9.05	2.52
Singapore	28 431 100	29 937 700	31 600 000	5.30	5.55
Hong Kong (China)	23 699 242	24 384 000	23 100 000	2.89	-5.27
Shenzhen	22 509 700	22 569 800	22 940 000	0.27	1.64
Busan	14 194 334	16 184 706	17 030 000	14.02	5.22
Ningbo	13 144 000	14 686 200	14 973 400	11.73	1.96
Guangzhou	12 550 000	14 400 000	14 520 000	14.74	0.83
Qingdao	12 012 000	13 020 000	14 500 000	8.39	11.37
Dubai	11 600 000	13 000 000	13 280 000	12.07	2.15
Tianjin	10 080 000	11 500 000	12 300 000	14.09	6.96
Rotterdam	11 145 804	11 876 921	11 900 000	6.56	0.19
Port Klang	8 871 745	9 603 926	9 990 000	8.25	4.02
Kaohsiung	9 181 211	9 636 289	9 781 000	4.96	1.50
Hamburg	7 900 000	9 014 165	8 930 000	14.10	-0.93
Antwerp	8 468 475	8 664 243	8 629 992	2.31	-0.40
Los Angeles	7 831 902	7 940 511	8 080 000	1.39	1.76
Dalian	5 242 000	6 400 000	8 060 000	22.09	25.94
Tanjung Pelepas	6 530 000	7 500 000	7 720 000	14.85	2.93
Xiamen	5 820 000	6 460 700	7 200 000	11.01	11.44
Laem Chabang	5 068 076	5 731 063	5 927 000	13.08	3.42
Total top 20	253 348 589	274 210 224	282 96 392	8.23	3.19

Source: UNCTAD secretariat and *Lloyd's List Intelligence*, July 2013.

Note: In this list Singapore does not include the port of Jurong.

to be readily available. One industry research firm has identified 662 institutions that are open to making new infrastructure investments, 56 per cent of which are actively seeking new opportunities in 2013, while the remaining have an opportunistic investment strategy (Preqin, 2013). Pensions are attracted to infrastructure investments as they expect them to produce predictable and stable cash flows over the long term. Infrastructure assets can operate in an environment of limited competition as a result of natural monopolies, government regulation or concessions. Investments can be capital intensive and include a tangible asset that must be operated and maintained over the long term (OECD, 2011). In some countries, pension funds do not directly invest into infrastructure projects because of a lack of in-house expertise. However, this is not the case for many pension funds in Australia, Canada and the Netherlands, which have been investing directly in infrastructure

over the past 20 years (*Financial Times*, 2013a). Global institutional investors put almost \$214 billion into unlisted infrastructure funds between 2004 and January 2013, with nearly \$111 billion heading into North America, just over \$62 billion into Europe and \$21 billion into Asia (Preqin, 2013).

The port is not an isolated entity and must be linked to its hinterland. A distinction needs to be made regarding which part of the port infrastructure and equipment will be paid for by the port as service-production centre or business unit, and which part the community as a whole will finance, according to development objectives and priorities. There may be certain large capital expenditure items that would place too heavy a strain on port finances. Some would argue that the connecting road and rail systems should be financed by the port while others argue that major long-term structures such as

breakwaters or channel dredging should be partly or wholly charged to the central or regional government. It is for each government to decide this policy according to the financial capacity of existing ports and the expected profitability of planned new ports (UNCTAD, 1985).

In Mozambique, the dredging operations to the port of Maputo were financed by the port authority. Port customers, however, complain that the high cost of dredging is being passed onto them, whereas the cost should be borne by the government, since the benefits are for the wider population. Other ports within the same country that do not need to dredge because they are natural deepwater ports (for example, Nacala) can offer more competitive prices to its customers. This can lead to a bias towards one national port or a regional port in a neighbouring country and create extended use of land transport, which is costly both to the consumer and the environment. In addition, deciding to invest in new port facilities is not necessarily a clear-cut case. Related issues that should be explored include how much to expand or how deep to go, how to best cater for present and future demand, and how to attract customers prior to and following the modifications.

The funding of infrastructure can come from a number of primary sources such as the public sector budget, official

development assistance (ODA) and the private sector (Bond et al., 2012). Table 4.3 lists some of the major international banks that are providing infrastructure lending and the share apportioned to the transportation sector.

Public-private partnerships (PPPs) in port development projects have become common place in the last 25 years. The most common form of PPP is the operation of a concession agreement. This usually involves investment by the private company to develop or rehabilitate the port followed by a defined period of operation, during which the investors recuperate their initial layout and make a profit. The concession may adopt different forms of PPP including build-operate-transfer, build-operate-own-transfer and build-transfer-operate schemes. In the period 2000–2009, 29 per cent of public-private investment in ports took place in East and South East Asia (Holman Fenwick Willan LLP, 2013). To the partnership the private sector brings much needed capital and know-how, as well as expected increased efficiency gains associated with combining construction, maintenance and operations arrangements.

Furthermore, most PPPs are attractive to governments because they are kept off government spending books. However, this could prove costly in the long run as the project may not be able to take advantage of lower

Table 4.3. A comparison of international finance to the transport sector (2012)

	Total lending* (Billions of US dollars)	Infrastructure lending (Billions of US dollars)	Transport Sector lending*** (Billions of US dollars)	Transportation sector share (Percentage)
European Investment Bank	57.6 (€44.8 billion)		13 (€10.1 billion)	23
Asian Development Bank	21.6		5	25
International Bank for Reconstruction and Development /International Development Association	35.3		4.4	13
International Finance Corporation	15.5	1.5		
Inter-American Development Bank	11.4		1.7	15
European Bank for Reconstruction and Development	7.7 (€6 billion)		1.6 (€1.3 billion)	21
African Development Bank	8.8 (UA 5.7 billion)	2.4** (UA 1.57 billion)	1.5 (UA 1 billion)	17

Source: Compiled by UNCTAD from various annual reports 2011–2012.

Notes: 1 Unit of Aid (UA; official currency of African Development Bank projects) = \$1.53527.

* For 2012 except, where indicated, may also include third-party lending, guarantees and/or credit lines.

** For 2011.

*** May include other sectors, for example, communication or environment.

government lending to reduce the cost of the venture (Engel et al., 2010). If this is the case, then the design of PPP should be streamlined by adjusting the transfer point from the public to the private sector, given that the highest risk and the most costly part usually comes at the initial construction phase. Investors often worry that projects will be delayed before coming online, so incurring higher interest rates. The removal of this risk by transferring the asset after this point will lower costs.

The leading investors into infrastructure projects are government agencies, asset managers, public pension funds, funds of fund managers, corporate investors, banks, investment companies, endowment plans, insurance companies, private-sector pension funds and foundations. Table 4.4 gives a brief overview of some of the leading infrastructure investors. According to one report more than half of current active investors in infrastructure are looking to commit between \$50 million and \$349 million in infrastructure in 2013, and 16 per cent of investors are looking to invest \$500 million or more. For example, the \$9.6 billion Kuwait Fund for Arab Economic Development is seeking to make a minimum of three new infrastructure fund commitments over the next 12 months. This government agency has a 5 per cent (\$470 million) target allocation for infrastructure projects, with currently just 1 per cent (\$96 million) invested (Preqin, 2013). Aviva Investors are to launch funds aimed at infrastructure investment, and the world's largest asset manager, BlackRock, launched a European infrastructure

debt division that will lend to companies in the transport sector (*Reuters*, 2012). Sovereign wealth funds have over \$4 trillion in assets suitable for long-term investments such as infrastructure (Group of 30, 2013).

One study estimated that between 2013 and 2030, some \$57 trillion in infrastructure investment (including transport, power, water and telecommunications) will be required to keep up with projected GDP growth and yet still be insufficient to meet maintenance deficiencies or the broader development goals of emerging economies, let alone the cost of adapting to climate change (McKinsey Global Institute, 2013). This report goes on to say that institutional investors are frustrated about not being able to find enough suitable vehicles to reach their target allocations for infrastructure and that even if pension funds and asset managers achieved their infrastructure target allocations of around 6 per cent, from 3 per cent today, it would only represent an additional \$2.5 trillion in capital between now and 2030, far short of the \$57 trillion (or more) needed. While the \$57 trillion total includes roads, rail, ports, airports, power, water and telecommunications, transport represents around \$23 trillion, with the share for ports around \$1.5 trillion. In Africa, another study estimates that transport volumes will increase between six to eight times, and as much as 14 times for some landlocked countries, and port throughput will rise from 265 million tons in 2009, to more than 2 billion tons in 2040 (Commonwealth Business Council, 2013).

Table 4.4. A brief comparison of potential investors in infrastructure

	Global Infrastructure Partners	The Canada Pension Plan Investment Board	Ontario Municipal Employees Retirement System	Prudential Plc.	Macquarie Infrastructure and Real Assets
Description	A private equity firm that invests worldwide in infrastructure assets in the energy, transport, and water and waste industry sectors	An investment management organization that invests the assets of 18 million Canadians	Established in 1962, it manages over 930 employers' pension funds for 429,000 members, retirees and survivors	An international financial services group serving more than 24 million insurance customers	The managers of specialist funds which focus on infrastructure, real estate and adjacent sectors
Total investments	\$13.9 billion (GIP II \$8.25 billion)	\$10.3 billion	\$60 billion	\$600 billion	\$101 billion
Transport arm			Allianz and Borealis Infrastructure	Infracapital (M&G Investments)	
Transport-related investments	\$2.8 billion	\$4.6 billion		\$2.3 billion	\$31 billion
Significant transport investments	Gatwick Airport (United Kingdom)	Toll roads (Chile), Formula One (United Kingdom)	Associated British Ports, Channel Tunnel Rail Link (United Kingdom)	Associated British Ports, Red Funnel (United Kingdom)	M6 (United Kingdom), Autoroutes Paris–Rhin–Rhône (France), Warnow Tunnel (Germany), Incheon Grand Bridge (Republic of Korea) Busan New Port Phase 2V3 (Republic of Korea)

Source: Compiled by UNCTAD from various company websites including M&G Investments, 2013 data.

During the period 2000–2009, there were some 195 private investment projects in container, dry and liquid bulk and multi-purpose cargo terminals worth \$38 billion. Seventy-eight greenfield projects in Asia, the Pacific, Latin America and the Caribbean during the period equalled around \$20 billion. In the same period there were 97 concession projects worth \$15.5 billion while there were 11 management and lease projects totalling \$305 million. China, India and Brazil have attracted the highest number of private investments in recent years. China drew almost \$4 billion of private funds in 2006–2009, India \$2.5 billion and Brazil \$1.5 billion. During the same period Singapore's PSA International invested \$2.92 billion, APM Terminals \$2.46 billion and DP World \$1.91 billion (Holman Fenwick Willan LLP, 2013). One Chinese firm, China Harbour Engineering Company, a subsidiary of China Communications Construction Company, has a global portfolio of projects valued in excess of \$10 billion in more than 70 countries (*Cayman Net News*, 2012). The international marine engineering and infrastructure construction firm continues to win major port development contracts around the world in collaboration with the Chinese investment bank CITIC Securities, which has its headquarters in Shenzhen and is listed on the Hong Kong Stock Exchange.

In the United States some ports have secured finance for infrastructure through the issuing of bonds to the value of \$12 billion to be repaid by existing and future user fees. This process helps ports to shore up cash flow and address liquidity constraints without relying on public funds. Port revenue bonds are retired through revenues, user fees and tariff charges paid principally by port customers (*PMISA*, 2013). The issuing of bonds is seen as a favourable means to raise revenue for new

infrastructure projects. In Cleveland the port authority issued a \$90 million bond to construct a new building on its land which will then be tenanted to produce rental income (*The Plain Dealer - cleveland.com*, 2013). In India, tax-free bonds are also seen as a way to raise \$769 million for port projects (*Livemint*, 2013a). In Peru, \$110 million of bonds were used to finance new infrastructure at the Paita Terminal Port in the region of Piura. In this case the site was a brownfield location already generating income, and this avoided the usual problem of construction risk increasing the price of the bonds (Bacchiocchi, 2012). Table 4.5 lists the ten largest infrastructure funds for the period 2008 to September 2012.

C. RECENT PORT DEVELOPMENTS

Port development is seen as a catalyst to stimulate economic activity and create employment. In the United Kingdom, despite no longer being a major trading centre for merchandised goods, it is estimated that 262,700 jobs and £13.8 billion (\$21.5 billion) were generated in 2011 through the provision of maritime services (Oxford Economics, 2013). The United Kingdom distribution industry as a whole employed an estimated 2.67 million people, 10 per cent of workplace employees in 2007 (Haven Gateway Partnership, 2010). Similarly, the six-berth London Gateway terminal development nearing completion is expected to create 12,000 new jobs and another 20,000 jobs indirectly (Holman Fenwick Willan LLP, 2013). Virtually every government, national, regional or local authority, as well as the ports themselves, have a port development plan with the aim of increasing the wealth of its citizens through the provision of some service. These plans may be driven in response to

Table 4.5. Ten largest infrastructure funds, 2008–2012

Fund	Firm	Size (Millions of US dollars)	Region
Global Infrastructure Partners II	Global Infrastructure Partners	8 250	Global
Global Infrastructure Partners	Global Infrastructure Partners	5 640	Global
Energy Capital Partners II	Energy Capital Partners	4 335	North America
EIG Energy Fund XV	EIG Global Energy Partners	4 121	Global
Alinda Infrastructure Fund II	Alinda Capital Partners	4 097	North America, Europe
Morgan Stanley Infrastructure Partners	Morgan Stanley Infrastructure	4 000	Global
Citi Infrastructure Partners	Citi Infrastructure Investors	3 400	OECD
ArcLight Energy Partners Fund V	ArcLight Capital Partners	3 310	North America, Europe
GS Infrastructure Partners II	GS Infrastructure Investment Group	3 100	North America, Europe
Brookfield Americas Infrastructure Fund	Brookfield Asset Management	2 655	North America, South America

Source: (Prequin, 2012).

customer needs, as part of a regional integration plan, or simply national aspirations aimed at capturing passing trade. The following sections provide a brief overview of some of these developments organized alphabetically. The list is not exhaustive and the ports mentioned are merely meant to give a regional perspective as well as illustrate the variety and type of developments. Other developments mentioned in previous issues of the *Review of Maritime Transport* continue at their pace.

Africa

Container traffic in Africa is growing across the continent. In West Africa a recent study highlighted that 3 million TEU passed through the region in 2011 (CATRAM, 2013). The French carrier CMA CGM, which has a strong presence in Africa, sold a 49 per cent stake in its terminal operating business, Terminal Link, to China Merchants for €400 million (\$538 million) (Dynamar B.V., 2013a). The deal gives the French company a capital injection to be used in its main business, liner shipping, at a time of when shipyards are offering to build cheap ships and when banks are reluctant to lend. For the buyer it provides quick means to expand its global presence in a growing market. Another large liner shipping company, MSC, is focusing its attention upon the port of Lomé as a regional hub. While in Central Africa, the port of Pointe-Noire (the Congo) is also being considered by various parties to be in a good location to become an important trans-shipment hub for North–South shipments and shipments East–West to Latin America. Some recent infrastructure improvements made by foreign investors include a third berth in Dakar built by DP World, a third quay in Lomé for both Bolloré and TIL/MSK (part of which is now owned by China Merchants), and facilities in Cotonou (Benin) and Pointe-Noire for Bolloré (CATRAM, 2013). Some other African port-development projects currently underway are detailed in the following paragraphs.

In Abidjan, Côte d'Ivoire, port expansion plans include increasing TEU capacity to 1 million–1.5 million. In early 2013, a \$933-million contract was signed between the Abidjan Port Authority and China Harbour Engineering Company Limited. The project involves waterway and basin dredging, construction of a container terminal and a ro-ro terminal, and waterway breakwater reconstruction (*Dredging Today*, 2013). APMT is investing \$40 million into the container terminal so that vessels of 8,000 TEU may be catered for in Abidjan (Sea-web, 2013).

In Cameroon, the Mbalam iron-ore project progressed with the signing of a convention between the Minister of Mines, Industries and Technological Development and the Australian firm Sundance Resources through its

local partner Cam Iron. This will allow the developers to start securing the \$8.7 billion needed for construction work which will include a 510-kilometre rail line for the transportation of iron ore from the Mbarga Mine to the Cameroon coast, with a 70-kilometre rail spur line connecting to the Congo. A deepwater iron-ore export terminal will be built at Lolabe, in Kribi, with the capacity to handle Chinamax iron-ore bulk carriers (Cameroon Tribune, 2012). The Cameroon–Congo–Gabon region has been likened to the Pilbara, the region in Western Australia that has some of the world's biggest iron deposits (*Financial Times*, 2013b).

In Ghana, an agreement between the Ghana Ports and Harbours Authority and China Harbour Engineering Company was signed for work to begin on the first phase of the \$150-million Takoradi Port Infrastructure Development Project. The three year project includes the demolition and reconstruction of port office buildings, the expansion and reconstruction of access roads, land reclamation and the development of water and electricity facilities (*Cayman Net News*, 2012).

In Kenya, the Government has set aside \$12 million (1 billion Kenya shillings) to buy land to develop Mombasa into a free port where manufacturers may undertake works at reduced tax (*Daily Nation*, 2013). The port of Mombasa handled some 19.6 million tons of cargo, of which about 4 million tons were imports and 5 million tons were transit cargo to neighbouring countries. Uganda is the largest destination of transit cargo accounting for nearly 85 per cent (4.2 million tons), of which 90 per cent comprises imports. The Democratic Republic of the Congo is the second largest transit market, taking up to 8 per cent of the total at 430,000 tons. Seventy-two per cent of cargo going through Mombasa is for Kenya's domestic market, 22 per cent is for Uganda, 2.3 per cent for the Democratic Republic of the Congo, 1.5 per cent for Rwanda and less than 1 per cent is destined for the United Republic of Tanzania, Burundi, South Sudan and Somalia (*The East African*, 2012).

In Sierra Leone, a memorandum of understanding (MOU) between the Ministry of Mines and Mineral Resources and China Kingho Energy Group Co. Ltd. was signed in May 2013. The MOU includes \$6 billion of investments for the construction of a railway from Tonkolili to Sulima and a deepwater quay port for transportation of products, among others (*Awareness Times*, 2013).

In the United Republic of Tanzania, an agreement with the Government of China to build a \$10 billion–\$11 billion new port at the historical port city of Bagamoyo was announced in 2013. The new port will be the biggest

in the whole of Africa and handle some 20 million TEUs a year when complete, compared with the 800,000 TEUs current throughput at Dar es Salaam. The project will include the building of a 34-kilometre road joining Bagamoyo to Mlandizi and 65 kilometres of railway connecting Bagamoyo to the Tanzania–Zambia Railway and the Central Railway. The bilateral deal calls for China to commit \$500 million in 2013 to start the port construction with the rest of the Chinese financial aid package to follow in 2014 and 2015 (*Sabahonline.com*, 2013; *The East African*, 2013). The port is also expected to be run by Chinese operators and offer facilities to naval vessels, albeit not necessarily China's (*Africainvestor*, 2013). The new port will ease congestion at Dar es Salaam, which may find other business in niche areas. China is already financing the \$1.2 billion construction of a 532-kilometre gas pipeline linking recently discovered gas reserves in the south of the United Republic of Tanzania and northern Mozambique to the port of Dar es Salaam (World Socialist Web Site, 2013). The new port is good news for the landlocked neighbouring countries of Rwanda, Burundi and Uganda, which will have a choice of importing and exporting either through Mombasa, Kenya, or Dar es Salaam. The development may negatively affect Mombasa, as shipping lines may prefer to call directly at Bagamoyo new port. Inefficiencies at Mombasa can add 50–80 per cent to the time required to move imports to landlocked countries (*The East African*, 2013).

The Americas

In the Americas the anticipated opening of the newly expanded Panama Canal and the implications this will have for ports on the eastern seaboard is driving port development. Ports on the eastern seaboard and in the Caribbean have tended to remain smaller than their peers on the Pacific coast because of the limitation on vessel size governed by the historical width of the Panama Canal. The Panama Canal expansion is set to be complete by early 2015 and will increase the size of the container ships able to transit from the present maximum of around 4,800 TEU to 13,000 TEU.

In Jamaica, China Harbour Engineering Company is set to invest between \$1.2 billion and \$1.5 billion in the development of a trans-shipment port. The Port Authority of Jamaica and China Harbour Engineering Company Limited had signed an MOU for the establishment a new trans-shipment port at Fort Augusta. However, the project has since been expanded and it is now necessary to find a new location with more space, which has yet to be determined (*Port Finance International*, 2013). The plans are part of a major infrastructure investment programme to meet

Jamaica's desire to be a global logistics hub by 2015, and which also include improvements to the north–south link of Highway 2000 and the dredging of Kingston harbour to accommodate larger cargo ships (*RJR News*, 2013).

In Nicaragua, plans to build a canal to rival the Panama Canal passed through congress in June 2013. The cost of the canal is estimated to be \$40 billion and it will be built and operated by a Chinese company – the Hong Kong Nicaragua Canal Development Investment Co. Ltd.. The company has been granted a 50-year concession to build and operate the waterway with the option to extend the concession for another 50 years. The canal is likely to be three times longer, about 250 kilometres, than the Panama Canal and include provision for two free trade zones, an airport, a freight railway and an oil pipeline (*The Guardian*, 2013). Crucially, the Nicaragua canal will be wider than the Panama Canal and be able to cater for the world's largest cargo ships, including the Maersk Triple E vessels of 18,000 TEU (*CNNMoney*, 2012). The Nicaraguan government is expected to receive \$10 million a year for 10 years from the canal (*The Guardian*, 2013).

In Peru, the Ministry of Transport and Communications and the Ministry of Land, Transport and Maritime Affairs of the Republic of Korea have signed an MOU to update the development plans for four Peruvian ports (those of Iquitos, Ilo, Salaverry and San Juan de Marcona) (*Shipping Seenews*, 2013). The port sector in Peru will benefit from more than \$2 billion of investment by 2015, according to the National Port Authority. The planned investments in public ports include the first phase of DP World's \$617-million investment programme in the Muelle Sur terminal at the Port of Callao in Lima, \$228 million at Terminales Portuarios Euroandinos Paita port terminal, and Peru LNG's \$332-million LNG export terminal at Pampa Melchorita (*Fruitnet*, 2011). Since a bilateral trade agreement came into force on 1 August, 2011, Korean exports to Peru have increased by 29 per cent – among others, exports of iron ore have increased by 263 per cent, colour televisions by 268 per cent, petrochemicals by 57 per cent and passenger cars by 42.5 per cent (around one third of all new cars sold in Peru are made in the Republic of Korea). Other sectors receiving investment from the Republic of Korea include oil, hydrocarbons and mining (*Financial Times*, 2013c).

In the United States, Virginia Ports Authority received an unsolicited \$3.9 billion offer from APM Terminals to operate its marine terminals for 48 years, as well as a bid of \$4.66 billion from JP Morgan for a 50-year concession. The rival JP Morgan bid was originally presented by RREEF America, part of the Deutsche Bank Group. A third offer from Carlyle Infrastructure Partners, an

infrastructure investment unit of the Carlyle Group, was withdrawn (*Suffolk News-Herald*, 2013). In the end all bids were refused and the port authority instead opted to rationalize both its management and financial positions. It is thought that foreign interest in Virginia and other United States East Coast ports comes as the Panama Canal expansion means larger ships requiring better port infrastructure are likely to serve this region. In New York the Bayonne Bridge is being raised to allow bigger vessels to access the Port Newark–Elizabeth Marine Terminal, the largest container port on the East Coast.

Asia

In Asia, port development projects are largely spurred by the importation of raw materials and increased industrial output. China continues to lead the world in terms of port throughput and efficiency and increasingly as a provider of expertise in port construction and management. As Chinese labour costs increase, some of the production processes are moving to neighbouring countries and Chinese companies are able to take advantage of this movement of trade through the provision of other higher value services such as expertise in port construction.

In Cambodia a new cargo terminal officially opened in the capital in 2013, in response to a sharp increase in shipments moving through the country's existing ports. The new terminal is located in the Kien Svay district of Kandal province, about 30 kilometres from the existing port in Phnom Penh, and cost over \$28 million. It was financed by the Chinese government and will be capable of handling 300,000 TEUs when the second phase is complete (*PortCalls Asia*, 2013).

In India plans to enable trust ports to lease land to private companies are being considered for the purpose of establishing industrial or special economic zones to generate more trade. This proposal will affect 12 major ports (Chennai, Kochi, Ennore, Jawaharlal Nehru, Kolkata (including Haldia), Kandla, Mormugao, Mumbai, New Mangalore, Paradip, Tuticorin and Visakhapatnam), which have a capacity to handle over 740 million tons of cargo each year and account for about 58 per cent of India's external trade shipped by sea. The proposed port land policy will allow land to be leased up to a maximum period of 30 years by a port with the approval of its board of trustees. Leases of above 30 years and for a maximum of up to 99 years will have to be recommended by the port trust board to the shipping ministry for committee approval (*Livemint*, 2013b). Elsewhere in India two new port development projects are being considered by the Cabinet Committee on Economic Affairs. One port called Dugarajapatnam is located 45 kilometres from Gudur and

about 140 kilometres north of Chennai port. The proposed port, which will occupy 5,000 acres and have an expected throughput of 50 million tons per annum, will be the second major port in Andhra Pradesh controlled by the central government after Visakhapatnam. The other slightly larger port project with an anticipated throughput of 54 million tons per annum is located at Sagar in West Bengal. The ports are part of the government's "look east policy" which aims to triple the country's cargo-loading ability to 3.13 billion tons by 2020 through PPPs (*The Hindu*, 2013). Just over one fifth of Indian cargo is containerized, which is about half the world average (*The Economist*, 2013a). The Government is set to increase this with the development of container facilities along its east coast at the ports of Ennore, Kakinada, Karaikal, Kattupalli and Krishnapatnam (*Drewry Container Insight*, 2013).

Also in India, draft guidelines to allow major ports to fix their own tariffs based on the market conditions are currently being considered. Presently tariffs are regulated by the Tariff Authority of Major Ports. It is thought that the private sector is waiting upon the final decision as to how tariffs are calculated before making investments. Indeed, it has been cited as one of the chief reasons why there have not been any private bidders at three recent port projects proposals in Chennai, Tuticorin and Visakhapatnam (*Business Standard India*, 2013). It is proposed that the new tariff structure will be adjusted once a year and partly index linked to inflation. Interestingly, statistics on cargo traffic, berth day output, average turnaround time of ships, average pre-berthing waiting time, percentage idle time of total time of vessels at berth, as well as the actual tariff levied for each major port-trust owned berth/terminal should be provided within 15 days following the end of each month (*The Economic Times*, 2013). However, some argue that Indian ports are too regulated and that the country's private ports are more profitable than the state-owned ports, suggesting that greater liberalization may be the way forward (*Lloyd's List*, 2013a).

In Myanmar, the existing port of Yangon has outdated facilities and there is a need to build new port facilities to help the country better integrate into the world trade arena. However, there is still much uncertainty as to where such new port facilities will be located. Two possible sites have been identified, one at Kyaukphyu to the north of Yangon, where oil and gas pipelines running across Myanmar to China's Yunnan province are being completed, and the other is Dawei to the south, which is only 250 kilometres from Bangkok and could be a valuable source of transit cargo. Further assessment on demand, revenue, investment, timeframes and technical aspects need to be undertaken (*The Vancouver Sun*,

2013). To directly service Yangon a new \$200-million riverine port called Thilawa will be constructed just to the south of the city (*The Economist*, 2013b).

In Sri Lanka, the first stage of the Port of Colombo's third container-terminal expansion plans came online in 2013, with the final stage expected to be completed by 2016. The port has a draft of 18 metres and a gantry crane outreach of 24 containers wide, which enables it to cater for the largest container ships, including the Maersk Triple E class container vessels. The new terminal will be in a better position to serve cargo from and to Indian ports, although competition between ports in the region will grow (*Drewry Container Insight*, 2013).

In Thailand, a new PPP act is set to quicken the pace to bring projects to fruition. The act will set a limit of 180 days to the period between the winning of a government tender and the signing of the contract, as well as establish a committee for five-year strategic development plans. This examining committee will consist of 17 members led by the prime minister. The new act also states that a member of the committee cannot become a board director of the company winning the bid for three years after his or her resignation from the committee. The previous 1992 PPP act dealt with only 40 projects in its lifetime, 33 between the private sector and national state agencies and seven with provincial authorities (*The Nation*, 2013).

Reforms to the country's infrastructure include the building of high-speed rail lines, four more ports and other transport infrastructure over the next seven years, amounting to investments of \$67.6 billion. The ports are to be located on the banks of Bangkok's main river, the Gulf of Thailand and on the Andaman Sea coasts. The government has said the projects will bolster Thailand's economic growth rate by 1 per cent a year and create 500,000 jobs. By borrowing the funds overseas, delays provoked by the annual government budget process can be avoided, thus alleviating investors' concerns that the project could be delayed. Funding projects through the regular annual budget can be problematic if there's a change of government or in politics, as the schemes could be discontinued. The borrowing bill will enable private investors to plan their investment to develop infrastructure more confidently (*Sea News Turkey*, 2013).

Europe

In Europe, port developments relate mainly to building new terminals within existing ports rather than developing new greenfield sites. As such, much of the reform process is more to do with the organization and operational aspects of ports.

In Belgium, organizational practices designed to spur improvements in performance had to be reviewed. DP World and its partners that operate the Antwerp Gateway, as well as PSA's Deurganck Terminal, owed the Port of Antwerp Authority some €70 million (\$93 million) in underperformance penalties, principally because of a decrease in cargo volumes as a result of the global downturn (Dynamar B.V., 2012).¹

Concession agreements to operate container terminals can contain clauses which specify minimum throughput volumes. If throughput falls below the minimum, the tenant, the terminal operator, must compensate the landlord, usually the port authority. The Port of Antwerp Authority, however, announced that it will reduce the underperformance penalties for not reaching the contractually stipulated volumes for DP World's Antwerp Gateway and PSA's Deurganck Terminal to €4.0 million (\$5.1 million) and €9.47 million (\$12.1 million), respectively (Dynamar B.V., 2013b).

The European Commission launched a new initiative to improve port operations at 319 key seaports. The guidelines are aimed at proposing legal changes that will help port operators upgrade their services and facilities as well as giving them more financial autonomy. Currently, 74 per cent of the goods entering or leaving Europe are transported via sea, with one fifth of this volume passing through just three ports: Rotterdam, Hamburg and Antwerp. This concentration results in congestion and extra costs for shippers, transport operators and consumers. The new proposals could save the European economy up to €10 billion (\$12.8 billion) by 2030 and help develop new short sea links (*Europa*, 2013). The proposal excludes cargo handling and passenger services from market-access rules. Included is a new Social Dialogue Committee, which will handle labour reform issues. More stringent measures are planned to deal with concession and public contract awards and financial procedures, which reinforce transparency in the way that charges are set. The proposal extends the freedom of ports to levy infrastructure charges and to reduce charges for vessels with better environmental performance (*Lloyd's List*, 2013b).

In the Netherlands, the Port of Rotterdam Maasvlakte 2 port expansion area has opened to shipping, making the site accessible by road, rail and water. By the end of 2013, ship-to-ship transfer will commence. Construction of the two container terminals at Maasvlakte 2, one operated by DP World-led Rotterdam World Gateway and the other by Netherlands-based APMT, is on schedule to be operational at the end of 2014 (*Lloyd's List*, 2013a).

D. ASSESSING PORT PERFORMANCE

Efficient ports could help to lower transport costs by enabling goods to get to and from markets in a more timely and cost-effective fashion. UNCTAD has a number of mandates from its member countries which state for the need to help developing countries reduce their transport costs (Accra Accord paragraphs 57, 121, 165, 166 and Doha Mandate paragraphs 45, 47 and 48) as well as a long history of working on port reform. Previously, much focus was given to helping ports identify efficiency indicators to measure and record. The next logical step is for countries to share their data to identify lessons learned and best practices. By showing what similar-sized ports have achieved, greater operational advances and lower transport costs may result.

The considerable amount of data collected by ports includes not just information on the cargo but also upon the assets, equipment usage/performance and maintenance. This data is used by the port managers to monitor performance and plan for future needs.

However, ports tend to assess their performance on an inward-looking and historical perspective, that is, they judge themselves today on how well they did yesterday, not against how their competitors are performing today. In some countries it is mandatory for port data to be submitted to the national Government for analysis. In the previous section C (Recent port developments) an example of the Indian Government's collection of port statistics was given. However, many developing countries only have one main port and comparisons with other ports are impossible. Despite all the activity on record keeping, it is rare that the information is published at a port or national level, let alone on a global basis. Ports may be reluctant to publish data since there is no pressure to do so, nor any direct benefit without reciprocation. This is an important point, for unless there is a clear benefit to the port the situation is unlikely to change without some external intervention.

This external intervention came in early 2013 when the *Journal of Commerce* in association with Ocean Shipping Consultants obtained data from 17 liner shipping companies visiting 650 ports to produce a

Figure 4.1. A comparison of port productivity by region (2013)



Source: *Journal of Commerce* and Ocean Shipping Consultants.

Port Productivity Ranking list (*Journal of Commerce*, 2013). The analysis of this data enables a comparison of container-port productivity by region as depicted in Figure 4.1. The results show that port performance has been assessed by the number of crane moves per hour in various broad geographical regions. The raw data and how the calculations have been made are not yet freely available. The research shows wide variations in the average cargo-handling times, from 19 moves per hour in African ports to 71 per hour in ports in North Asian. One important limitation is that ports cannot see how they rank compared against other ports, although selective port comparisons have been made in separate lists; another is that it is limited to container activities which represent about 15 per cent of global port throughput. The most significant factor is that ports are not the only holders of data on their activities. Port customers are also collecting data on port performance and if the ports do not reveal their own statistics then it will be hard for them to dispute any suggestions of inefficiency.

A way forward for ports would be to publish their own data and not rely on customer assessment of their performance. The challenge for policymakers would be to convince their ports to voluntarily share data. Official reporting systems could be devised on a national basis, but this does not guarantee that efforts will be reciprocated by other countries. A common repository of the data would still be needed to facilitate the publication of data for independent analysis. Analysis could be undertaken by the Port Performance Research Network, an informal network made up of academics from various institutions located around the world who meet annually along with the International Association of Maritime Economists. The publication of the raw data would also provide ports with an opportunity to undertake their own analysis rather than having to accept comparisons forced upon them. Thus, ports who rank low in any overall assessment could obtain a more meaningful measure by comparing themselves against their peers or ports in other regions.

What data to collect

Volume and time are the two crucial aspects of measuring performance. Volume, which is a measurement of throughput or a port's output, is expressed in either units (TEUs) or weight (tons). The time goods spend in a port is also a useful figure that is easy to compare. Examples of time measurements within a port include ship turnaround time, ship waiting time, berth occupancy rate, working time at berth, cargo dwell time and number of cargo-crane moves per hour. The primary focus when comparing global port performance, on an initial basis, should therefore be time and volume. Measuring how long a vessel spends in port and how much cargo is transferred seems an achievable first step towards creating any global assessment of port performance. The data should also cover all cargo types and not just containers.

E. CONCLUSIONS

Global port developments are continuing despite, or perhaps because of, recent uncertainties in world trade. Ports are generally considered to be a long-term investment offering steady returns and hence their appeal to long term asset managers. At the same time ports are also becoming more capital intensive with the growth of cities creating spatial constraints that force expansion plans further out to sea, the complexity of cargo handling superstructures and operations also adding to the price of development. Developing countries, however, stand to benefit from both the need of investment portfolios to invest in long-term stable businesses and from the experience of international terminal operators that have perfected their techniques at some of the world's most voluminous ports and need new markets to invest in. Without port reform countries will struggle to get their goods to markets at competitive price levels as well as to secure their needs at reasonable prices. Port efficiency, a subject of concern to many developing countries and UNCTAD, will, through the advent of modern proliferation of data collection practices, become a reality either by port managers' own actions or that of port users.

REFERENCES

- Africainvestor* (2013). China builds the biggest port in Africa. 8 April.
- Awareness Times* (2013). \$6Billion Chinese investment for Sierra Leone. 13 May.
- Bacchiocchi GG (2012). The project bond evolution: Port of Paita case study. *Latin Infrastructure Quarterly*. Issue 4. June.
- Bond DL, Platz D and Magnusson M (2012). Financing small-scale infrastructure investments in developing countries. DESA Working Paper No. 114. ST/ESA/2012/DWP/114. May.
- Business Standard India* (2013). Private bidders give port sector a miss. 11 May.
- Cameroon Tribune* (2012). Cameroon: Cam Iron gets mining convention for Mbalam iron project. 30 November.
- CATRAM (2013). Market study on container terminals in West and Central Africa. Final report – MLTC/CATRAM. 23 January. 1–133.
- Cayman Net News* (2012). China Harbour wins major Ghana port project. 27 September.
- CNNMoney* (2012). Nicaragua OKs canal to be built by Chinese company. 27 September.
- Commonwealth Business Council (2013). *Africa Infrastructure Investment Report*. ISBN 978-0-9570432-6-8. London. March.
- Daily Nation* (2012). Sh1bn set aside for free port project. 5 December.
- Dredging Today* (2013). Dredging Today – Côte d'Ivoire: CHEC Signs EPC Contract for Abidjan Port Dredging. 24 January.
- Drewry Container Insight* (2013). Competition heating up on India's East Coast. 17 March.
- Dynamar B.V. (2012). *DynaLiners Weekly*. 21 December.
- Dynamar B.V. (2013a). *DynaLiners Weekly*. 5 April.
- Dynamar B.V. (2013b). *DynaLiners Weekly*. 29 March.
- Engel EM, Fischer RD and Galetovic A (2010). The economics of infrastructure finance: Public-private partnerships versus public provision. *EIB Papers*. 15(1): 40–69.
- Europa* (2013). Press release – Commission proposes upgrade for 300 key seaports. 23 May.
- Financial Times* (2013a). Pension funds wary of UK infrastructure. 7 February.
- Financial Times* (2013b). Sundance calls off takeover by Hanlong. 9 April.
- Financial Times* (2013c). Peru: the South Koreans are coming. Beyondbricks blog. 4 May.
- Fruitnet* (2011). Peru to boost port investment. 16 March.
- Group of 30 Working Group (2013). *Long-term Finance and Economic Growth*. ISBN 1-56708-160-6. Group of Thirty. Washington D.C.
- Haven Gateway Partnership (2010). The economic impact of the ports, transport and logistics industry on the Haven Gateway area. Colechester, United Kingdom.
- Holman Fenwick Willan LLP (2013). Global investment in ports and terminals. Ports and Terminals. Holman Fenwick Willan LLP. London.
- Journal of Commerce* (2013). Introducing JOC port productivity. *Journal of Commerce*. 14(3).
- Livemint* (2013a). Tax-free bonds issued by ports get poor response. 19 March.
- Livemint* (2013b). Policy aims to attract port infrastructure investments. 21 April.
- Lloyd's List* (2013a). Power ports. *Lloyd's List – Ship Operations*. 19 June.
- Lloyd's List* (2013b). Brussels moves to prevent price abuse at European ports. *Lloyd's List – Ports and Logistics*. 23 May.
-

- McKinsey Global Institute (2013). Infrastructure productivity: How to save \$1 trillion a year. McKinsey and Company, New York. January.
- OECD (2011). Pension funds investment in infrastructure – a survey. September. Available at <http://www.oecd.org/sti/futures/infrastructureto2030/48634596.pdf>.
- Oxford Economics (2013). The economic impact of the UK maritime services sector. Oxford Economics. February. Available at <http://www.oxfordeconomics.com/publication/open/239345> (accessed 26 September 2013).
- PMSA (2013). Port investment. Pacific Merchant Shipping Association. Available at <http://www.pmsaship.com/port-investment.aspx> (accessed 25 September 2013).
- Port Finance International* (2013). Chinese company to invest more than \$1.2bn in new Jamaican transshipment port - Port Finance International. 5 February.
- PortCalls Asia* (2013). Cambodia opens new container terminal. 28 January.
- Preqin (2012). *2012 Preqin Infrastructure Review*. Preqin.
- Preqin (2013). Infrastructure spotlight. April.
- Reuters* (2012). BlackRock to tap infrastructure debt demand. 26 November.
- RJR News* (2013). Plan for trans-shipment port at Fort Augusta abandoned, larger site being sought. 30 April.
- Sabahonline.com* (2013). Tanzania and China sign port development package. 27 March.
- Sea News Turkey* (2013). Bangkok seeks US\$67m loan to build infrastructure, ports and railways. 31 March.
- Sea-web (2013). News and analysis. APMT explains plans at African ports. 13 June.
- Shipping Seenews* (2013). Peru to update plans for 4 ports with support from South Korea. 7 March.
- Suffolk News-Herald* (2013). VPA punts port bids. 26 March.
- The East African* (2012). Congestion at Mombasa port slows down trade in EAC bloc. 13 December.
- The East African* (2013). With \$11bn Bagamoyo port, Tanzania prepares to take on EA hub Mombasa. 11 May.
- The Economic Times* (2013). Major ports will soon be allowed to fix market-linked tariff. 19 March.
- The Economist* (2013a). China's foreign ports – the new masters and commanders – China's growing empire of ports abroad is mainly about trade, not aggression. 8 June.
- The Economist* (2013b). New bay dawning. 27 April.
- The Guardian* (2013). Nicaragua waterway to dwarf Panama canal. 12 June.
- The Hindu* (2013). Cabinet nod for two new major ports in West Bengal, Andhra Pradesh. 9 May.
- The Nation* (2013). New act tipped to speed up projects. 27 May.
- The Plain Dealer - cleveland.com (2013). Port Authority board approves \$90 million bond deal for new Cuyahoga County headquarters. 14 March. Available at http://www.cleveland.com/business/index.ssf/2013/03/port_authority_board_approves.html (accessed 25 September 2013).
- The Vancouver Sun* (2013). Thai–Burma port project stalled. 24 February.
- World Socialist Web Site* (2013). New Chinese president courts Africa. 28 March.
- UNCTAD (1985). *Port Development: A Handbook for Planners in Developing Countries*. TD/B/C.4/175/Rev. 1. United Nations publication. New York.

ENDNOTES

¹ The ownership share of all partners is as follows: DP World (42.5 per cent), Zim Ports (20 per cent), Cosco Pacific (20 per cent), Terminal Link/CMA CGM (10 per cent) and Duisport (7.5 per cent).