Comparison of Potential Transshipment Hub Ports in the Indian Ocean Region

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Contents

- Setting the scene - Industry trends - ship size revolution
- What is happening to the container fleet?
- Regional fleet developments
- Increase in T/S demand
- “Cascade” effect
- Changes to service patterns
- Historical regional port volumes
- Existing regional container facilities
- Planned regional terminal developments
- Implications for container terminals
- Conclusions
Industry trends - Ship Size Revolution

World Container Fleet Development 1990-2016 (’000TEUs)

- 10,000TEU+
- 8000-9999TEU
- 4000-7999TEU
- <4000TEU
Industry Trends–Ship Size Revolution

- Fully cellular containership fleet expanded to >16m TEU.
- Focus remains on larger vessels – 8,000TEU+ sector up by 10.8%.
- Trend for bigger ships well established since 2004 – 18,000TEU+ ships in service.
- Almost all major lines committed to ULCS.

- China Shipping and MSC confirmed current orders to be extended to 19,000TEU.
- Expect other lines to follow – Maersk Line, CMA CGM, UASC all committed to larger tonnage.
- Ship cascading will continue to secondary trade lanes in Africa.
Industry Trends - Ship Size Revolution

Key factors of note for lines operating larger vessels:

- **Port Concentration:**
  - Terminals have to meet needs of larger ships.
  - Potential fewer ports of call.

- **Transshipment:**
  - Intensifying in key locations.
  - Hub & Spoke, Relay/Interlining used.

- **Alliances/Consolidation:**
  - Individual lines lack overall traffic to successfully utilise bigger ships cost-effective – hence alliances.
  - G6 Alliance, 2M Alliance, CKYHE and “Ocean Three” grouping will all continue in major trade lanes.
  - Fewer viable alternatives for customers on main trade lanes.
What is Happening to the Container Fleet?

- The role of 10,000TEU+ vessels has increased dramatically, driven by scale economies and competitive pressures.
- Massive ordering for ULCS and New Panamax vessels.
- Transpacific and Asia-Europe trades cannot absorb all of this tonnage - 'cascade' effect on other routes now being felt and also beginning to impact on Africa and Indian Ocean.
- Development of new ‘broad beam’ 8,000-10,000TEU vessels for North-South trading, particularly in Africa and South America.
- The overall effect will be further concentration and greater transshipment activity.
- New generation container feeder vessels – 1,800-2,000TEU (and larger) will be typical. Potential for cooperation too.
Future Container Fleet Developments

- The shipping lines desire to maximise the size of vessels, whilst minimising the slot costs looks set to continue with designs for 22,000TEU and 24,000TEU vessels already under discussion.

- New vessel designs offer either an increase in LOA (from 400m to 430-450m) or an increase in beam from 59.0m to 61.5m.

- In all new design option, draught required remains the same as EEE-Class vessels.

- WAFMAX/SAMMAX vessels specifically designed to maximise capacity for use in shallower waters such as in Africa and South America.

### Container Vessel Sizes and Rows Across

<table>
<thead>
<tr>
<th>Type</th>
<th>TEU range</th>
<th>No. of rows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panamax</td>
<td>4,500-4,900</td>
<td>13</td>
</tr>
<tr>
<td>Post Panamax</td>
<td>5,000-6,000</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>6,000-9,000</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>9,000-10,000+</td>
<td>18</td>
</tr>
<tr>
<td>New Panamax</td>
<td>12,500-13,000</td>
<td>20</td>
</tr>
<tr>
<td>Post New Panamax</td>
<td>14,500</td>
<td>23</td>
</tr>
<tr>
<td>EEEE-Class</td>
<td>18,270</td>
<td>23</td>
</tr>
<tr>
<td>New generation</td>
<td>22,000</td>
<td>24</td>
</tr>
<tr>
<td>WAFMAX/SAMMAX</td>
<td>7,450-8,700</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: Ocean Shipping Consultants
Regional Fleet / Service Developments

- The increase in liner capacity links in the region as a whole – capacity +142% between 1995 and 2010.
- Focus of expansion in Asian Trades – especially feeder ing, but also some direct services to regional hubs appearing.
- Switch to cellular vessels – less use of ship’s own gear – result of larger tonnage. 10,000TEU already on SAF trades.
- Average vessel sizes of up to 3,000TEU on Asian Trade and 3,500TEU on Europe Trade in 2011 have now increased to 8,500TEU and 6,100TEU respectively. Further increases are also anticipated.
- Indian Sub-Continent Links still expanding.
- Integration with major East-West services via Salalah, Djibouti, Aden, Colombo etc. and increasing number involve direct calls at transshipment hubs in Indian Ocean, South Africa and West Africa.
- Port capacity lags behind demand – a transformation is required to increase capacity and productivity levels.
Increase in Transshipment Demand

- The development of transshipment demand will be a function of a number of interrelated factors:
  - The continuing increase in vessel size and further moves to reduce the number of direct calls on deepsea vessels.
  - Related terminal accessibility for largest vessels.
  - Adequacy of existing ports for direct calls.
  - Future development of built-up costs of direct calls vs feeder alternatives.
  - The availability of overall capacity for transshipment operations, as determined by the balance of supply/demand in the regional port markets.
  - Degree of shipping line investment in terminal developments in dedicated terminals – effectively fixing a shipping line at a particular port.
Requirements For Transshipment Hubs

- Geographic location - minimal deviation from main East-West route.
- Tariff levels and operating costs.
- Performance and service levels.
- Labour/workforce arrangements.
- Facilities (e.g. physical accessibility, water depth, size/number of cranes).
- Availability of capacity.
- Avoidance of congestion.
- Potential for dedicated facilities/terminal areas.
- Priority berthing.

- Low degree of bureaucracy at port, especially customs authorities.
- Efficient vessel support systems in place – i.e. pilots, tugboats etc.
- Other support services and functions.
- Value-added services.
- Good security and protection coverage at all times.
“Cascade” Effect on The Region

• The increase in the size of vessels deployed on the main arterial lanes has resulted in a displacement of the vessels that were historically dominant on the Asia-Europe routes, i.e. 6,000-8,500TEU capacity vessels to secondary routes.

• New services such as the “Africa Express” Service operated by MSC, are now operated by vessels of up to 8,500TEU capacity and which serves Indian Ocean and both South and West Africa from Asia via the Cape of Good Hope instead of the Suez Canal.

• These service effectively replacing services that transship in Algeciras by services that offer transshipment opportunities at hubs in the Indian Ocean, South and West Africa.

• Displacement of 2,500TEU vessels by 3,500-4,300TEU vessels on FE-SAF-WAF services as a result of new cooperation.

• When more services of this type are introduced, there will be a likely increase in the average size of vessels handled particularly in the ports in Sub-Saharan Africa and the Indian Ocean region.
Different Service Patterns Emerging

- MSC’s Africa Express has developed as a result of the cascade of vessels from main services that are being replaced by newbuild vessels of 18,000TEU.

- Service has seen vessels increase from 3,400TEU deployed in 2014 to 8,500TEU for 2015 and offers calls at 3 hubs in Indian Ocean, South and West Africa.

- South Africa Asia Express services see expansion in size of vessels deployed as a result of the further cooperation between a number of lines, i.e. Evergreen, Cosco, PIL, K-Line, MOL and now HL increase vessels deployed to 6,300TEU.

- MSC looking to consolidate West Africa services in hub at Lome.

- Maersk reorganising Indian Ocean feeder services via Salalah.

- PIL’s SWS and SW2 services are operated by new wide beamed, geared tonnage with vessels up to 4,200TEU capacity.

- New cooperation sees 2,500TEU vessels replaced by 3,500-4,300TEU capacity vessels.
Regional Container Port Volumes

![Graph showing regional container port volumes from 2000 to 2012 for various countries including Madagascar, Reunion, Mozambique, Mauritius, Tanzania, Djibouti, Kenya, and South Africa. The graph indicates an increase in volumes over the years.]
### Existing Major Regional Terminal Facilities

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Length (m)</th>
<th>Max. Depth (m)</th>
<th>STS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durban - Pier 1</td>
<td>1900</td>
<td>16.0</td>
<td>17</td>
</tr>
<tr>
<td>- Pier 2</td>
<td>650</td>
<td>12.5</td>
<td>6</td>
</tr>
<tr>
<td>Cape Town</td>
<td>1137</td>
<td>15.5</td>
<td>9</td>
</tr>
<tr>
<td>Port Elisabeth</td>
<td>925</td>
<td>14.5</td>
<td>5</td>
</tr>
<tr>
<td>Coega (Ngqura)</td>
<td>1310</td>
<td>16.5</td>
<td>8</td>
</tr>
<tr>
<td>East London</td>
<td>2512</td>
<td>10.4</td>
<td>MHC</td>
</tr>
<tr>
<td>Richards Bay</td>
<td>644</td>
<td>13.5</td>
<td>MHC</td>
</tr>
<tr>
<td>Dar-es-Salaam (TICT)</td>
<td>725</td>
<td>12.2</td>
<td>7</td>
</tr>
<tr>
<td>Mombasa</td>
<td>964</td>
<td>13.0</td>
<td>4</td>
</tr>
<tr>
<td>Tanga</td>
<td>500</td>
<td>14.6</td>
<td>MHC</td>
</tr>
<tr>
<td>Maputo</td>
<td>300</td>
<td>11.5</td>
<td>2</td>
</tr>
<tr>
<td>Beira</td>
<td>645</td>
<td>12.0</td>
<td>2</td>
</tr>
<tr>
<td>Nacala</td>
<td>372</td>
<td>14.0</td>
<td>1</td>
</tr>
<tr>
<td>Toamasina (MICT)</td>
<td>307</td>
<td>12.0</td>
<td>MHC</td>
</tr>
<tr>
<td>Port Louis</td>
<td>560</td>
<td>14.0</td>
<td>5</td>
</tr>
<tr>
<td>Port Victoria</td>
<td>370</td>
<td>13.5</td>
<td>MHC</td>
</tr>
<tr>
<td>Port Reunion</td>
<td>510</td>
<td>12.8</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Ocean Shipping Consultants
Maximum Size of Vessel Accommodatable

Design Development of Large Containerships

<table>
<thead>
<tr>
<th>TEUs</th>
<th>Length overall (m)</th>
<th>Beam (m)</th>
<th>Maximum draught* (m)</th>
<th>Noted Required berth depth (m)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>First generation: 1968</td>
<td>1,100</td>
<td>213</td>
<td>27.4</td>
<td>10.8</td>
</tr>
<tr>
<td>Second generation: 1970-80</td>
<td>2-3,000</td>
<td>280-305</td>
<td>41.1</td>
<td>12.7</td>
</tr>
<tr>
<td>Panamax: 1980-90</td>
<td>3-4,500</td>
<td>320-380</td>
<td>43.4</td>
<td>14.0-14.5</td>
</tr>
<tr>
<td>Post-panamax: 1988-95</td>
<td>4-5,000</td>
<td>330-347</td>
<td>42.9</td>
<td>14.0-14.5</td>
</tr>
<tr>
<td>Fifth generation: 1996-2005</td>
<td>6,400-8,000</td>
<td>380-400</td>
<td>56.4</td>
<td>15.5</td>
</tr>
<tr>
<td>Super post-panamax: 1997-&gt;</td>
<td>8,000-11,400</td>
<td>380-400</td>
<td>56.4</td>
<td>15.5</td>
</tr>
<tr>
<td>Ultra large container ships: 2006-&gt;</td>
<td>14,500</td>
<td>380-400</td>
<td>60.0</td>
<td>16.1</td>
</tr>
<tr>
<td>New-panamax: 2010</td>
<td>12,500</td>
<td>366</td>
<td>49.0</td>
<td>15.2</td>
</tr>
<tr>
<td>Triple E-Class</td>
<td>18,270</td>
<td>400</td>
<td>59.0</td>
<td>15.5</td>
</tr>
<tr>
<td>CSCL 18,400 Class</td>
<td>18,400</td>
<td>400</td>
<td>58.6</td>
<td>15.5</td>
</tr>
</tbody>
</table>

* Maximum draught is rarely realised, even when vessels are fully laden, so required berth depth is less in practice.

Source: Ocean Shipping Consultants

Maximum Vessels Accommodated When Full

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<thead>
<tr>
<th>Terminal</th>
<th>Max.Depth (m)</th>
<th>Max.Vessel Cap.</th>
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<td>16.0</td>
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</tr>
<tr>
<td>Nacala</td>
<td>14.0</td>
<td>6,400</td>
</tr>
<tr>
<td>Port Louis</td>
<td>14.0</td>
<td>6,400</td>
</tr>
</tbody>
</table>

Source: Ocean Shipping Consultants
Planned Regional Port Developments

- Mombasa 2nd Terminal - 1.2m TEU capacity by 2016.
- Lamu – 0.35m TEU capacity by 2018.
- Dar expansion – as much as 10m TEU possible.
- New port is also planned at Tanga.
- Cape Town currently undergoing multi-phased Terminal upgrade. Phase 2 to increase capacity from 1m TEU to 1.4m. Berth deepen to 15.5m and quay extended to 1,137m.

- Coega expansion plan from 2 to 4 berths by Transnet will complete 2nd phase by early 2015 increase capacity from 0.8m – 2.3m TEU.
- CMA-CGM plan to use Reunion more as it Indian Ocean hub and intend to increase berth by 160m and depth to 16m.
- Mauritius extension project expected to be finalised in 2016. Includes the dredging of channel to 16.5m and depth alongside to 13.5m and quay extension of 244m.
Implications for Container Terminals

- Terminals must expand and make better use of existing facilities to handle larger vessels and consignment sizes.

- Terminal productivity has improved, but there remain a need for further improvements.

- Terminals which do not lift productivity will see market share decline.

- Need for dredging – approach channels and berths. Clear planning needed for all terminal developments. Depth alongside is critical to ‘future-proof’ terminals. Channel and approach dredging can follow later.

- Longer berths; larger terminal area; increased gate pressure.

- Larger/Havier Quay Cranes - Longer reach; Taller clearance; Twin/Tandem Lifts.

- Increase in load on quay structures and increase in electrical loads and electrical infrastructure.
Conclusions

• Major Alliances gives access to markets ahead of notional demand for individual shipping lines

• Increased number of t/s hub options

• Terminals have to become increasingly efficient and look to offer ‘something different’ to be able to attract calls

• Continued developments in Coega and planned capacity increases in Kenya, Tanzania and Indian Ocean Islands will put pressure on traditional t/s hubs in South Africa

• Also expansion plans in Port Louis and Reunion

• New service structures will see introduction of larger tonnage and consolidation of volumes at major t/s hubs across the region
Thank You

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