Global Trends to 2030
Impact on Ports Industry
Rotterdam, July 2015
Contents

Trends & developments in past decade

Global drivers to 2030

Port trends to 2030
Trends & developments in past decade
Trends & developments in the past decade
Nine trends shaped today’s landscape in the ports & shipping industry

- Globalization
- Increasing competition
- Alliances and cooperation
- Supply chain integration
- Containerization of cargo
- Multimodal transport and infrastructure
- Increasing vessel size
- Focus on security
- IT applications

Consolidation and rationalization in the ports, shipping and stevedoring industry
Trends & developments in the past decade

Globalization: GDP, merchandise trade and seaborne trade are interlinked and have grown rapidly

Gross domestic product, merchandise trade and seaborne shipments (Index, 1990 = 100)

Source: UNCTAD, Review of Maritime Transport 2014, UNCTAD database; WTO, appendix tables, table A1a
Globalization: Seaborne trade volumes rose on average by 3% per year from 1980 to 2013 to a level of 9.5 billion tons loaded

Developments in international seaborne trade (billions of tons loaded)

* Iron ore, coal, grain, bauxite and alumina, and phosphate rock
Source: UNCTAD, Review of Maritime Transport 2014
## Trends & developments in the past decade

Increasing competition: substitutability determines commercial success of ports

### Variables affecting port competition (identified for different users)

<table>
<thead>
<tr>
<th></th>
<th>Owner/shipper of goods</th>
<th>Forwarder</th>
<th>Shipping company</th>
<th>Terminal operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Location</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Port operations quality and reputation</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Speed/time</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Infrastructure and facilities availability</td>
<td>+</td>
<td>o</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Efficiency</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Frequency of sailings</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Port information system</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Hinterland</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Congestion</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

Source: UNCTAD, Review of Maritime Transport 2014, UNCTAD database; WTO, appendix tables, table A1a
Trends & developments in the past decade

Alliances and cooperation: A select number of shipping companies have come to dominate the market through takeovers and alliances.

Leading container shipping companies worldwide (Based on number of ships as of May 19, 2015)

- APM-Maersk: 607 ships
- Mediterranean Shg Co: 490 ships
- CMA CGM Group: 463 ships
- Evergreen Line: 202 ships
- Hapag-Lloyd: 185 ships
- COSCO Container Lines: 165 ships
- PIL (Pacific International Line): 156 ships
- CSCL: 139 ships
- Hamburg Süd Group: 127 ships
- MOL: 114 ships
- OOCL: 106 ships
- Hanjin Shipping: 104 ships
- NYK Line: 100 ships
- Yang Ming Marine Transport Corp.: 96 ships
- Wan Hai Lines: 96 ships

Source: Alphaliner
Trends & developments in the past decade

Supply chain integration: global supply chains have emerged, focus has shifted from port performance to supply chain performance.

Phase 1: Scattered ports

Phase 2: Hinterland capture

Phase 3: Interconnection

Phase 4: Centralization

Phase 5: Transshipment hub

Phase 6: Regionalization

Trends & developments in the past decade

Containerization of cargo: Capacity of container ships in seaborne trade has risen significantly from 1980 to 2014

Capacity of container ships in seaborne trade (in million dwt)

Source: UNCTAD
Containerization of cargo: The largest container ports worldwide in 2014, based on throughput (in million TEUs)

Largest container ports worldwide in 2014, based on throughput (in million TEUs)

Source: UNCTAD
Trends & developments in the past decade

Containerization of cargo: the largest increase in average container ship size has occurred on the Far East – South Africa route

Increase in average container ship size by trade route, 2006-2013 (in percentages)

Source: Drewry Research, Global impacts of ship size development and liner alliances on port planning and productivity
Trends & developments in the past decade
Increasing vessel size: vessels have increased significantly over the past 50 years

Increase in container-carrying capacity, 1986-2015

Source: Allianz Global Corporate & Speciality
Trends & developments in the past decade

Increasing vessel size: the size of the vessel also implies limitations for the trade routes

Increase in ship size
Trends & developments in the past decade
Focus on security: spending on security, both on international waters and in the port has increased significantly after 9/11

Costs of increased security (in million US$)

- **Increased speed**: 2,710
- **Military operations**: 1,270
- **Security equipment and guards***: 1,064
- **Insurance**: 635
- **Re-routing***: 486
- **Labor**: 195
- **Ransoms**: 160
- **Counter piracy organizations**: 21
- **Prosecutions and imprisonment**: 16
- **Total economic cost of Somali piracy***: 6,600

Source: One Earth
Trends & developments in the past decade

ICT applications: Ports have been at the forefront of adopting sophisticated ICT solutions to optimize logistics

Costs of increased security (in million US$)

More information: Identifying Trends in the Adoption of ICT in Ports to enable Information. Coronado Mondragon, Adrian E; Lalwani, C.S. 2010
Global drivers to 2030
Four drivers that change the context in which organizations operate
Each driver represents a shift in demographics, society, technology, or the economy that impacts the future

**DEMOGRAPHIC**
Demographic factors like aging, rapid urbanization and the rise of a truly global citizen create ripples of change in 2020

**SOCIETAL**
Society adapts to the positive and negative effects of a hyper connected, digital lifestyle

**TECHNOLOGICAL**
**Digital**: Rapid advances in social, mobile, analytics and cloud technologies take computing to the next level

**Exponential**: These fast-evolving technologies represent unprecedented opportunities as well as existential threats. Don’t get caught unaware.

**Cyber Physical Systems**: In 2020, computers evolve into connected systems that sense, monitor, and control human and physical environments

**ECONOMIC**
From digital currencies to growing emerging markets, these represent a host of economic factors shaping 2020

Demographic factors

Demographic factors like aging, rapid urbanization and the rise of a truly global citizen create ripples of change in 2020

Societal factors

Society adapts to the positive and negative effects of a hyper connected, digital lifestyle

Resolving the privacy debate
Chipping away at pervasive corruption
The socially conscious consumer
Expanding human potential
The “hyper-connected” vs. the barely connected
Empowered citizen-consumers
Living with technology’s dark side


© 2017. For information, contact Deloitte China.
Economic factors
From digital currencies to growing emerging markets, these represent a host of economic factors shaping 2020

Technology factors

Fast evolving, rapid advances in social, mobile, analytics and cloud technologies take computing to the next level (hyper connected systems)

**Digital**
- Social media
- Mobile technology
- Cloud computing
- Analytics

**Exponential**
- Additive manufacturing
- Robotics technology
- Artificial intelligence

**Cyber Physical Systems**
- Unmanned aerial vehicles
- Augmented reality
- The “Internet of Things”
- Sensor technology
- Geo-spatial technology

Port trends to 2030
Port specific trends & developments
We’ve selected nine drivers & trends that will shape the future of global ports and shipping

Global trends in the ports & shipping industry
1. Globalization, demographic growth and scarcity of natural resources
2. Energy transition and bio based economy
3. Digitalization of logistics
4. Additive manufacturing (3D printing)
5. Security
6. Knowledge intensive labor market
7. Further integration of supply chains
8. Increasing scale of transport
9. Sustainability
Globalization, demographic growth and natural resources

Further globalization and development of the world economy are expected to trigger growth in global freight transport

- Power (economic) is shifting towards Asia. Asia’s share of the world’s GDP is expected to rise to more than 40% up to 2030
- Asian dominance in world shipping is expected to continue to change towards the Asian continent
- Ports will link Africa to Asia, getting the right regulatory framework in place to attract Asian investors will become more important
- A mismatch will arise between supply and demand in fossil energy resources, ores, water, food and minerals; the flows of raw materials from Africa will increase
- The increasing scarcity of raw resources implicates geo-economics (corresponding trade routes and investments in infrastructure)
- Urbanization trend implies ports have to be stronger connected to the larger cities, high-speed rail link proposed between Johannesburg and Durban prime example
Energy transition and bio based economy
Will the port remain at the heart of the energy supply?

• The share of renewable energy is increasing and the efficiency of solar energy is rapidly increasing

• The number of hybrid and fully electric cars is growing; limiting the need for transportation fuels

• The amount of biofuels will increase, bio based chemical products will develop fast

• Importance of middle distillates and gas in fueling ocean and inland shipping will increase sharply

• The changing mix of fuels brings opportunities: new cargo flows such as LNG, biomass and

• It also implies threats: a decline in mineral oil products used as transportation fuels, and local energy generation for the port
Digitalization of logistics

The future is technology; technology will radically change the way logistics are organized

- Logistics are becoming more complex, therefore an increasing need to digitalize the information streams
- Digitalization will allow for optimization of current existing infrastructure, reducing the need to invest in additional infrastructure
- Possibility to eliminate unnecessary (empty) transport
- Data analytics and data exchange becoming a new comparative advantage for ports
- Self steering ships will become the standard
- The usage of sensors will replace the need for towing
- The usage of drones for inspection will increase efficiency
Additive manufacturing
3D printing potentially removes the need for shipping

• The size of the market, including 3D printer sales, materials and associated services, reached US$3.8 billion in 2014. The market is continuing to experience rapid growth, reaching US$16.2 billion by 2018. This represents an expected compound annual growth rate (CAGR) of 45.7% from 2014 to 2018

• 3-D Printing is already enabling some manufacturers to 'next-shore' and remove the need for shipping at all

• It is driving manufacturers towards the goal of zero-inventory

• It is going to transform the way that ships are supplied in the future – cargo streams will most likely differ: more shipment of raw materials rather than end products

• As trade patterns alter, new opportunities will emerge to service new manufacturing requirements to ship materials out for recycling and refurbishment
Security

The ability of hackers to remotely control port operations is the new “hole in the fence” of port security

• The use of various control systems and increasing automation in general in the port will reduce the risk of human errors and automation increases reliability of the system; limiting the number of delays

• However, technology also has a dark side: cybersecurity and cyber-resilience are becoming more important as a parallel development to automation

• Be prepared to deal with existing and emerging cyber threats from criminals, terrorists and enemy nation states that could shut down large pieces of the country’s critical maritime transportation system

• Drug dealers shut down IT security more easily

• This preparation is not just technological – it requires building a risk-aware culture
Knowledge intensive labor market

The war on talent is focusing on STEM profiles

• Knowledge and innovation will become increasingly dominant factors in determining the competitive strength of the port

• Science, Technology, Engineering and Mathematics (STEM) students will become more and more sought after

• Competition for skilled employees is increasing and as a result the (port) labor market will further internationalize in the next few years

• Western shipping companies facing this shortage of talent will look for Asia and Africa to secure their human capital

• Universities and port authorities in Rotterdam and Singapore are working together to secure talent potential

• Mismatch between high (youth) unemployment and lack of skilled workers is a social change
Further integration of supply chains
A chain is only as strong as its weakest link

• Connections to the hinterland are becoming the most important asset of a port
• The role of the port authority changes, from landlord to active participant in the supply chain
• Shipping companies, logistics providers, terminal operators are becoming more global and a few players is gaining market power; implying a stronger bargaining power
• Taking positions by the port authorities in foreign ports is becoming more common – port authorities become stronger players as well
• The port authority is taking the lead in putting together a common investment agenda – most ideally with large private players in the supply chain – for the required infrastructural improvements
• More and better insight into inventory status and transport flows will help companies to further optimize their supply chains and make them more flexible – the port authority of the future is assisting
Increasing scale of transport
Size and capacity of ships, trains and trucks is rapidly increasing

• The trend of increasing size of ships, trains and trucks is expected to continue in the next 15 years

• The largest vessels, such as the 22,000-TEU ships which are at the design stage, can only call at a limited number of ports

• Larger ships require more depth, wider docks, stronger quays and larger cranes

• Implementing major infrastructural projects typically takes 15 years

• Transshipment is becoming more structural, the need for cooperation with other ports increases to secure optimal transport
Environmental regulation becomes more comprehensive and more stringent

Ports could distinguish itself more clearly from other industrial locations by focusing on energy efficiency, recycling of residual materials and carbon capture, storage and reuse – therewith promoting itself in the global landscape.

The sustainable port, it’s not just marketing
Contact details
Please contact the authors if you require more information / additional insights

Sjors (George) Berns
Deloitte Real Estate | Deloitte Port Services | Deloitte Financial Advisory Services B.V.
Direct: +31 88 288 3206 | Mobile: +31 6 2078 9894
Deloitte | Orteliuslaan 982 | P.O. Box 3180 | 3502 GD Utrecht | The Netherlands
sberns@deloitte.nl, http://www.deloitte.nl

Jochem Dragt
Monitor Deloitte | Deloitte Port Services | Deloitte Consulting B.V.
Direct: +31 88 288 6187 | Mobile: +31 6 8201 9148
Deloitte | Gustav Mahlerlaan 2970 | P.O. Box 58110 | 1040 HC Amsterdam | The Netherlands
jdragt@deloitte.nl, http://www.deloitte.nl

Thomas van Bergen
Deloitte Real Estate | Deloitte Port Services | Deloitte Financial Advisory Services B.V.
Direct: +31 88 288 5828 | Mobile: +31 6 8333 0007
Deloitte | Gustav Mahlerlaan 2970 | P.O. Box 58110 | 1040 HC Amsterdam | The Netherlands
tvanbergen@deloitte.nl, http://www.deloitte.nl
Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee ("DTTL"), its network of member firms, and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as "Deloitte Global") does not provide services to clients. Please see www.deloitte.com/about for a more detailed description of DTTL and its member firms.

Deloitte provides audit, consulting, financial advisory, risk advisory, tax and related services to public and private clients spanning multiple industries. Deloitte serves four out of five Fortune Global 500® companies through a globally connected network of member firms in more than 150 countries bringing world-class capabilities, insights, and high-quality service to address clients’ most complex business challenges. To learn more about how Deloitte's approximately 244,400 professionals make an impact that matters, please connect with us on Facebook, LinkedIn, or Twitter.

About Deloitte China
The Deloitte brand first came to China in 1917 when a Deloitte office was opened in Shanghai. Now the Deloitte China network of firms, backed by the global Deloitte network, deliver a full range of audit, consulting, financial advisory, risk advisory and tax services to local, multinational and growth enterprise clients in China. We have considerable experience in China and have been a significant contributor to the development of China’s accounting standards, taxation system and local professional accountants. To learn more about how Deloitte makes an impact that matters in the China marketplace, please connect with our Deloitte China social media platforms via www2.deloitte.com/cn/en/social-media.

This communication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively the "Deloitte Network") is by means of this communication, rendering professional advice or services. None of the Deloitte Network shall be responsible for any loss whatsoever sustained by any person who relies on this communication.

© 2017. For information, contact Deloitte China.